

№CTOM-21 ИИ

**Federal State Budgetary Educational Institution higher education  
"NORTH-OSSETIAN STATE MEDICAL ACADEMY"  
Ministry of Health of the Russian Federation**

**Collection of guidelines in medical informatics  
for 1st year students Faculty of  
Dentistry**

Vladikavkaz 2023

Collection of guidelines drawn up in compliance with:

1. GEF VPO in the direction of training (specialty) "medicine", approved by the Ministry of Education and Science of the Russian Federation № 984 from 12.08.2020 y.
2. The curriculum for the specialty "medicine", approved by the Academic Council of Medical University SOGMA Ministry of Health of the Russian Federation.
3. Work program of the discipline Medical informatics.

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Approved at the meeting of the Central Committee of UMS

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# **Theme 1: "Standard software. Text editor Microsoft Word. Create, format and save the document to address the health problems "**

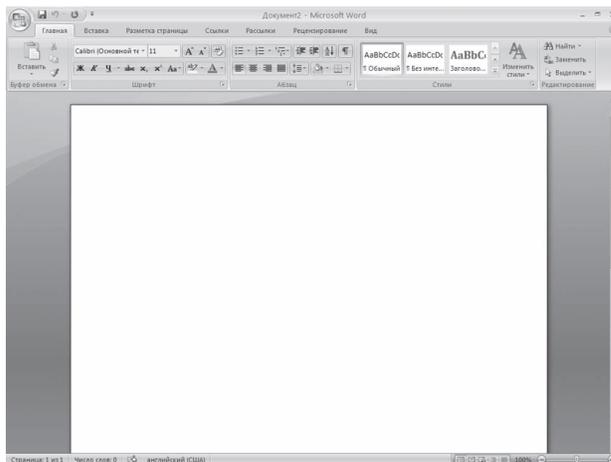
## **1. Scientific and methodological support of the theme:**

Automated Information Technology (AIT) text processing - one of the basic information technology. Virtually every medical specialist meets with the need to prepare those or other text documents (certificates, memos, reports, articles, letters, promotional materials, etc.). From the correctness of the documents and their design depends largely on the activities of any modern organization. The appearance and layout, along with the contents of the documents can tell a lot about the organization. They are a kind of measure of organization of information culture forming its image. Therefore, it is extremely important to fully own text information processing technology. The ability to issue the document in accordance with the demands placed on them is one of the criteria for expert assessment in any area. Efficient processing of textual information in MSWord Editor assumes knowledge of the basic rules of registration of the document text. These rules are well-established standards of business paperwork style. This standards such as: padding fields, point size, line spacing, choosing a size for headings and body text, etc.

## **2. Brief theory:**

### ***1. Interface elements word processor window.***

All the programs that are included in Microsoft Office package, have a similar interface. All programs have a working area, toolbar, main menu, the task pane.

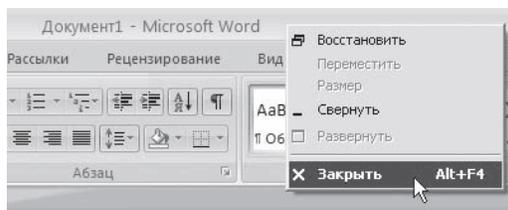


## 1.1. The title bar and the Quick Access Toolbar

The title bar at the top of Microsoft Word window. It shows the name of the program, it displays the name of the current file. If the document you are working on, is not saved, Document1 inscription (the serial number can be different) will be displayed instead of the file name. This is the name of Microsoft Word by default gives the created files.

When creating a new document in Microsoft Word, it is better to keep it well and give it a name.

The title bar also provides access to the menu.



This menu appears when you right-click on the title bar. With this menu command, you can move a window, resize it and, as you already know, close the program. Consider the team more.

- Restore - turns the document window if it is maximized.
- Move - command is available only if the program window is not maximized. When you select this command, the pointer changes the shape, and then you can move the window using the cursor keys (arrows)
- Size - the command is only available if the program window is not maximized.
- Close - minimizes the program window on the taskbar. Again, call the Word window, you can click on the button of the program on the taskbar.



**Pic.** Word button on the taskbar

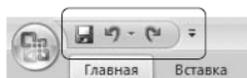
- Open - command is only available if the program window is not maximized. This command deploys Microsoft Word window to full screen.
- Close - this team is already familiar to you. It is used to close the program and the completion of its work.

Also manage the application window, you can use the window control buttons.



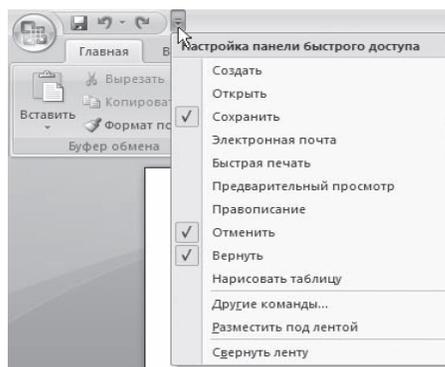
**Pic.** the window control buttons

In Word 2010, a new interface element - Quick Access Toolbar, which is located on the left side of the title bar.



**Pic.** Quick Access Toolbar

By default, the Quick Access Toolbar handed three teams: the preservation of the document, cancellation and refund action. You can configure this panel: add or remove a command. To do this, click **Customize Quick Access Toolbar** located on the right side panel.

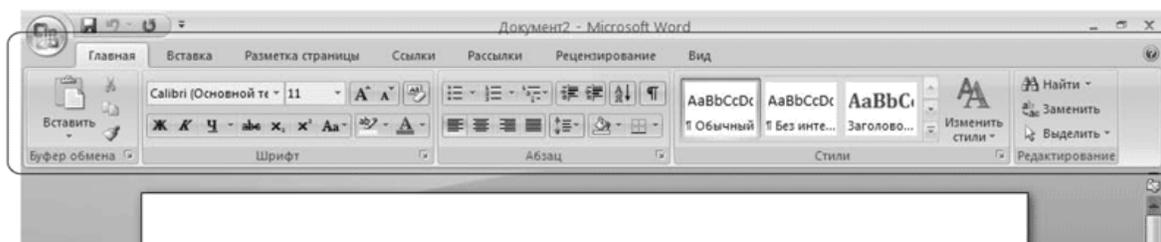


**Pic.** Setup Menu Quick Access Toolbar

## 1.2. Office button

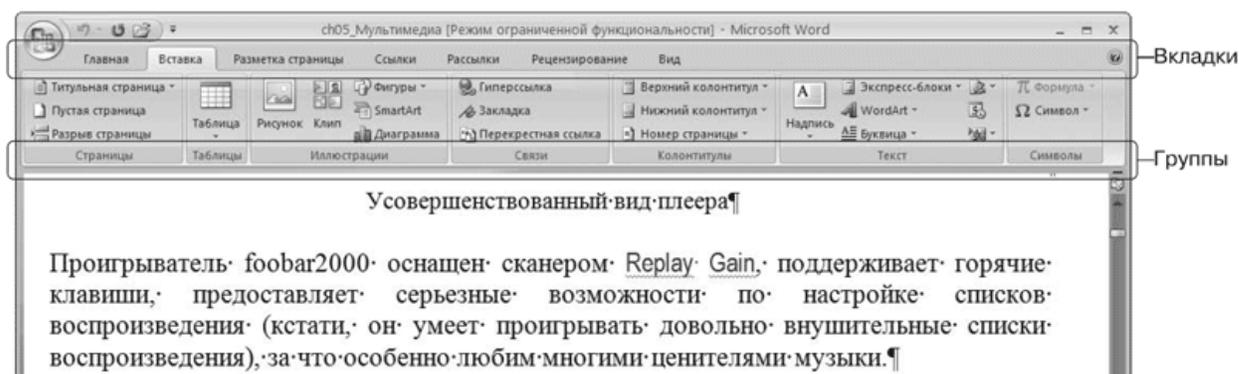
This menu contains the basic commands for working with files:.. Creating, opening, saving, closing a document, printing and its settings, etc. To the left of the names of some teams have an arrow when the mouse pointer on a command, it appears the sub-menu.





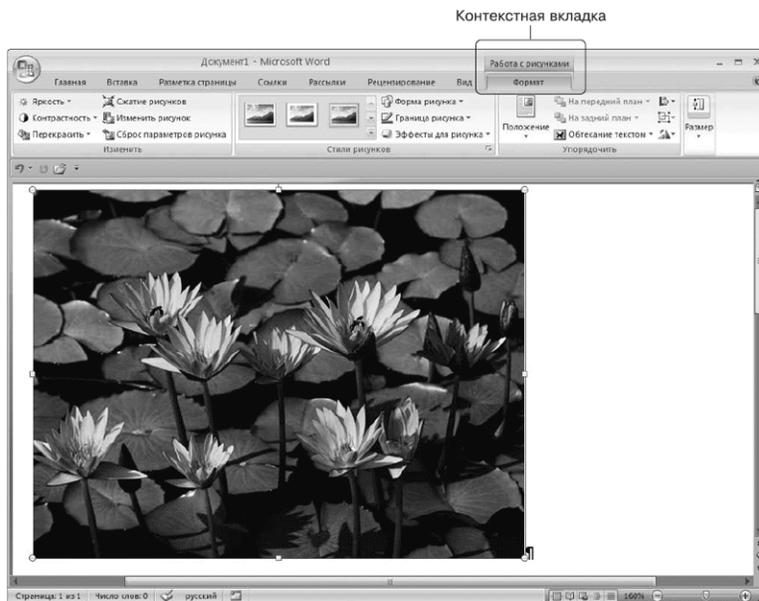
**Pic. Tape**

The tabs are located groups of buttons with different icons that provide quick access to program commands. On one tab there are groups that let you perform similar command. For example, to group pages is the Insert tab, Tables, Illustrations, Header and Footer, symbols, and so on. E., Allowing to insert the corresponding elements in a Word document.



**Pic. Tabs and Ribbon group**

When you select some elements (.. Illustrations, formulas, tables, etc.) on the tape there are additional tabs - context. They contain special tools to work with these elements. For example, the allocation pattern appears tab Picture Tools → format, which includes the tools to change the size, brightness, contrast, shape, borders illustration for specifying effects (for example, a drop shadow pattern) frames, determining the position in the text, and so on .



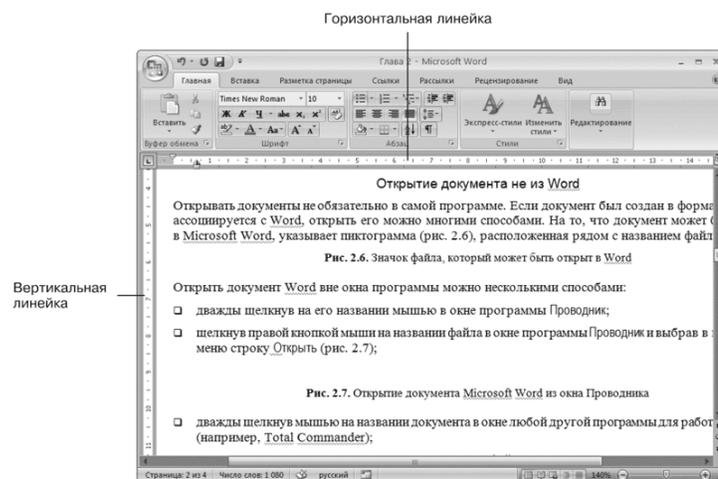
**Pic.** Contextual tab that appears when working with drawings

## 1.4. Scroll bars

The scroll bars (vertical and horizontal) are used to move the contents of the document.

## 1.5. Ruler

At the top of the stage have a horizontal line, and the left side - the vertical. You can use it to navigate to the text box to change the size and margins of the document.



**Pic.** Rulers markup

At the bottom of the window is a status bar.



**Pic.** Status bar

Each element of the status bar is a button:

Page shows the number of pages and the current page number.

Document Statistics shows the number of pages, words, characters, paragraphs, and lines.

Spell checking reports the document contains errors.

Language of the document defines the language for checking spelling.

View Modes provide the ability to view a document before printing the document in read-only mode as a web document, etc.

Document Scale Zooms in or out of the working area.

## **2. Entering and editing text**

The program window is a blank sheet on which the text is typed by keyboard input.

### **2.1. Text selection**

To perform many editing operations (copy, move, delete, and so on. D.) You must first select the desired portion of text. To highlight text used as a mouse and keyboard.

In addition to the mouse to highlight text fragments often use a keyboard. Move the cursor to the desired location while holding down the Shift key, you can select text with the mouse or use the arrow keys.

In addition to the above in Word, there are many ways to select different parts of the text:

- word - double click the mouse button;

- suggestions - click on any of its word while pressing Ctrl;
- one line - move the mouse pointer to the left of the page field and click once;
- several parts of the text - press and hold down the Ctrl key while selecting with the mouse.

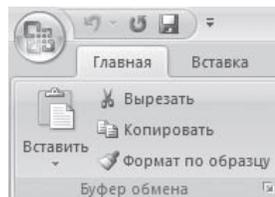
## 2.2. Basic Editing Commands

The basic editing commands are Cut, Copy and Paste. Normally, when editing the commands in the following order: Copy or Cut → Paste → Paste.

With these commands, you can move the parts of the text, quickly make copies of a document, and so on. D. Before you copy or move the text, it is required to allocate to show the program with which site you want to perform the operation.

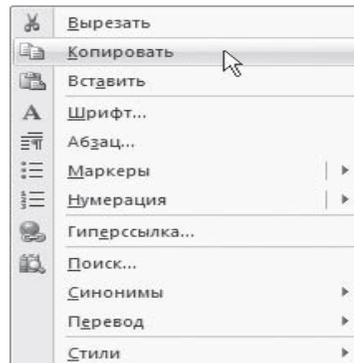
Copy or move text in several ways:

- using the buttons tab Clipboard group on the Home ribbon;



**Pic. Group Clipboard**

- the context menu that appears when you click in the text, right-click;



**Pic. Commands Cut, Copy, Paste from the context menu**

- keyboard shortcut: Ctrl + X - to cut; Ctrl + C - Copy; Ctrl + V - paste.

## THE MAIN OPERATION WHITH DOCUMENTS

| Operation   | keyboard Shortcut  | Call                            |
|---|--------------------|---------------------------------|
| Creating a new document                               | Ctrl+N             | Office → CREATE                 |
| Opening an existing document                          | Ctrl+O<br>Ctrl+F12 | Office → OPEN                   |
| Saving a document                                     | Shift+F12          | Office →SAVE                    |
| Save the document under a different name              |                    | Office → SAVE HOW               |
| The conclusion of the document to the printer (print) | Ctrl+P             | Office → PRINT                  |
| Preview the document before printing                  | Ctrl+F2            | Office → Preview the document   |
| Check the spelling of the document                    | F7                 | Reviewing →Spelling             |
| definition<br>Page Setup (printed sheet)              |                    | Page layout → Page settings ... |

### 3. Original text formatting

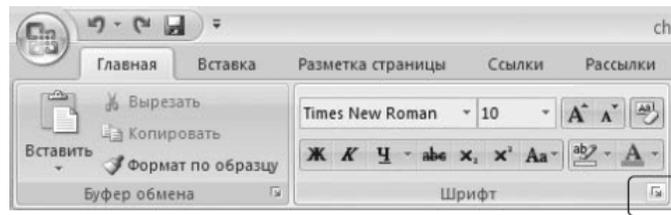
Word contains a lot of formatting tools, with which you can significantly improve the appearance of documents on screen and in print. Validity of the documents will facilitate the visual perception, and properly selected portions of text will indicate on what you need to focus.

#### 3.1. Font Settings

Formatting is carried out most frequently by changing font attributes. It has various attributes: font style (bold, italic, underline), the size (size), and Headset.

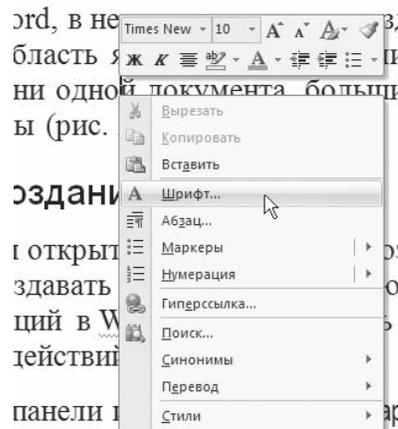
Parameters text decoration, which are relevant to the font, assembled on the Home tab of the ribbon and in the Font dialog box. To open it, do one of the following:

- Click on the button, which is located in the Font group of the Home tab on the Ribbon;



**Pic.** Opening the window Font button

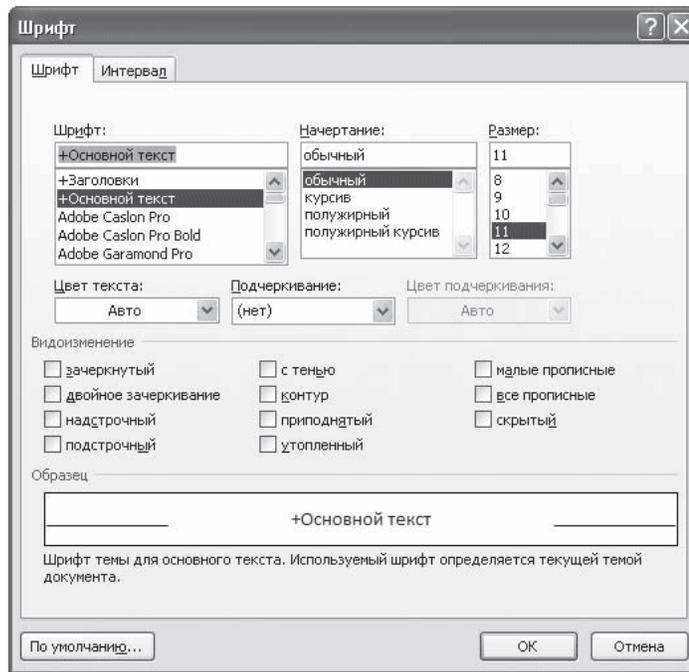
- press the key combination Ctrl + D;
- click Font from the shortcut menu.



**Pic.** Selection in the context menu of the Font menu

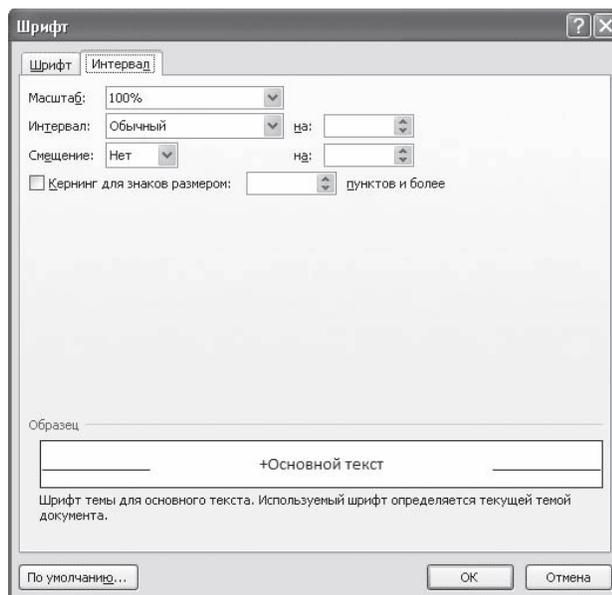
Font dialog box has two tabs: Font and Spacing. Consider the available options.

- Use the Font tab, you can choose the color of the text, change the font style (regular, italic, bold, bold italic), set the size and color of the character.



**Рис.** Font tab window of the same name

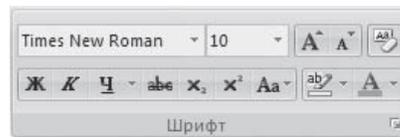
- Spacing tab helps to determine the distance between the text characters. Depending on the option selected font can be compacted, and the usual sparse. On the same tab you can select the scale at which symbols become wider or narrower (if more than 100%, the text is stretched, if less - compressed).



**Рис.** Tab Interval window font

### 3.2. Font group of the Home tab

Change the font settings is possible, using not only the Font tab of the same name of the window. In many cases, much more convenient to use tools Font group of the Home tab on the Ribbon.

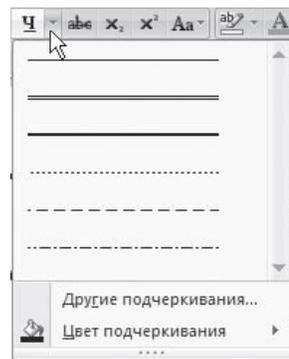


**Pic.** Font group of the Home tab

Use the Font group of buttons you can perform all the basic steps for registration of the text:

- change the font style - make bold, italic, underline, strikethrough.

If you click on the triangle to the right of the Underline button, you will see a list from which you can choose the type, thickness and color of the underline line.



**Pic.** The list of options underscore line

- Create sub-  and superscripts;
- modify register 
- highlight text , and set the font color .

If you click on the triangle to the right of the button, you will see a list of available colors.



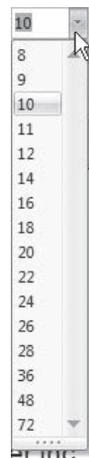
**Pic.** A list of available font colors

- Set the headset (type) font. The most common headset Times New Roman, Arial, Courier New;



**Pic.** List of Typefaces

- Select a font (size) font;



**Pic.** The list of font sizes

- increase  or decrease  the font size in increments of one point;
- clean the format, that is, clean design 

### 3.3. Paragraph Formatting

In the previous section, you were introduced to character formatting tools. In Word there are also special features for text formatting within paragraphs: alignment, line spacing and margins. Formatting Operations paragraphs, as well as with other parts of the text are made only after prior isolation.

### 3.4. Alignment

Alignment of text on the page - one of the most important formatting operations. Using alignment, you can, for example, put the header text in the middle of the page, and the signature at the end of the letter - to the right. Many novice users for such tasks repeatedly press the space bar, but with the help of alignment to control the placement of text on the page is easier, faster and more correct.

Align all text or individual paragraphs can be changed in several ways:

- using the corresponding buttons Paragraph group of the Home tab on the ribbon:

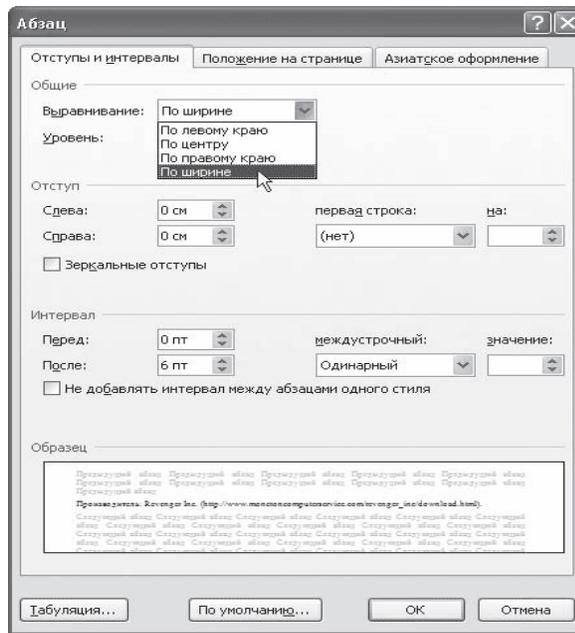
- Align Left 

- In the center 

- Align Right 

- Justify 

- Alignment using a list of the Paragraph dialog.



**Pic.** Paragraph dialog box, a list of Alignment

This window can be opened by clicking on the button to open windows in the Paragraph group on the Home tab, or by running the tape Paragraph pop-up menu that appears when you right-click anywhere in a paragraph.

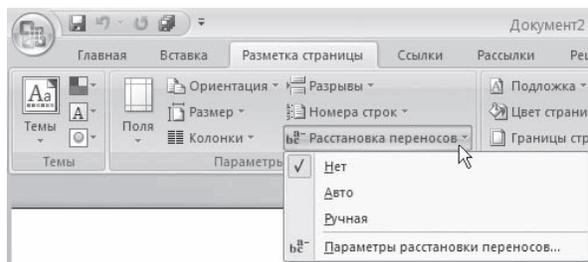


**Pic.** Paragraph window Call Button

### 3.5. Hyphenation

When aligning the width of the narrow blocks of text (eg, speaker) spaces between words may be too large. To avoid this, you need to hyphenate follows.

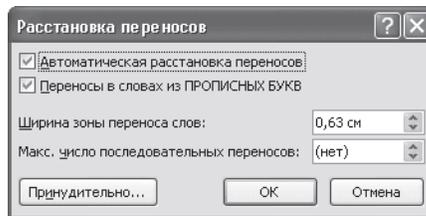
1. Click the Layout ribbon page. In the Page Setup group, click Hyphenation.



**Pic.** Hyphenation menu button

2. Vypolnite in Auto menu command. As a result, transfers will be placed automatically in the entire document.

3. If necessary, adjust the hyphenation settings in hyphenation, which opens the command menu options hyphenation hyphenation button.



**Pic.** Dialog hyphenation

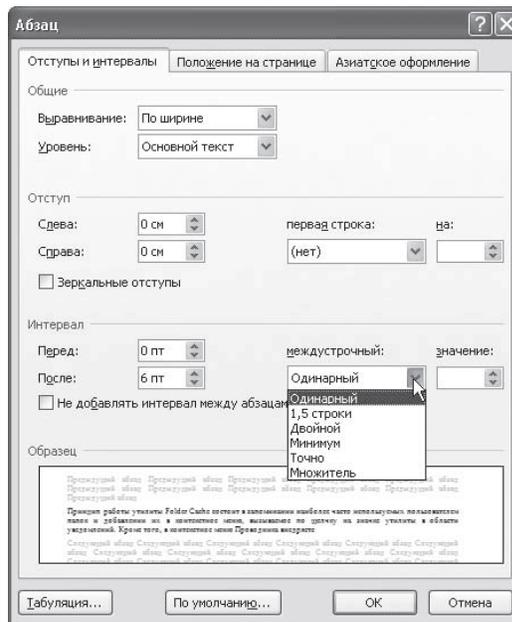
### 3.6. Interval

Line Spacing - the vertical distance between lines of text within a paragraph. By default, Microsoft Word uses single line spacing. However, depending on the type of document can be changed.

To change the interval, do the following.

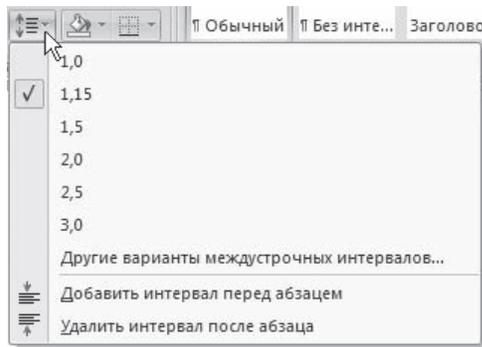
1. Open a window Paragraph by clicking on the appropriate button Paragraph group, and then click the Indents and Spacing tab.

2. Select an option in the list of interline interval.



**Pic.** The interval in the Paragraph dialog box

The most used intervals can be changed without causing the Paragraph window. To do this, you can use the Line Spacing button in the Paragraph group of the Home tab on the Ribbon.



**Pic.** List of buttons Spacing

### 3.7. Indents and tabs

Offset - the distance between the text and the left or right of the page field.

Adjust indentation can be manually using the horizontal ruler.

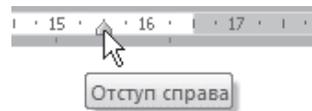
Padding can be divided into three types:

- Left Indent - sets the position of the entire paragraph with respect to the left margin of the page, use the marker to change it, illustrated in Figure



**Pic.** Marker left indent

- Right Indent - sets the position of the entire paragraph with respect to the right page margin, to change it, use the marker shown in the figure;



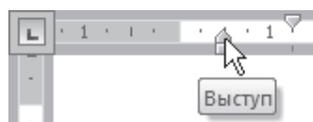
**Pic.** Right indent marker

- Indent the first line - determines the position of the first line of the paragraph, to change it, use the marker shown in Figure



**Pic.** Marker indent the first line

Along the indented projections can be used. Tab moves the text to the left from the original line of text at the same time it does not apply to the first line of a paragraph. To install, use the marker Promontory.

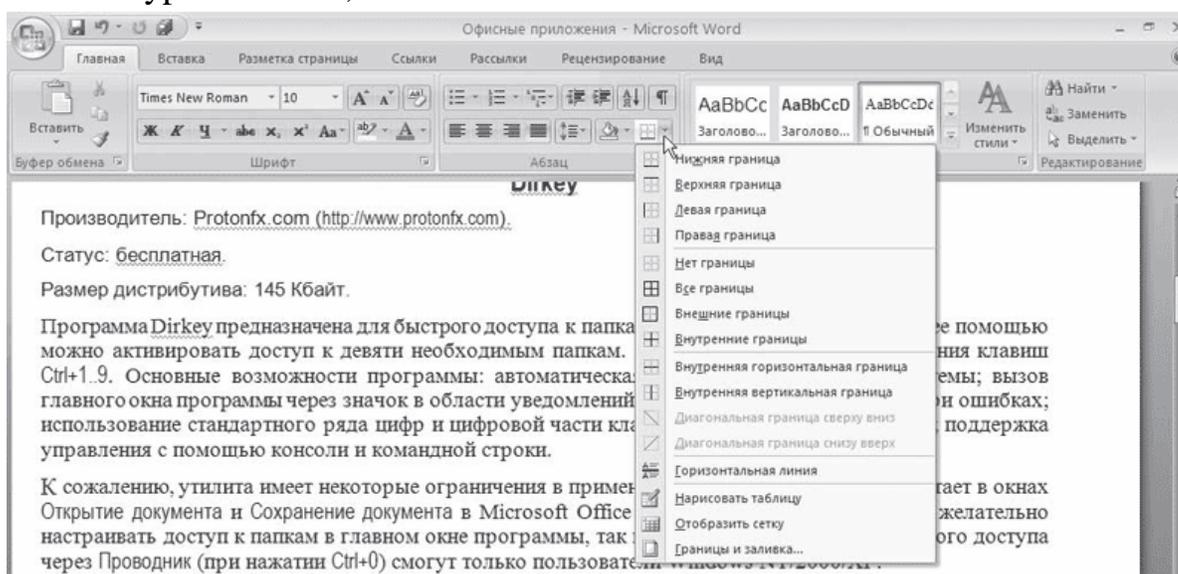


**Pic.** projection Marker

Adjust indentation and projections can not only using the horizontal ruler, but also in the Paragraph dialog box.

### 3.8. Text boundaries

To make text with borders, click the arrow button to the right of the type of border that is in the Paragraph group of the Home tab on the Ribbon and select the pop-up list of your preferred option. To remove borders, click the arrow button to the right of the type of border, and select from the menu There is no border.

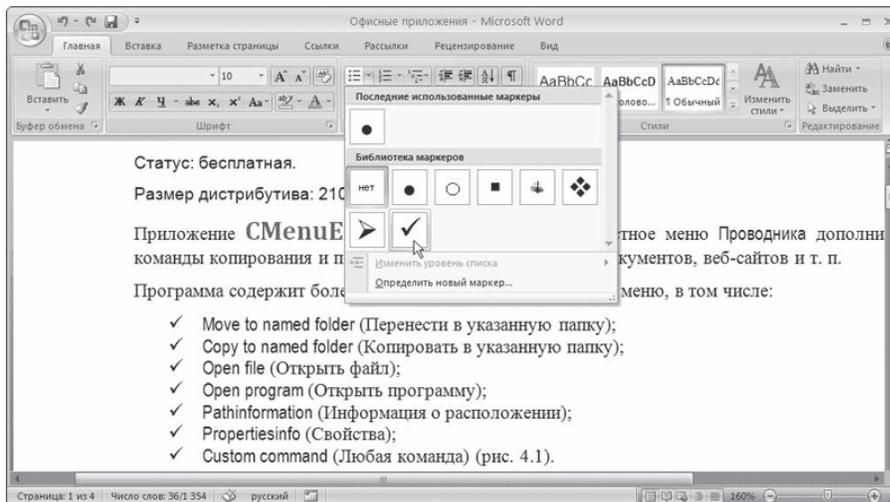


**Pic.** Types borders

### 3.9. Generating lists

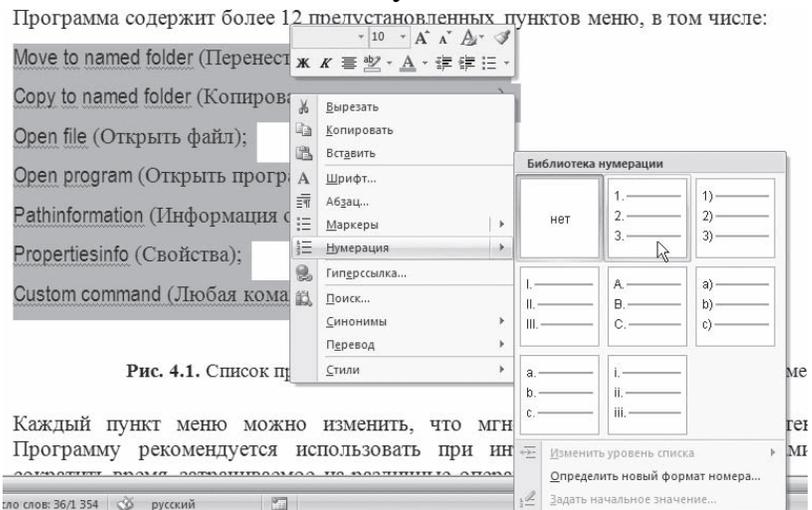
Very often it is necessary to allocate any part of the text visually (for example, when transferring). In this case, it makes sense to use bullets and numbering. Markers combine items related one theme. Numbered lists contain items follow one another. In addition, there are multi-level lists contain a nested lists.

To create a numbered, bulleted and multi-level lists, you can use the buttons Markers  Numbering  and Multilevel List  in the **Paragraph** group of the **Home** tab on the Ribbon. Simply click on these buttons, you will create a list with the last selected formatting. If you click on the triangle to the right of the button, you will open a list with the list of design options.



**Pic. Choosing Your list**

Numbered and bulleted lists can also be created using the Bullets and Numbering command context menu that appears when you right-click on the line next to the list or the selection of text that you want to issue a list.



**Pic. Create a numbered list from the context menu**

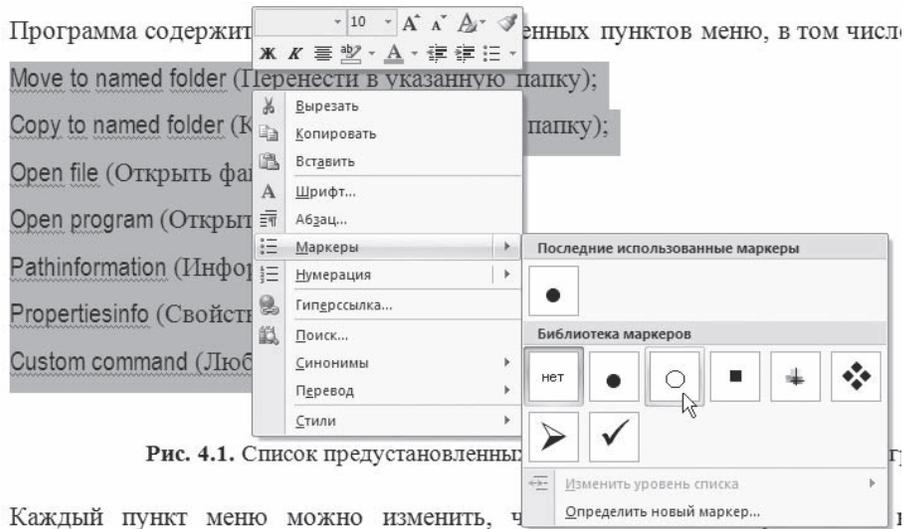


Рис. 4.1. Список предустановленных

Каждый пункт меню можно изменить, ч

**Pic.** Create a bulleted list using the context menu

To create the list, do the following.

1. Scroll to the desired portion of text.
2. Right-click and select the context menu or click on the appropriate button in the Paragraph group of the Home tab on the Ribbon.
3. Click on the desired type of marker.

#### 4. Tabulation of textual information

Tabulation of textual information is a way to offset the text within a paragraph by using the TAB key.

Pressing TAB приводит to the horizontal displacement of the cursor to input a certain distance to the right edge of the page. Default distance that moves the insertion point is fixed. However, it is possible to arbitrarily set the point of the cursor with the tab called tabulstopami or tab stops.

Tab stops are set for each paragraph or paragraphs of a group using the scale ruler or the Tabs button in the Paragraph group of the Home tab on the Ribbon. There are several types of tab stops defined by the alignment of the text method at the point of the paragraph.

| Type of position<br>TAB | Designation | Description  |
|-------------------------|-------------|--|
| with left-aligned       |             | the text that is entered in this tab stops will be left-aligned. |
| on the right edge       |             | the text will be aligned at the right edge                       |
| Central                 |             | the text will be aligned at the center of the tab                |

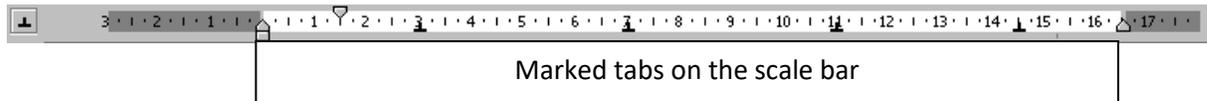
|             |   |  |
|-------------|---|--|
| with a dash |  | when you select the icon in the tab is inserted into a vertical bar. |
|-------------|---|--|

Current view of the tab set click on the button "Type tab stops."



To create a paragraph of the tab, you must:

1. to click the mouse on the scale bar
2. sign tabulstopa move by dragging to the desired position on the scale bar.

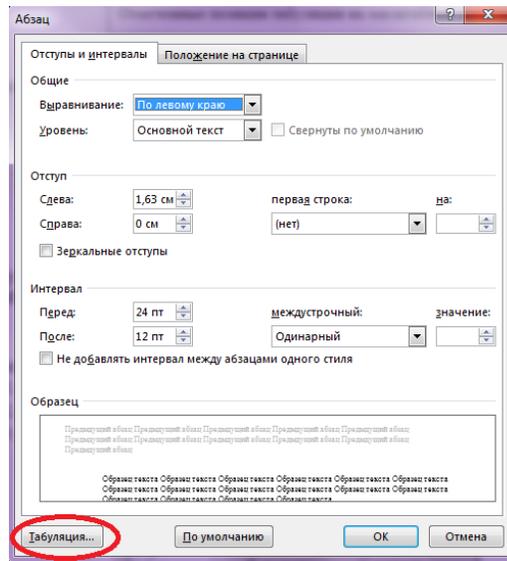


Now you can use the **TAB** key to change the cursor position and placement of the text information in certain positions tab. To remove individual items tab, drag the mark **tabulstop** beyond the scale ruler.

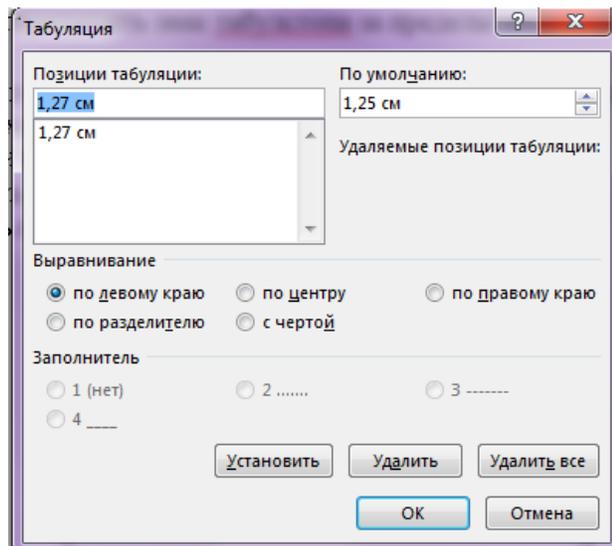
To remove all tab stops paragraph or group of paragraphs, you must:

Select the paragraph or paragraphs group.

1. Call dialogue Paragraph → Tabulation.
2. Click the Delete All button.



**Pic.** Tabs in the Paragraph dialog box,

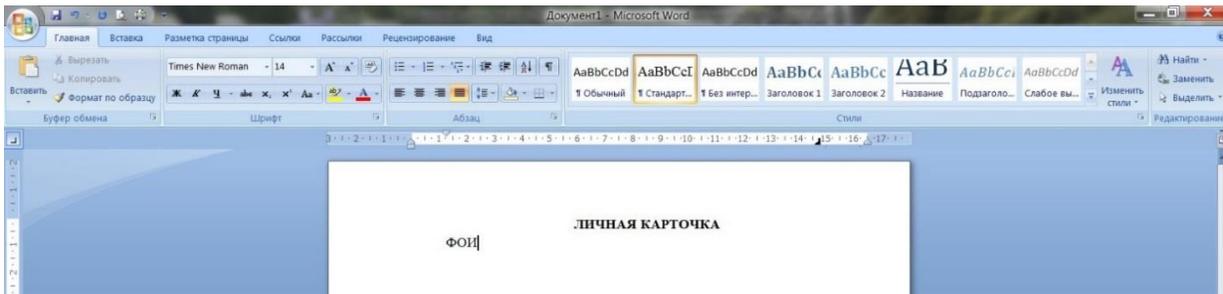


**Pic.** Tabs dialog box

Tab stops can also be used when creating lined forms where necessary to underline blank space where you want to enter text by hand.

For the horizontal line of the text field to the page you need to:

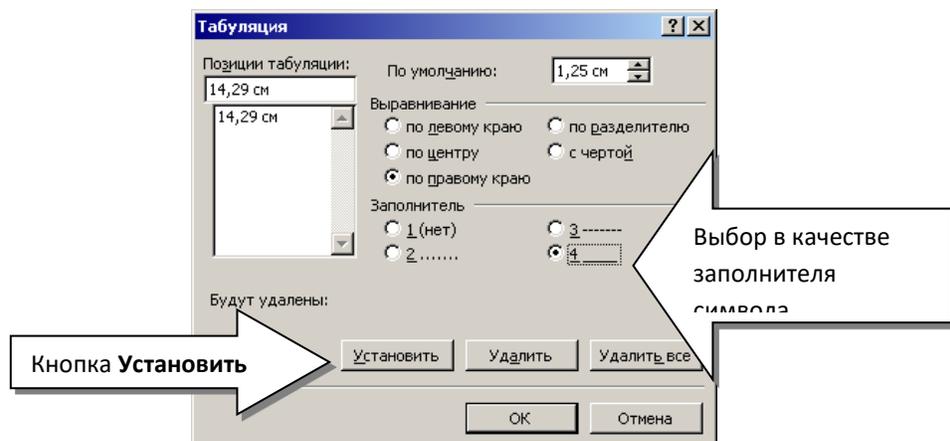
1. Enter the text and set tabulstop with right justified: after selecting the type of the tab click on the scale bar.



**Pic. Installing Tabulstopa**

2. Change the settings tab (Paragraph → Tabulation ...):

- In the section of the aggregate select 4 as shown figure;



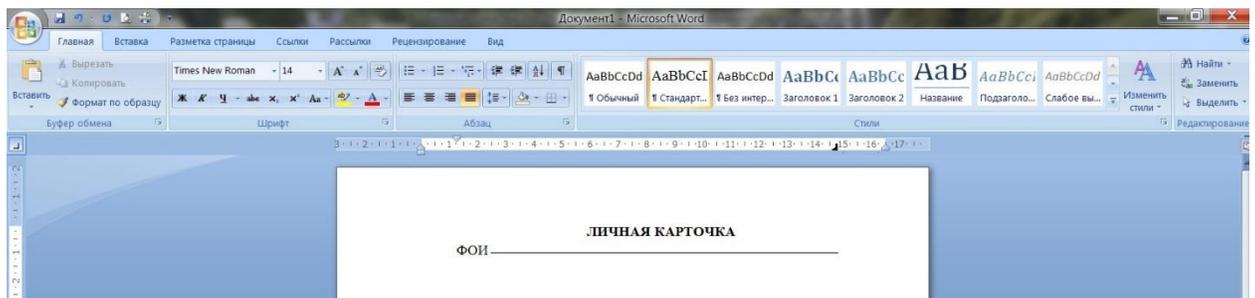
**Pic. window Tabs**

The dialogue involves the installation tabs manually, if it is known beforehand the distance from the page margin to the tab stop in centimeters.

Section alignment is designed to set the alignment of the text in the tab. Filler section allows you to fill the space on the edge of the page or the previous tab stop by symbol.

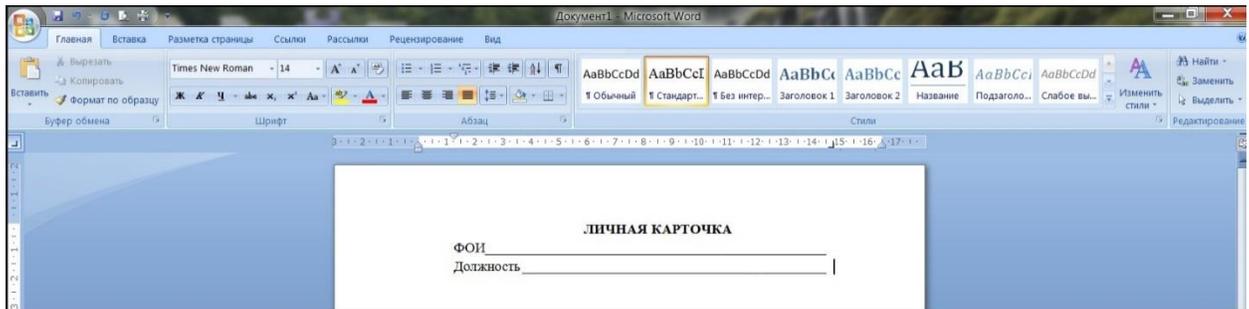
- Press the Set button.

After clicking Ok button, we get.



**Pic. Inscription line with a tab**

Now, while continuing to test the input in order to carry out horizontal holding will need only to press the TAB key. So, if you press Enter, enter the test "position" TAB, you get:



**Pic.** Inscription line with a tab

### **3. The purpose of activity of students in class:**

#### **The student should know:**

1. The structure of the main window of the text editor MS. Basic operations for the text.
2. Key shortcuts.
3. How to change the font of text.
4. How to change the parameters of a paragraph.
5. How to set boundaries.
6. The principle of the tool tabulation of textual information.
7. How to create and delete the tab.
8. How to increase or decrease the length of the line using the tabulation

#### **The student should be able to:**

1. Possess basic tools for text processing.
2. Leverage the tabulation of textual information tool, to ensure the stability of supply of textual material in a changing formatting.
3. Create lists.
4. Set the text border.
5. Typing in text editor MSWORD primary formatting for a specified period of time (15-20 minutes).

### **4. Learning content:**

1. Interface elements word processor window.
  - 1.1. Tape

- 1.2. Office button
- 1.3. scroll bars
- 1.4. ruler
- 1.5. Status bar
2. Entering and editing text
  - 2.1. Text selection
  - 2.2. Basic Editing Commands
  - 2.3. Original text formatting
  - 2.4. font Settings
  - 2.5. Font group of the Home tab
3. Paragraph Formatting
  - 3.1. alignment
  - 3.2. hyphenation
  - 3.3. Interval
  - 3.4. Indents and tabs
  - 3.5. text boundaries
  - 3.6. Generating lists
  - 3.7. multicolumn text
4. Tabulation of textual information

**5. The list of questions to test the level of knowledge:**

1. What is the unit of text data?
2. List the main interface elements MS Word window?
3. What is the Ribbon?
4. What change the font of the text?
5. How to change the paragraph?
6. What is the style of the document?
7. List the basic operations with the text?
8. How do I create a list?
9. How to draw a horizontal line using the Tabs tool?

**6. The list of questions to check the final level of knowledge:**

1. Describe the process of creating a new document and save it.
2. Describe the process of formatting text.
3. Describe the paragraph formatting process.

4. Describe the process of creating a horizontal line using the tools tab.
5. The process of creating the list.
6. How to cause a preview mode of document?
7. How do I output the document for printing?

**7. Establish document, collect and format the following text, in accordance with the sample. Casting Time: 20-30 min.**

### **LIST OF SYMBOLS AND TERMS**

1. CT scan (CT), (CT) - X-ray computed tomography
2. MRI (MR, MRI) - Magnetic resonance imaging
3. XA - digital subtraction angiography
4. RF - digital radiography (eg myelography)
5. MRA- magnetic resonance angiography
6. CTA - radiopaque computed Angiography
7. MR diffusion - a special MRI program based on the ability of the diffusion process to influence the processes of MR relaxation. It is used for in-depth study of pathological processes such as violations of cerebral circulation, inflammatory central nervous system diseases, neoplasms of the central nervous system.
8. MR and CT perfusion - special methods of CT and MRI, allow to study the parameters of cerebral blood flow.

### **Employee card**

Surname \_\_\_\_\_  
Name \_\_\_\_\_  
Middle name \_\_\_\_\_  
Paul \_\_\_\_\_ Year of birth \_\_\_\_\_  
Education \_\_\_\_\_  
(Incomplete secondary, secondary, tertiary)  
Position \_\_\_\_\_  
\_\_\_\_\_

**8. Independent work of students:**

According to the textbook will learn the basics of creating, editing, and formatting text files in MS Word 2007 text editor.

**9. Hronokarta training session:**

1. Organizing the time - 5 minutes.
2. Monitoring of knowledge - 30 min.
3. Analysis of the theme - 20 min.
4. Practical work - 30 minutes.
5. Wrap-up sessions - 10 min.

**10. A list of textbooks for the class:**

1. AN Stepanov Computer science. Textbook for high schools. 4th izd.g. St. Petersburg, Peter., 2006;
2. Esaulenko IE, Semenov SN Basics of practical informatics in medicine; Voronezh, 2005;

## **Theme 2: "Standard software. Text editor Microsoft Word. Tables, formulas, page breaks for solving medical problems "**

### **1. Scientific and methodological support of the theme:**

To develop and consolidate the skills to work with tabular data in Word.

A significant portion of the text information compiled information organized in tables (table information). Organizing information in tabular form provides a way of presenting information in which information is grouped according to certain characteristics, and is located in the network structure. The unit of this structure is a cell.

The cell is a container for placing textual information.

Many new users after the creation of the grid of the table immediately begin to change the width of columns, and merge and split cells. This is - the wrong approach, leading to an increase in table creation time. You must first enter the information in the table header and in its information part, and only then deal with the change in the width of columns, and the rest of the table formatting.

### **2. Brief theory:**

1. Create a table structure.

A significant portion of the text information compiled information organized in tables when the information is grouped according to certain characteristics, and is located in the network structure. The unit of this structure is a cell.

The cell is a container for placing textual information. You can select the following operations with cells:

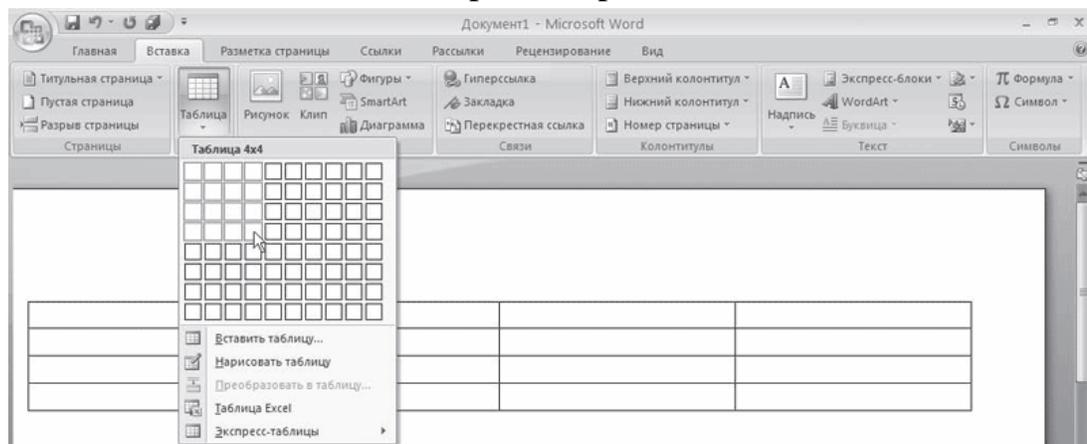
1. Entering data into a cell.
2. Editing information in the cell.
3. Remove the information in the cell.
4. Copying and moving information from one cell to another.

5. Copy and delete cells.
6. Consolidation and separation of cells.
7. Format cells.

Table terminology text processing technology is a form of a rectangular lattice structure consisting of a number of cells containing text information or designed to contain text information. The number of rows and columns in the table reflect its dimension.

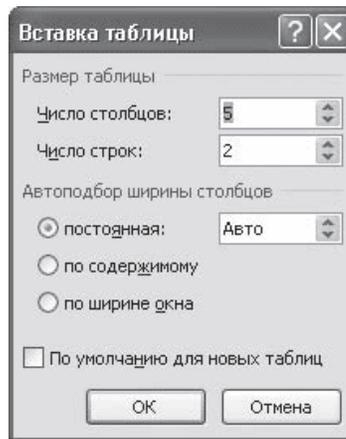
Working with the table usually begins with its creation. To create a table in Word 2010, use one of the following methods.

- Click on the Insert tab, in the Tables group, click Table button. the mouse pointer to select the number of columns and rows. In the document at the point where the cursor will draw a table with the specified parameters.



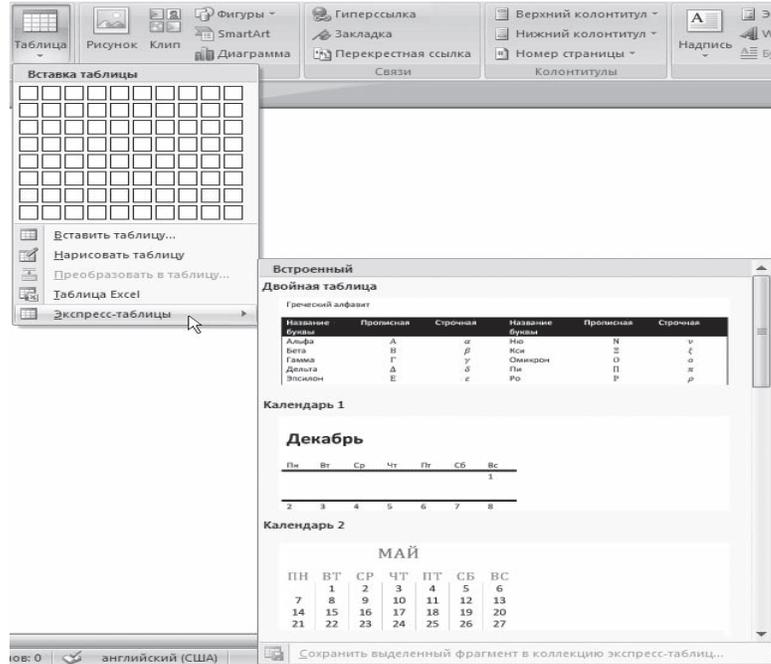
**Pic.** Select the number of rows and columns in a table

- On the Table menu button, click Insert Table. In the Insert Table window that appears, choose the number of columns and rows, and then click OK.



**Pic.** Insert Table window

- Use a blank table from the list of rapid tables. The list is in the Table menu button. To insert a table into the text, just click on its image in the list, then fill in your data table.



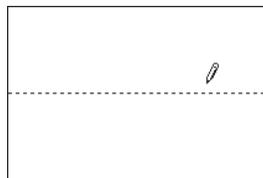
**Pic.** List of express tables

Type in your document where you want to insert a table, the signs "+" and "-" and press Enter. For example, to create a table of three columns, enter + \_ + \_ + \_ +. Please note that such harvesting must necessarily end with a plus, otherwise the table will not be created.

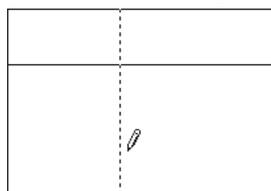
- Create a table manually using the Draw Table command in the Table menu button. When you click Draw Table, the pointer changes to the pencil shape . First, create a table shape, and then draw horizontal and vertical lines.



**Pic.** Create a table, stage 1



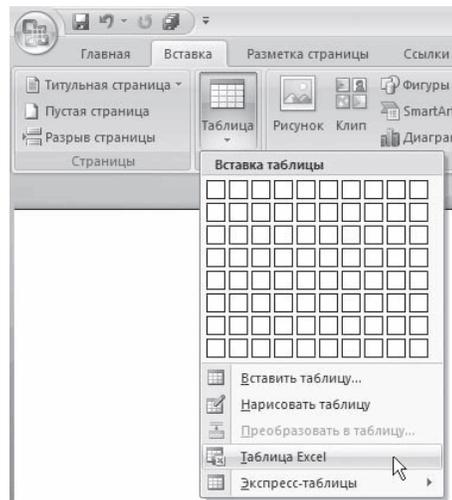
**Pic.** Create a table, stage 2



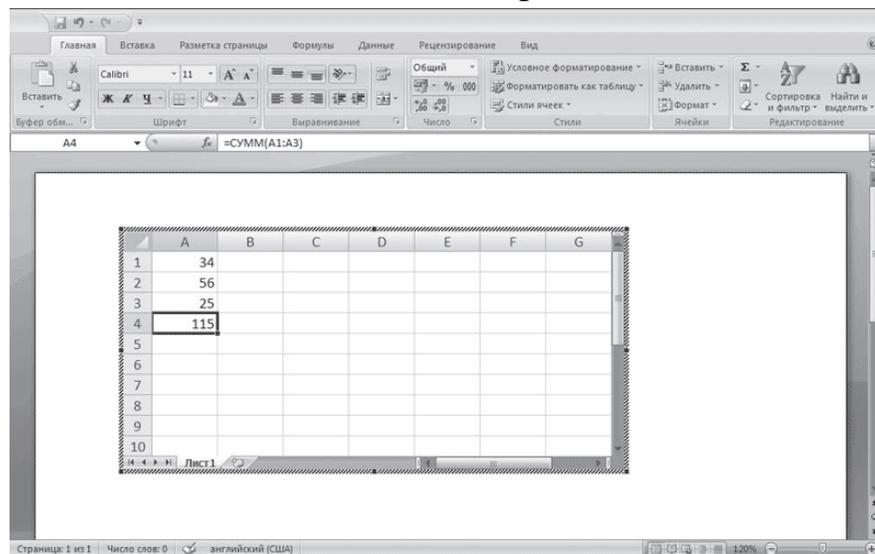
**Pic.** Create a table, stage 3

When you draw a table on the tape will be two contextual tabs - Working with Tables → Designer and the Table → Layout (for details on these tabs, see below). Use the tab Work tables → constructor can change the type and width of the lines in the drawing. In addition, using the Eraser tool, you can remove the drawn lines. After creating the table press the Draw Table tab of the Table Designer → or press the Esc key.

- Use the command Table Excel Table button, insert a Word document Excel spreadsheet. In the Word document, Excel spreadsheet cell will be displayed, and Excel commands appear on the tape to a spreadsheet. In a cell, you can enter data, perform operations on them, using Excel capabilities. Then you need to click on the empty space outside the cells, and the table is inserted into a Word document. In this case the table will be inserted into a single object. For her editing will need to double-click on it to Excel team reappeared.

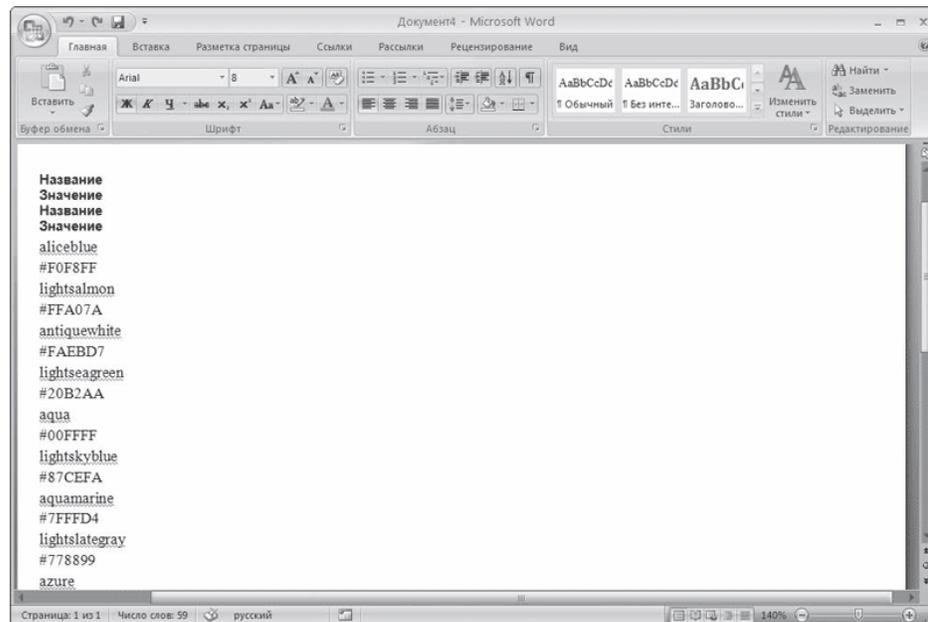


**Pic.** insert command in Excel spreadsheet document

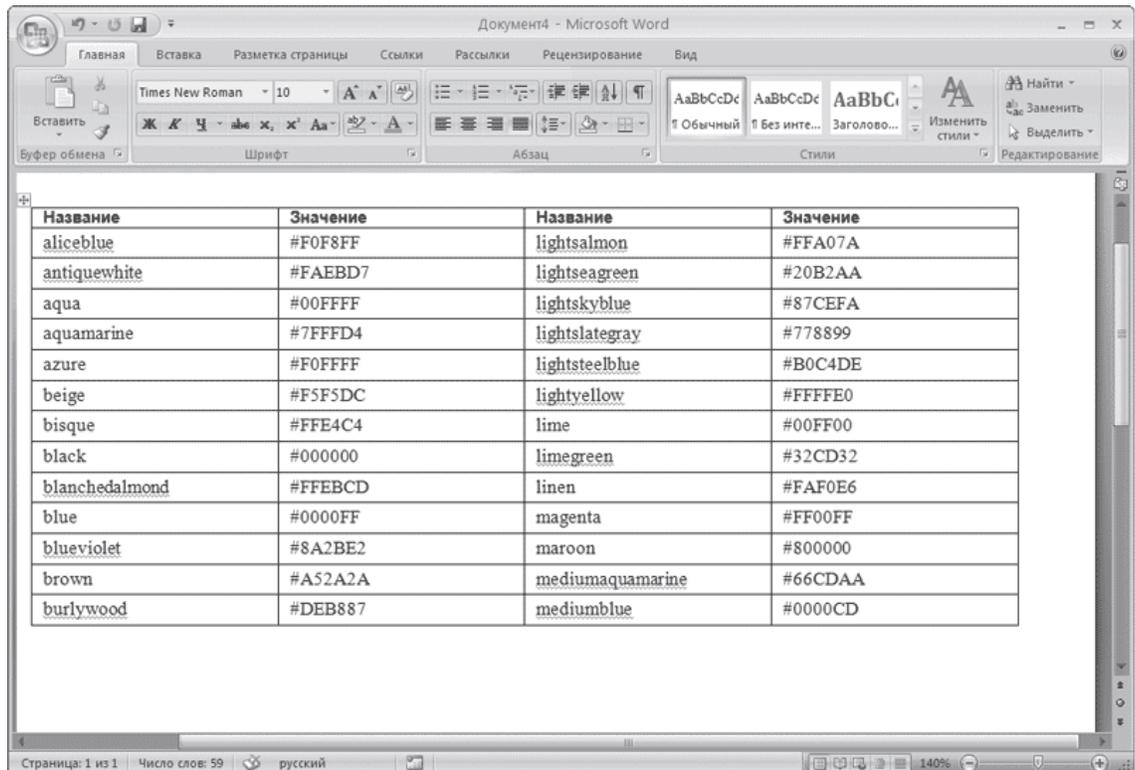


**Pic.** Inserting Excel Word document tables

Convert text into a table. The text, which will occupy a single cell, must be separated from the text, which will take another cell, some delimiter (such as a tab or indent). Highlight the text, go to the Insert ribbon, click Table, and then click Convert Table. This will open the corresponding window. Enter in this box the number of columns (number of rows at the same time will be set automatically), set the delimiter that was used when typing, and then click OK. The resulting text is converted into a table.



**Pic.** The text that you want to convert to a table



**Pic.** Text converted in table

## 2. Editing tables

For table editing operations include both actions that can be performed with the text in the cells, and a table of the elements - the rows, columns, borders. When you select a table on the tape there are two contextual tabs - Working with Tables → Designer and the Table Tools Layout → that contain special tools for editing table.

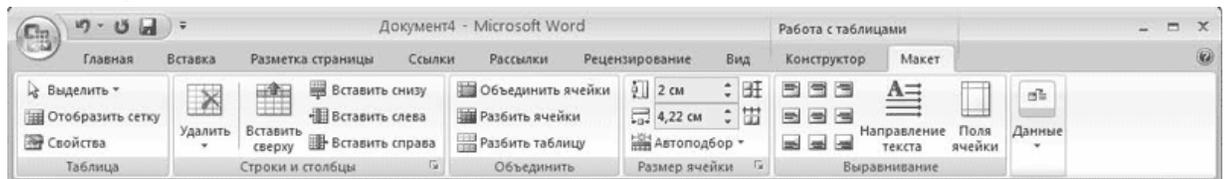
## 2.1. Edit text in a table

Jobs with the text located inside the table, almost no different from working with regular text. For data tables, you can install any formatting, use the usual editing commands. To move between the cells using the Tab key, the cursor keys or mouse.

To delete the text inside a table, select the table and press the Delete key.

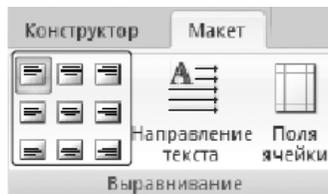
The text inside the table, has its own characteristics. For example, it can be set in any direction as follows.

1. Place the cursor in the cell, the text of which is to change the direction, or select the desired portion of the table.
2. Click the Table Tools Layout → tape.
3. Press the direction of the text alignment in the group as long as the text does not take the right direction.



**Pic.** Button Text direction

In addition, the text can be aligned in the cell relative to the cell borders: top left, top center, top right-aligned, centered, left justified, etc. This can be done by a group Alignment tab buttons Working with Tables → Layout.. tape or command submenu Align cell context menu that appears when you right-click on the text in the cell.



**Pic.** Buttons to align text in table cells

## 2.2. Changing the size and position of the table

To edit the spreadsheet using movement and change markers. move marker appears in the upper left corner of the table when you hover the mouse pointer over the table, or click on a table. It has the shape of the cross in the frame. If you click on it and hold the mouse button, draw, the table moves.



**Pic.** Marker moving table

Clicking on the marker move, you can quickly select the entire table.

Marker resize a table appears in the lower right corner when the mouse pointer is within the table. If you click on the marker changes the size of the table and pull some distance, the table will resize. In this case all of the columns and the cell will change proportionally.



**Pic.** Marker resize a table

### 2.3. Selecting a table

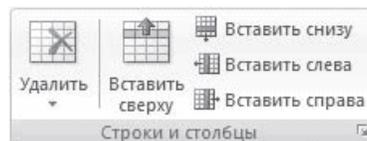
To select a row or column of the table, use one of these methods:

- Highlight the desired areas on the table cells, pre-press and hold the left mouse button;
- Move the pointer to the left margin or the upper border of the column, and then click the mouse button.

Often, if the table is located on multiple pages, select with the mouse the desired cells is very difficult. In this case, as when working with text outside a table, you can select the desired area by holding down the Shift key and moving the cursor with the keys ↑ and ↓. If you have a mouse with a scroll function, you can do the same much faster: the Shift key will replace the left mouse button, and ↑ and ↓ - scroll wheel.

### 2.4. Adding and deleting table elements

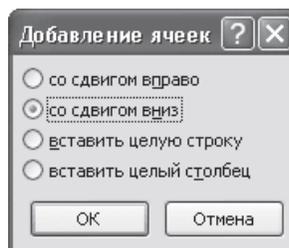
When editing the table, it is sometimes necessary to add additional elements to it - the rows or columns. To do this, select a number of rows or columns which you want to add. Then go to the tab Table Tools → Layout ribbon in the group of rows and columns, click the appropriate button: Insert the top, bottom Insert, Insert Left or Insert Right.



**Pic.** Group rows and columns tab Table Tools Layout →

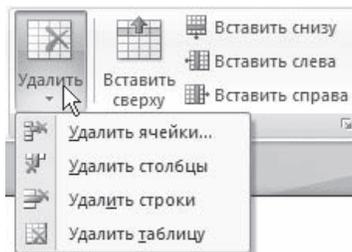
Another way to add items to the table - a window Adding cells. To use it, click the button located in the lower right corner of the row and column groups. In the

window that opens, specify how to generate the insert: a shift to the right; downward shift; insert an entire row; insert a column.



**Pic.** Window Adding cells

To remove items in the table to highlight what you want to delete, and use the Delete menu, which is in the group of rows and columns in the tab Table Tools → Layout ribbon. You can use this same menu to delete the entire table.



**Pic.** Menu button Delete

To remove a selected item, you can also perform the appropriate command from the context menu.

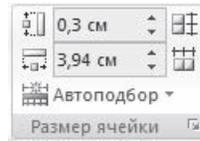
## 2.5. Changing the size of the table of elements

Column width and row height can be changed in several ways. The easiest ability with the mouse. To do this, move the pointer to the right border of the column or row to the bottom border. When the pointer changes to a double line with arrows pointing in opposite directions, move the border of a column or row to the desired location, without releasing the mouse button. In this case the dotted line will show where the new border will be installed.



**Pic.** Setting the table border

If you want to specify the exact value of the width or height of a cell, you can use the fields group Cell Size tab Table Tools → Layout on the tape.

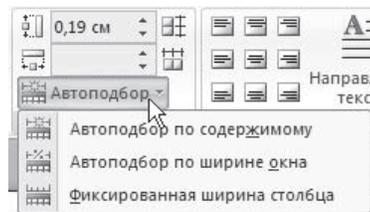


**Pic.** Group Cell Size

## 2.6. AutoFit Column Widths

When working with tables, you must pay attention to one detail: the column width is typically too small for the text, so the program moves it to the next line, which is often not necessary. Determine in advance exactly how much space you will need, it is very difficult. This is what the AutoFit command. To use it, do the following.

1. Select the table.
2. Click the Table Tools Layout → tape. Click AutoFit.



**Pic.** Menu Auto Fit button

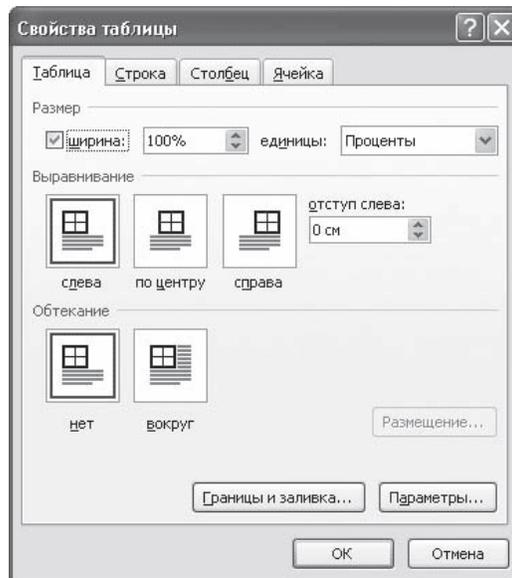
3. Select the desired option:

Autofit the contents - the column width is increased or reduced in accordance with the contents of the cells;

Auto Fit on width of the window - this option can be used if the table has moved beyond the page, or if you want to make the table width equal to the width of the work area.

## 2.7. Table properties

In Microsoft Word 2007 provides a very convenient feature set combined in the Properties window of the table. It can be opened by right-clicking anywhere in the table and with the command Table Properties or by clicking the Properties button in the Table group on the Table tab → Layout ribbon.



**Pic.** Table Properties Window

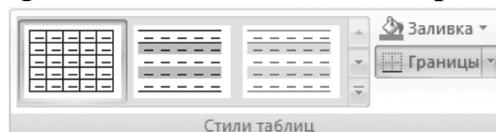
In the Table Properties dialog box, you can define the following parameters:

- the location of the table in relation to the text;
- borders and shadows;
- parameters of each column and row of the table;
- the location of the text in a cell.

## 2.8. table Styles

If the design table for you is not easy, or you simply do not have enough time to format the table, you will surely appreciate the presence of special stylesheets. With their help, you can create beautifully designed table in a matter of seconds. You will be able to quickly pick up the style of the table, create your own version of registration or a little change is available.

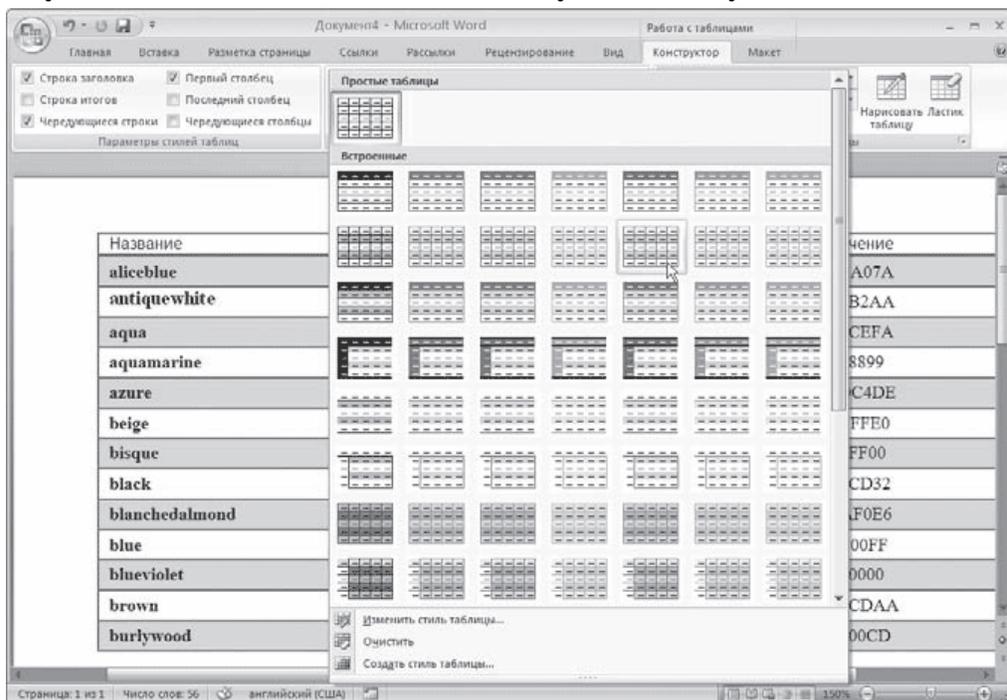
Table styles are on the Table tab → constructor in the Styles group tables. By default, the screen shows several styles (their number depends on the screen resolution). For a full list of styles, click open the dialog box Additional parameters, which shows an arrow pointing down. You will see a complete list of styles.



**Pic.** Group Table styles

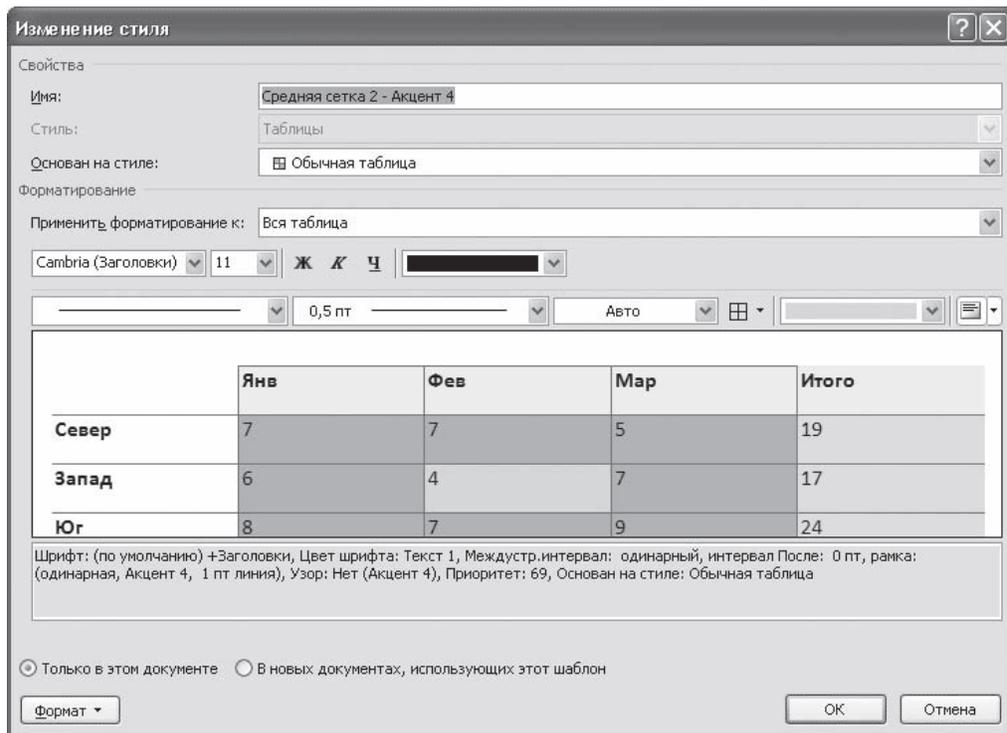
When you hover the mouse pointer over the sample style sheet in the document immediately takes the selected design. To confirm the selection of style, click its sample.

Word offers about a hundred automatic formatting options for different types of tables. If you can not find a suitable option, you can create your own. To create a style based on your table selected, use the Edit Style menu stylesheets.



**Pic.** Choosing a style sheet

In the window that appears, you can select the style Change style, line color, fill, typeface, font size of the text, and others.



**Pic.** Window Style Change

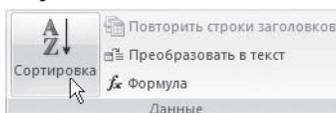
To create a new table style, use the Create style menu style sheets. A window Creating a style similar to the style of the window Change. In this window, you can also specify the type, line color, fill, typeface, font size of text, etc.

## 2.9. Sorting data in a table

Sorting data - this is one of the most important commands for the organization of the table. The objective of sorting is often the ordering of records based on the selected criteria. sorting is often used, if the data in the table are gradually recruited, and each recording was made just one line below. Find information in this table is very difficult, sorting application helps streamline data.

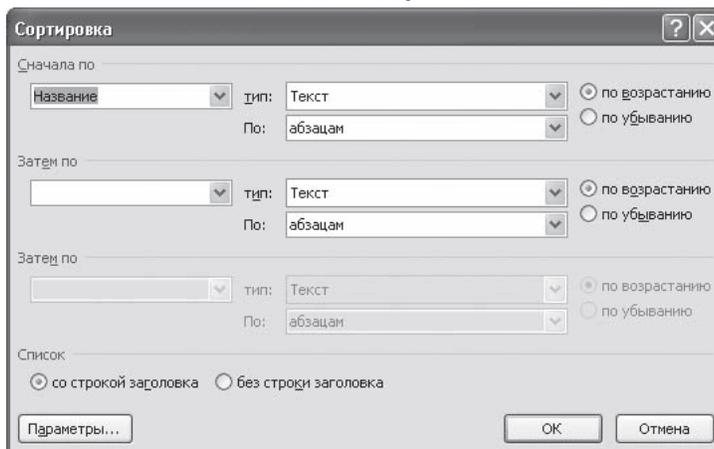
To sort the data in the table, do the following.

1. Select the columns to sort or place the cursor in the table, if you want to sort the column completely.
2. Click the Table Tools → Layout, click the Details button and click Sort.



**Pic.** data Group

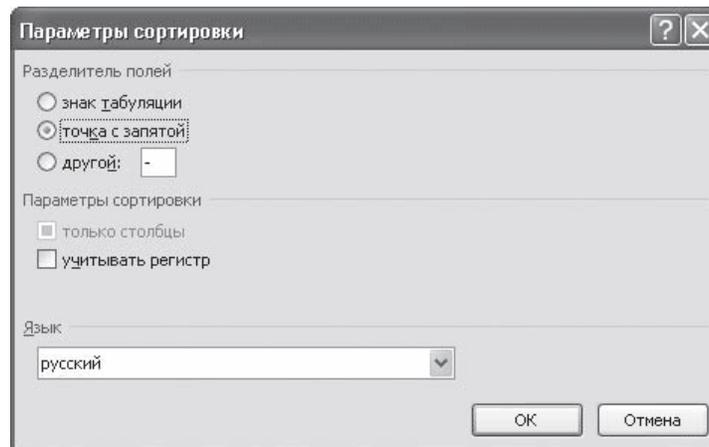
2. In the Sort dialog box, select the column on which you want to run the table to sort the list by first. Columns are listed by name on the left to the right.



**Pic.** Sort window

4. Select the sort type of data: text, number or date.
5. Set the sort order: ascending or descending order.
6. If necessary, set the parameters for a secondary sort on the second and third columns.

7. If you want to sort in which will take into account the case of letters, press the Options button and check the box in case-sensitive collations.



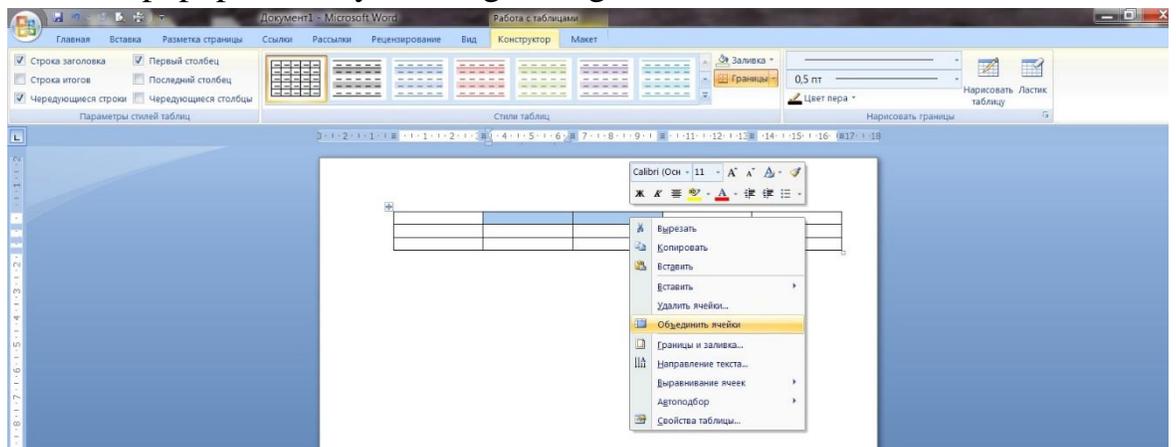
**Pic.** Window Collation

8. Click OK, to confirm the selected collation.

## 2.10. Merge cells and setting the table.

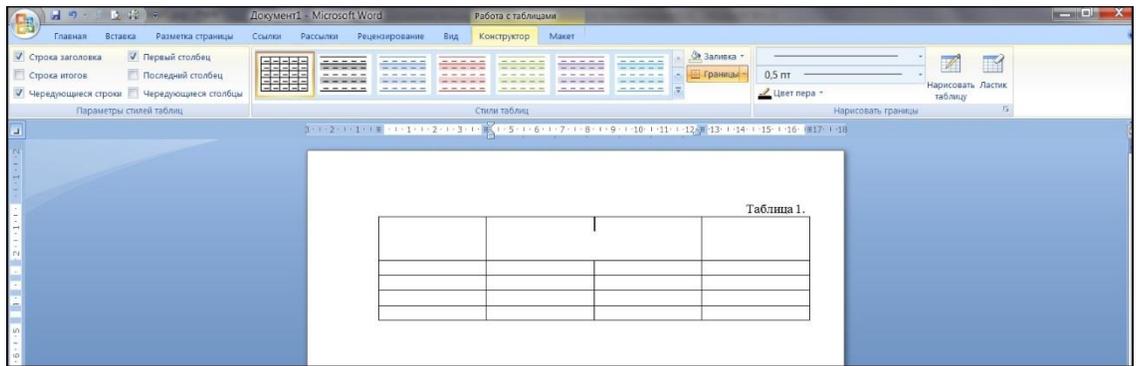
To merge cells should:

- Select cells;
- Call the popup menu by clicking the right mouse button;



**Pic.** Merge cells.

Select the Merge Cells and clicked on the left mouse button;

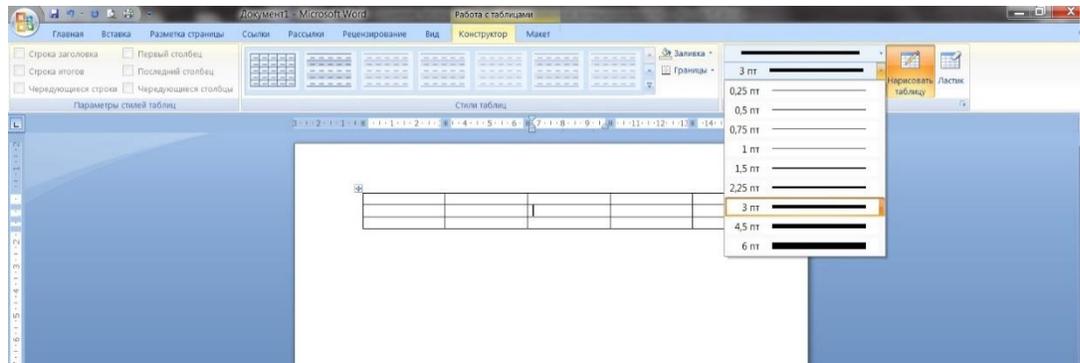


**Pic.** The result of combining the cells.

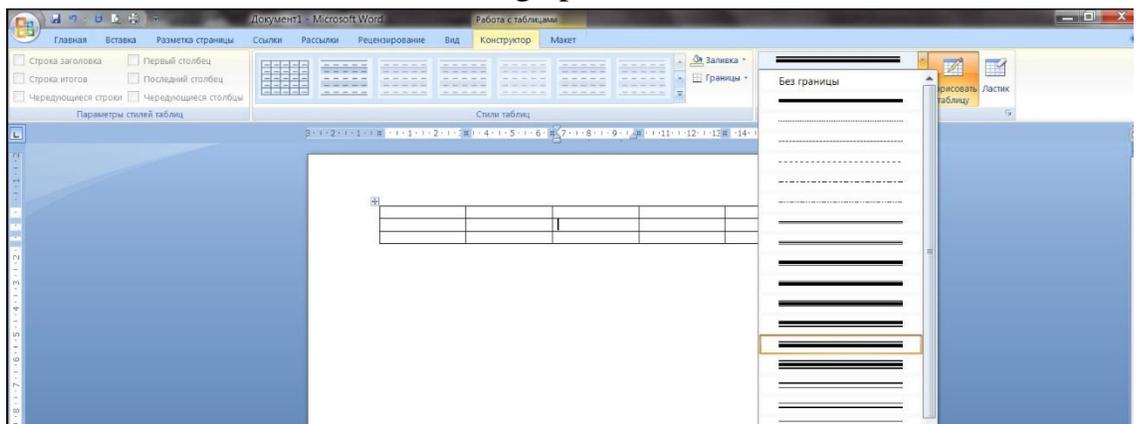
To end the need to align the column width.

To change the framing cell caps should:

- To put the cursor inside the table;
- Tab in the Table Designer in the group → Draw border to select the required thickness and style of the pen;



**Pic.** Change pen thickness.



**Pic.** Changing the pen style.

3. Tabulation text information in the table.

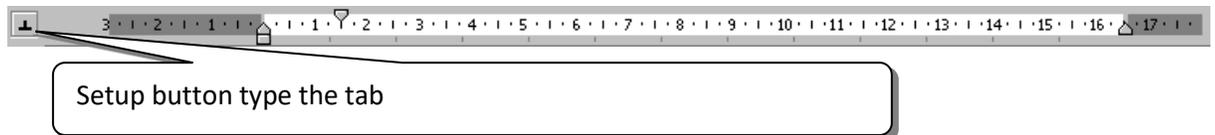
Tabulation of textual information is a way to offset the text within a paragraph by using the TAB key.

Pressing TAB provides the horizontal displacement of the cursor to input a certain distance to the right edge of the page. Default distance that moves the insertion point is fixed. However, it is possible to arbitrarily set the point of the cursor with the tab called tabulstopami or tab stops.

Tab stops are set for each paragraph or paragraphs of the group with the help of a scale bar or dialog tab Glavnaya □ Abzats → Tab. There are several types of tab stops defined by the alignment of the text method at the point of the paragraph.

| Type of position TAB | Designation   | Description  |
|----------------------|---|--|
| with left-aligned    |  | the text that is entered in this tab stops will be left-aligned.     |
| on the right edge    |  | the text will be aligned at the right edge                           |
| Central              |  | the text will be aligned at the center of the tab                    |
| with a dash          |  | when you select the icon in the tab is inserted into a vertical bar. |

Current view of the tab set click on the button "Type tab stops."



To create a paragraph of the tab, you must:

1. to click the mouse on the scale bar;
2. sign tabulstopa move by dragging to the desired position on the scale bar.

To use the tab means within the table structure, you must use the keyboard shortcut Ctrl + Tab

#### 4. Nested table: creation and use

TABLE like structure to accommodate textual information inserted into another table called nested table.

Nested tables are a powerful tool for placing the information in a particular form. The text of each cell of the table you can insert another table, the text in the

nested table cell can be inserted and insert a table, etc. Thus, nested tables, along with the lists are an excellent means of embedding information reflection. Here are some examples.

**Example 1:** Suppose there is a list of some of the objects - for example, the list of enterprises. Each enterprise is characterized by certain information: name, VAT number, address, telephone number. Each company has its own staffing and a list of employees. Staffing and a list of employees with this model are nested data structures in relation to the company, the data structures are completely different.

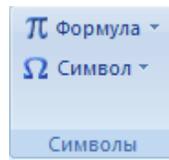
Now imagine a situation where these (or any other), heterogeneous in its structure the data should be submitted in a single table as a single information structure. Because data structure reflects the structure of the tables, then you must list the staff and staffing to include in the text of the relevant cells. We get:

| № | Наименование предприятия | Штатное расписание |           |        |       | Список сотрудников |                |           |
|---|--------------------------|--------------------|-----------|--------|-------|--------------------|----------------|-----------|
| 1 | ООО «СИГМА»              | №                  | Должность | Кол-во | Оклад | №                  | Ф.И.О.         | Должность |
|   |                          | 1                  | Директор  | 1      | 3000  | 1                  | Иванов А.А.    | Директор  |
|   |                          | 2                  | Бух-р     | 1      | 2500  | 2                  | Сидоров А.П.   | Бухгалтер |
|   |                          | 3                  | Инженер   | 5      | 2500  | 3                  | Федорова И.К.  | Секретарь |
|   |                          | 4                  | Водитель  | 2      | 1500  | 4.                 | Пугачев Н.Н.   | Инженер   |
|   |                          | 5                  | Секр-рь   | 1      | 1500  | 5.                 | Васильева В.А. | Инженер   |

## 5. Formulas and symbols.

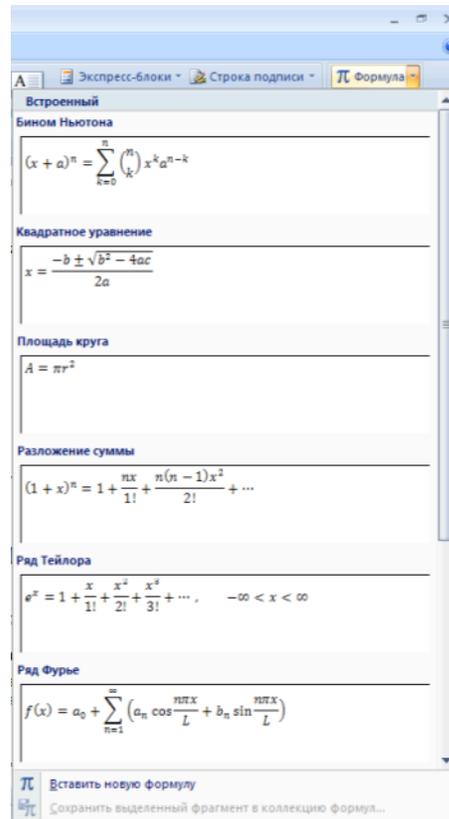
### 5.1 Inserting formulas.

On the Insert ribbon is the panel symbol containing two buttons, formulas and symbols



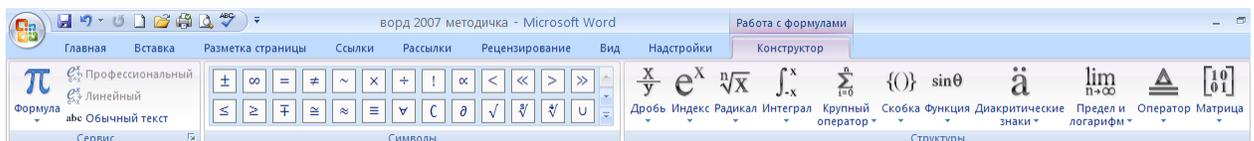
**Pic.** Group Symbols.

Formula button contains a drop-down menu, which contains the most commonly used formula



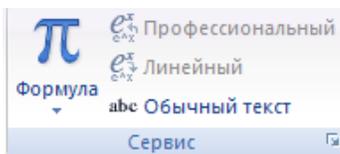
**Pic.** List of parts of the formula.

Button is located at the bottom of the Insert menu, the new formula, which opens the tape menu Designer Working with Formulas.

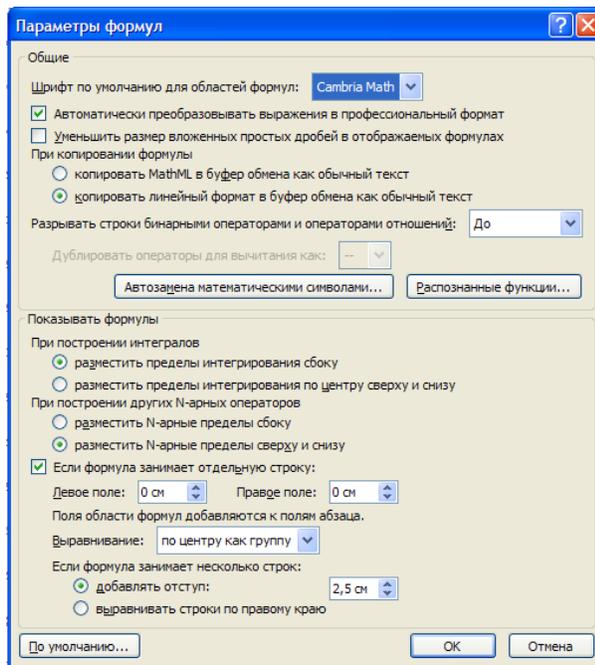


**Pic.** Menu Working with Formulas

The tape contains the Tools menu, which opens a window of fine-tuning the parameters of formulas to insert them into the document

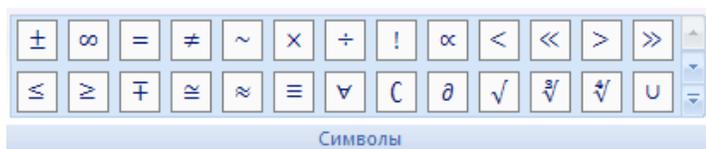


**Pic. Group Service**



**Pic. Options dialog box of the formulas.**

Symbols menu contains mathematical signs and symbols that are used when writing the formula



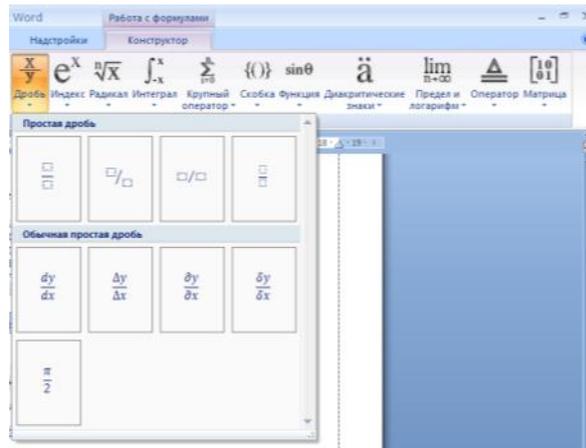
**Pic. Menu Symbols**

Menu structures that displays the structure used for writing formulas



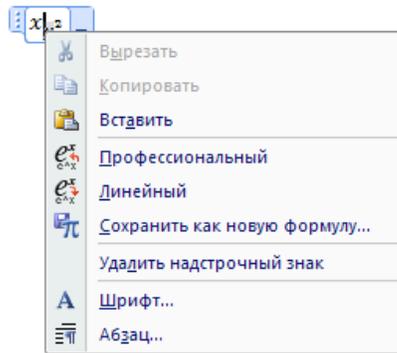
**Pic. Menu Structure**

To select the option of writing, you must call the drop-down menu of the selected formula



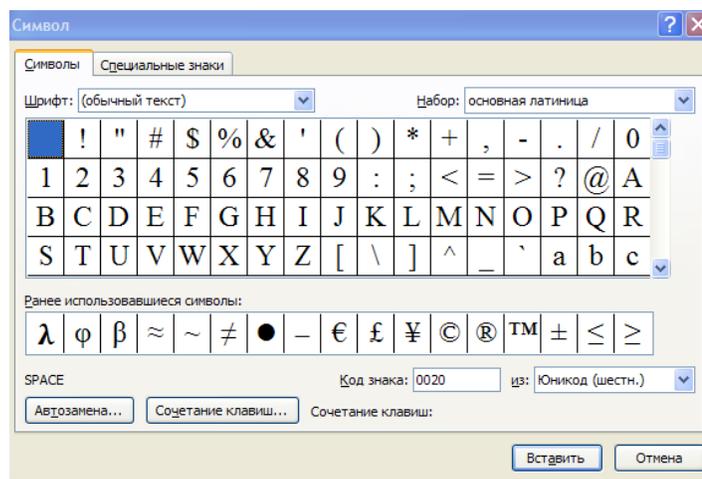
**Pic.** Drop-down menu formula

To select design options resulting formula can use the context menu of the formula itself



**Pic.** The context menu of the formula

Working with characters panel similar to working with formulas, if desired character is not in the drop-down list (or necessary character setting), you can call the Symbols menu.



**Pic.** Symbol dialog box.

### **3. The purpose of activity of students in class:**

#### **The student should know:**

1. The principles of the table structure.
2. What are the possible operations on the table cells.
3. How to create a table structure.
4. Ways to navigate the structure of the table.
5. Methods of tabulation of textual information in the table.
6. Methods for editing text in the table.
7. Principles of add / delete rows / columns in the table.
8. A method for sorting and style definition data in the table.

#### **The student should be able to:**

1. Use the opportunities Microsoft Word text processor for the submission and processing of tabular data.
2. Create a text electronic document containing the table data, and to give them the best for the perception of appearance.

#### **4. Learning content:**

1. Create a table structure.
2. Editing of tables.
  - 2.1. Text editing table.
  - 2.2. Changing the size and position of the table.
  - 2.3. Allocation table.
  - 2.4. Adding and deleting items in the table.
  - 2.5. Changing the size of the table of elements.
  - 2.6. AutoFit Column Widths.
  - 2.7. Table Properties.
  - 2.8. Table Styles.
  - 2.9. Sorting data in a table.
  - 2.10. Merge cells and setting the table.
3. Tabulation text information in the table.
4. Nested tables.
5. Formulas and symbols.
  - 5.1. Inserting a formula.
  - 5.2. Inserting characters.

#### **5. The list of questions to test the level of knowledge:**

1. What is the table in terms of processing technology of textual information?
2. What is the unit table structure?
3. What determines the dimensions of the table?
4. Which operations are possible with the table cells?

6. The list of questions to check the final level of knowledge:

1. List and describe ways to create a table structure.
2. Describe ways to navigate through the structure of the table.
3. List the ways to highlight rows / columns in the table.
4. How to insert and delete rows / columns in a table?
5. Describe how the editing table.
6. How is the consolidation and splitting cells?
7. How do I change the style of the table?
8. How to create a tab in a table?
9. How to insert a formula?
10. How to insert a character?

**7. Establish document, collect and format the following text, in accordance with the sample. Casting Time: 20-30 min.**

&&&&&&&

## **8. Independent work of students:**

According to the textbook will learn the basics of creating, editing and formatting of tables in MS Word 2007 text editor.

## **9. Hronokarta training session:**

1. Organizing the time - 5 minutes.
2. Monitoring of knowledge - 30 min.
3. Analysis of the theme - 20 min.
4. Practical work - 30 minutes.
5. Wrap-up sessions - 10 min.

## **10. A list of textbooks for the class:**

1. AN Stepanov Computer science. Textbook for high schools. 4th izd.g. St. Petersburg, Peter., 2006;
2. Esaulenko IE, Semenov SN Basics of practical informatics in medicine; Voronezh, 2005;

### **Theme 3: "Standard software. Using Microsoft Excel for solving health problems: the program interface, rows, columns, create a list of "**

#### **1. Scientific and methodological support of the theme:**

Automated Information Technology (AIT), spreadsheets or tabular data processing is the base during the spreadsheets. The user must not only be able to enter data and to make the electronic form of any calculation, but also extensive use of this technology to solve a large range of practical tasks.

In the healthcare professional has to face with the need to build charts, graphs, various tables, create a simple database and work with them, to carry out the statistical processing of data, as well as to receive and transmit information.

Spreadsheets, or, as they are called, tabular processors - is a convenient means of calculations and analysis. They are designed to work with large tables of numbers, in general, relatively simple to arrange a large number of calculations with identical data, for example, accounting calculations. To develop and consolidate the skills to create and edit charts and graphs in Excel in accordance with the requirements.

#### **2. Brief theory:**

##### **1. Structure of the spreadsheet.**

Various operations in Excel.

Spreadsheet - the Excel document - table with named columns and numbered rows.

In each cell of a spreadsheet, you can enter a numeric or textual information, the date and time, a hyperlink, and the formula for calculating or receiving data.

Each column of the table has a name given by the letters of the Latin alphabet (A, B, C, ..., AA, ..., AB, ..., XFD), each line - a number (1 ... 1048576). Text, numeric information is entered into certain cells of the table. The expression "to put into cell A1 information" means to move the cursor on cell A1 (column A row 1) and collect the necessary information from the keyboard.

Workspace Spreadsheet - Excel window area designed for data input - the document window.

Excel 2010 file - Excel book.

**Excel Worksheet** - Workspace - area input and editing of information is a table composed of 1048576 rows and 16,384 columns.

**The cell of the table** - the area of the electronic table, designed to enter information, which has its own unique name, consisting of column name and the serial number of the row. For example, D1.

**The range of cells** - an area characterized by a set of cells. Format: top left cell in the range: the lower right cell in the range.

**The formula** - the contents of the cell that starts with a "=" (equal), is an instruction to form the information in the cell.

**Relative link** - address of the cell that is used in the formula, which, when moving, copying is a certain way to change depending on the insert location.

**Absolute link** - address of the cell that is used in the formula, which, when moving, copying does not change. Specific reference is different from the relative presence of a dollar sign in front of the column name and (or) the name of the line, which means that the fixed nature of the elements of the cell address (line number, column name).

Formatting a spreadsheet cell formatting is done through the activation buttons, font type and size, the choice of framing or menu → Yacheyki format, where you can fully specify the data format in the cell and its form.

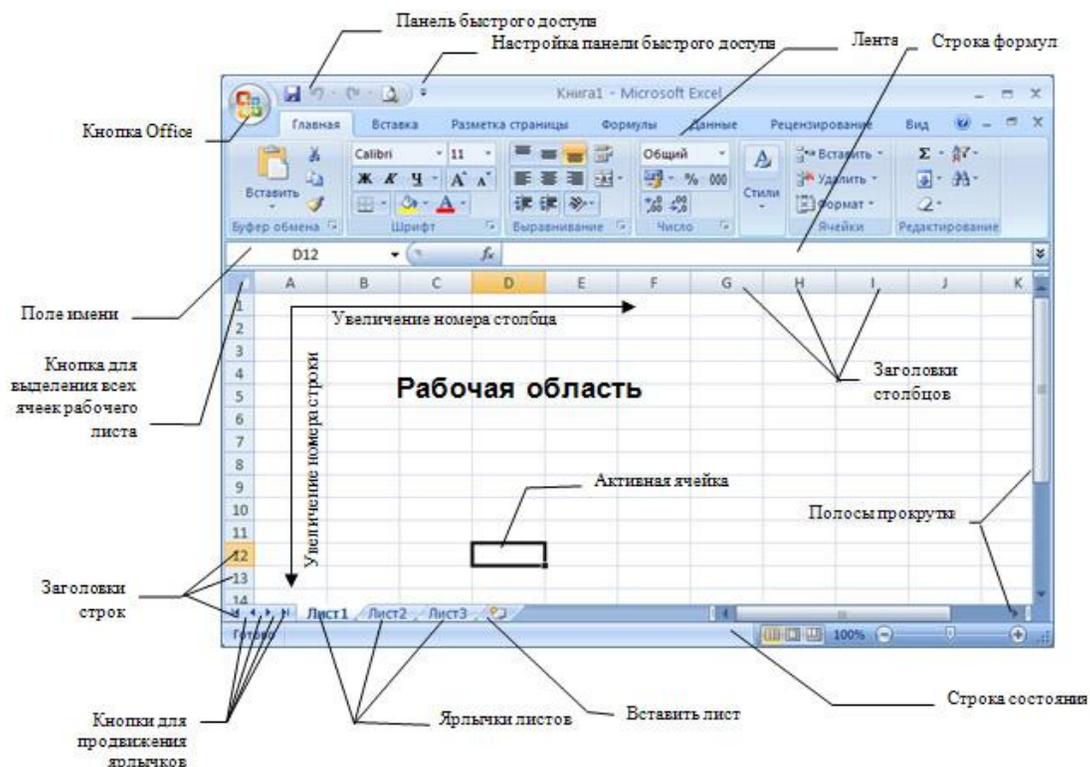
Among the Excel basic technologies can be identified:

1. Data entry and editing.
2. Enter formulas.
3. Isolation of cells.
4. Copying and moving a sheet of cells.
5. Remove the cells and data cells.
6. Filling the cells.
7. Format cells.

8. Copy cell formatting.
9. Hide and show rows and columns.
10. Work with the information blocks (arrays, named ranges).
11. Data Entry Control to the wells.
12. Finding and replacing data.
13. Sort lists and tables.
14. autofilter lists and tables. Getting the results of the filtered list.

## 2. Window MS Excel 2010

The first time you start Excel displays a window that contains the elements of the board corresponding to the standard setting. This window can be divided into several areas



**Pic.** Operating MS Excel 2010 window.

Areas of Microsoft Excel 2007 window when the default setting are listed below.

1. The File tab. In version 2007 file each application there is a tab, replacing the 2007 version of the File button command set, access to which is opened by clicking on this button allows you to perform usual activities. In earlier versions of Office programs, these teams were in the File menu. This, in particular, commands to create, save, and open documents.

2. Quick Access Toolbar. When you create a document of a particular type, we often use the same command. To each time does not "wander" in the search for the right team around the program interface, the most "popular" team brought to the Quick Access Toolbar in the form of small buttons with pictures. These buttons are called tools, and a mouse click on any of them leads to the implementation of the corresponding Excel team. Quick Access Toolbar is customizable. By default, there are only three buttons, but by setting it is possible to print any number of Excel commands.

3. The field specify the name of the object. It is convenient for naming various objects table (drawings, diagrams, individual cells and groups of cells). In the future, you can access named objects by their names.

4. Formula Bar. In this line you will enter the formula to calculate the different values. This also allows you to edit the text string already entered formula or view it in the case in the spreadsheet formulas are displayed instead of the calculated values.

5. Controls the main window of the program. These buttons allow you to expand, collapse or close button in the main Excel window.

6. Control buttons child program windows. These buttons allow you to maximize, minimize and close the Excel separate books inside the main window, which in this case is still open.

7. The headings of the table columns. To access the individual cells within the spreadsheet used the names of cells, which are a combination of column name and line number, which is located at the intersection of the cell. Accordingly, the column names are displayed in their titles. By default, Excel 2007, the standard table contains 16,384 column indicated combinations of letters of the alphabet, starting with A and ending with the XFD.

8. Non-row table. By default, Excel standard table contains 1,048,576 lines (more than one million!), Numbered in succession. Methods of access to cells in an Excel spreadsheet like a game "Battleship" and should not cause you difficulty.

9. navigator page of the book. Default Excel workbook contains 3 tables, called sheets. But in principle, the number of pages in the book is not limited except the amount of available physical memory, the computer (as the book is loaded into memory). Thus, the sheets in the book can be a lot more than can fit in the display area of their tabs. In this case, the "scroll" tabs within the area set aside for them can be carried out using the navigator.

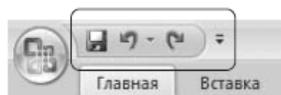
10. Sheet tabs. By default, Excel worksheets have the book Page 1 the names of Sheet 2 and Sheet 3. However, you can give the other adds the sheets arbitrary names, as well as modify existing standard sheet names.

11. Status Bar. This line is identified by the state as Excel or other parameters, as well as some of the properties of the edited document. Different areas of the status bar are not only indicators, but also act as a tool. This means that clicking on some icons of the status bar allows you to change the corresponding parameter.

12. Tape Tool. In Excel 2007, you will not find a menu command, which may have become accustomed to in other Windows programs. All commands that can be performed to Excel, are grouped by function and appear now only in the form of beautiful icons (tools). At first glance, this beauty may seem inconvenient, because there is no text. But do not worry: when you hover the mouse pointer over any of the tools you will find detailed and comprehensive hint that certainly gives a lot more information about the tool (or team) than one or two words in the name of the menu command.

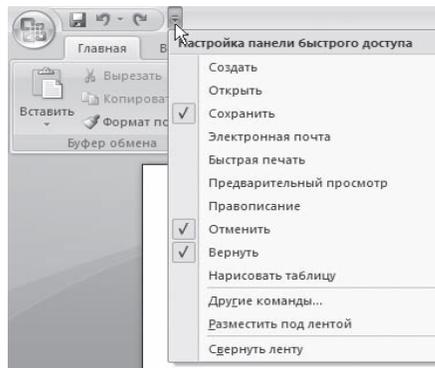
## 2.1. Working with the ribbon

As already mentioned, in the programs Microsoft File 2010 ribbon tools replaced the main menu bar and toolbars are combined into a Quick Access toolbar on the left side of the title bar.



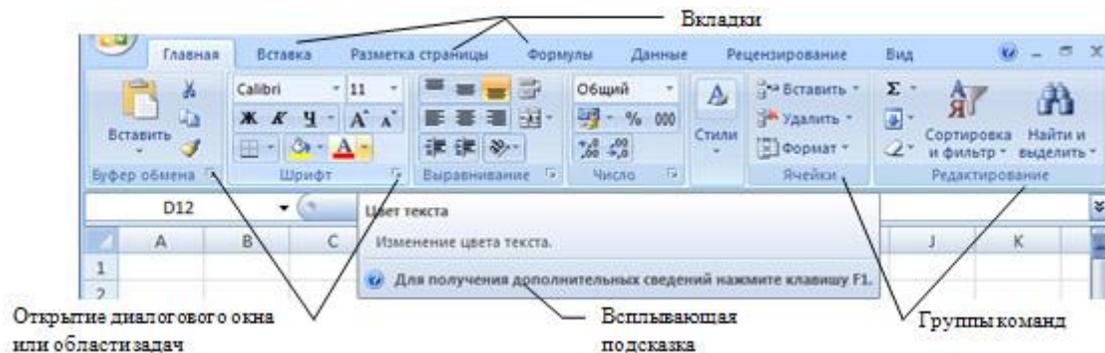
**Pic.** Quick Access Toolbar

By default, the Quick Access Toolbar handed three teams: the preservation of the document, cancellation and refund action. You can configure this panel: add or remove a command. To do this, click Customize Quick Access Toolbar located on the right side panel.



**Pic.** Setup Menu Quick Access Toolbar

In this version of the program menu and toolbars are in the form of tape. Commands are organized in logical groups, collected in tabs. For example, if the formula bar is not displayed on the screen, it can be enabled by clicking on the View tab, click Show or hide the setting and there is a corresponding flag string formulas.



**Pic.** Tape.

On the ribbon displays the most frequently used commands. If this group contains more commands and settings than shown on the tape, the down arrow button group will open a dialog box with the rest of the teams or task pane. What is the window you will see will help determine the tooltip.

Navigate through the tape, you can use the keyboard. Press the ALT key. All available commands on the ribbon will prompt to go to the appropriate tab. If you click one of the transition buttons, tooltips to all commands on this tab will be displayed on the selected tab.

If the work area is too small, the tape can be minimized. To do this, click Customize Quick Access Toolbar (see. The first drawing in this section) and select Minimize the Ribbon (ribbon to display this option need to be removed). This tape will be displayed only when you click on the header of one of the tabs and works

with its teams. To quickly show / hide the tape simply double-clicking on the header of any tab.

Ribbon in MS Excel includes the following tabs:

- Home - basic editing operations (insert, delete, cut, copy), basic operations of formatting tools ribbon and quick access toolbar text and specify the format of the cells, as well as job and insert simple formulas.

- Insert - This tab is responsible for creating and inserting into the current sheet of a variety of objects: drawings, charts, pivot tables, links to other documents.

- Page layout - everything related to the size of the sheet, the print area of the page orientation, as well as some design parameters that affect the entire table.

- Formula - all connected with calculations in an Excel spreadsheet: insert formulas, establishing connections between objects, naming tables and fragments of objects, setting the parameters of the calculation.

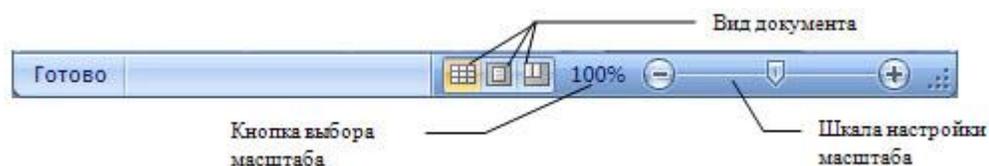
- Data - configure connections to external data source (whether another document or source of information on the Internet), process control data acquisition, job placement method of the data in the table, and finally, how to display assignment of the data.

- Review - responsible for the preparation of the table to to show it to other people, and to work together on this table. It includes both tools to collaborate on a document, including tools to insert notes and save the changes, and spell checking tools.

- Type - is responsible for the way the program looks outward, visible or hidden or that of its instruments, placing the screen at the same time open a few windows Excel, it allows you to set the scale display for the sheet as a whole and for its dedicated area.

## **2.2. Setting the status bar**

By default, the status bar displays hints except brief document viewing mode button, and select the Scale button scale. If these settings do not suit you, click on the status bar right-click menu, you can call and set up a line as you want.



**Pic.** Status bar.

### 2.3. Office Tab.

The File tab is on the left side of the ribbon and is responsible for the most important action, without which all other work just does not make sense: the creation of the document, document discovery, document preservation, as well as printing, publishing on the Internet and sending e-mail the file created by you. Tools File tab becomes available when you click on this tab, the left mouse button. By default, when you select the File tab displays a window with information about the current document.

- Create. Create tool proposes the creation of a new empty Excel workbook or a document based on a template. When you select it you'll see a selection window mode of creation of the document.
- Open. Open Tool displays a standard open file dialog box.
- Save. Save Tool displays a standard File Save dialog box.
- Save as. When you select Save As tool displays the standard save file window. This allows you to re-save an existing file in a different location under a different name or in a different format, without making this change in the existing saved file.
- Print. Printing Tool allows you to print the current book (sheet) in one of the Excel offers printing devices (not always a printer).
- Information. The tool allows you to view information and change the important properties of the document, making it available for collaborative space to archive or send via email. The tool provides access to several commands, which will be discussed in more detail later in the text.
- Access. Access Tool allows other users access to your document in different ways.
- Close. Tool Close closes the current Excel workbook.

## 2.4. Worksheets

Each workbook is comprised of one or more worksheets, labels which can be seen at the bottom. To go to another page, you need to click on its labels, or by right-clicking on the button to advance tabs and select from the list the names of the desired list. If too many sheets, the list will be the last point to All lists. By selecting this option, you can choose any of the sheets in the dialog box.



**Fig.** sheets control buttons.

Worksheets can be renamed at its own discretion. To do this, double-click on the sheet tab and enter a new name. You can also use the ribbon tab Home → Group → Cell Format button → Rename sheet, or right-click on the sheet tab and from the context menu select Rename.

By default, the new book by three worksheets. To change this number in Excel settings window in the main category, use the option Number of sheets from a group When you create a new book. Here you can set the font and display mode, which will be used in newly-created books default.

To rename, insert, delete, move or copy sheets, you can use the context menu of the sheet tabs or group of commands Cells Home tab on the Ribbon.

Undelete sheet is impossible, so think carefully before deleting.

Each larch is a big table with lots of cells in which data is entered. One of the cells in bold frame. This so-called current or active cell. The transition from one cell to another is possible, using the arrow keys or mouse. Also suitable key TAB. Without holding down the SHIFT key is moving to the right, with the press left

Cells adjacent to form a line, the cells are arranged one above the other to form a column. Each cell is formed by the intersection of the row and column. To be able to distinguish one cell from another, each cell has a so-called address, consisting of a column number and line number at the intersection where it is located. The rows are numbered in Arabic numerals and Latin letters columns. The address or link - is a column name and line number, which is located at the intersection of the cell. For example, the cell located at the intersection of column B and row 5, has an address B5. The addresses used in the formulas as cell references. An Excel sheet resembles a Cartesian coordinate system, only the axis arranged a little differently. current cell address is always displayed in the name field. It is the leftmost box in the formula bar.

Reference can specify not only one cell, but a group (range) cells. Rows on each sheet 1,048,576, column 16, 384. (column) of the worksheet, you can press the CTRL key and the appropriate arrow key to jump to the first or the last row.

### **3. Work with cells, rows and columns of the table.**

In order to perform various manipulations with the contents of cells, such as formatting, copying, or moving, they need to pre-allocate. There are many ways to separation, are the most commonly used.

The current cell is always highlighted. To select another cell, enough to bring to it the mouse and click the left button. To select a group of cells located near each other, drag the mouse with the left button in the right direction at the required distance. You can also click on the top left, and then on the bottom right of the cell area while pressing SHIFT (this method is particularly suitable for the isolation of large areas). Select a rectangular area of cells, called the range. Let us examine this concept in more detail.

Range is called two or more cells of the sheet, considered as a whole. Adjacent to the range - it is a rectangular block of cells. Represented by it by means of two links, separated by a colon. The first of them refers to a cell in the upper left corner of

the range, and The second one is the cell in the lower right corner. For example, the figure below highlight the range B2: C4 and E1: F2.

|   | A | B  | C  | D | E  | F  |
|---|---|----|----|---|----|----|
| 1 |   |    |    |   | E1 |    |
| 2 |   | B2 |    |   |    | F2 |
| 3 |   |    |    |   |    |    |
| 4 |   |    | C4 |   |    |    |

**Pic.** The ranges of cells.

We can also consider non-contiguous ranges. They are a plurality of adjacent bands are not adjacent to each other. ";" Symbol is used to record non-adjacent range. For example, the figure above shows a noncontiguous range B2: C4; E1: F2. To select a noncontiguous range, it is necessary to consistently allocate all its member field, hold down the CTRL key.

If you want to allocate a very large range, which does not fit within the screen, or range, located far from the current display area, it is convenient to the ribbon Home tab, in the Editing group of commands to use the command Go to the menu button and select Find.



In the Link dialog box that appears enter a value of one or more bands (for example, A100: A110 or C200: D205; G203: H212). After pressing the OK button, the Excel instantly identifies the specified area.

There is a faster way to move and highlight the desired area. Enter the interval (eg, C8: E12) directly in the name field, complete the entry by pressing the ENTER key.

To select an entire row, click on the row header on the left side of the sheet, where indicated by its number. The entire line is highlighted. To select multiple contiguous rows, drag the mouse cursor across multiple title bar or click on the first and last line of the desired range, hold down the SHIFT key. Similarly and columns are allocated. For this purpose only headers. To select noncontiguous rows and columns click on their headers, hold down the CTRL key. The table shows the various methods of isolating regions.

| <b>To select:</b>   | <b>action</b>  |
|---|--|
| single cell   | you need to activate it by clicking it with the mouse, or navigate to it using the navigation keys                 |
| a range of cells  | to stretch the mouse with the left button of the range of the first cell to the last                               |
| entire sheet  | use the "Select All". It is in the upper left corner of the sheet. Or press the key combination <b>CTRL+A</b>      |
| non-contiguous or non-contiguous cell ranges of cells           | you need to consistently isolate cells or ranges by holding down <b>CTRL</b>                                       |
| a large range of cells  | select the first cell of the range, then press the <b>SHIFT</b> key and hold it, select the last cell in the range |
| one line  | simply click on the row header   |
| one column  | simply click on the column header  |
| several adjacent rows or columns                                | протаскиваем мышь с нажатой левой кнопкой по заголовкам  |
| a range of cells using the keyboard                             | activate the first cell, press and hold the <b>SHIFT</b> key and using the arrow keys to extend the selection      |
| greater or lesser number of cells compared to the current range | hold down the <b>SHIFT</b> key and select the last cell you want to include in the newly allocated band            |

### **3.1. Insert rows, columns, cells, and their removal**

Very often it requires either insert or delete some cells in the range of finished table. Do not confuse the terms to remove and clean. When cleaning (using the DELETE button, the menu button or the Delete shortcut menu command Clear content) cells do not disappear, but only lose their contents. When deleting they really are completely removed, and their place is filled with cells arranged side by side.

To insert columns or rows, use the Home tab. Of the group of cells, follow commands Insert → Insert columns on a sheet or Insert → Insert Rows on the sheet.

There are other ways to insert rows and columns. Select the entire column (or row), to the left (or top) from which you want to add columns (lines) and do one of the following:

- tap on the Home tab, in the Cells group of commands, click Paste cell;
- Insert the command of the second group of the context menu commands.

If you select multiple columns (rows), the same number of columns (rows) and will be added.

With the removal - even easier. To delete rows or columns, select them and choose the Delete command on the ribbon - Delete columns (rows, cells) from a sheet, or select the Delete command from the context menu.

If you insert rows or columns of the selected row or column (or individual cells in them) somehow formatted, it will add an option button that reveals a dynamic menu by adding rows or columns. Using this menu command, you can format the rows or columns are added as one of the neighbors.

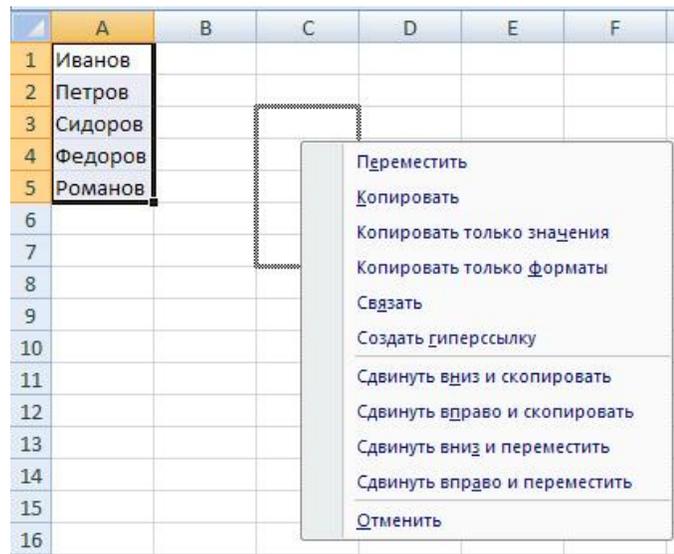
To insert a table of a certain number of cells, you must select a range in the beginning, to the left or above which will be added to the new cell (the size of the selected range must match the size of the pasted range), then tap the Home tab, in the Cells group, run the command Insert → Insert the cell and choose the way add. There may be two ways: shift down, at which the contents of the "old" cell is shifted down and to the right shift.

Removing cells also performed with the shift. The shift may thus be either upward or leftward. To delete a range of cells, first select it, and using the menu command Delete → Remove the tape, select a method of removing a cell. Practice alone, watching the program.

It should be noted that the insertion and removal of the cells should be done with caution, t. A. In this case can easily disrupt the structure of your table, which is undesirable.

### 3.2. Moving the rows, columns, cells with data

Note that when you move or copy a range of cells already filled in the range of the old cell contents replaced. When you try such a move. Excel displays an alert. To avoid such errors when you add data to an already full table, move the range abroad while pressing SHIFT. At the same time the old contents of the cells shifted to make room for the new. Simultaneously pressing the CTRL and SHIFT cell contents are copied to a new location. If you move, you hold down the right mouse button, then release it at the moment there is an extensive menu from which you can select the appropriate action.



**Pic.** Context menu

### 3.3. Changing the column width, row height

You can modify the row height and column width. For this enough to put the cursor in the desired row or column, and on the Home tab of the ribbon in the group commands click Format Cells. From the drop-down menu in the Cell Size group, select the command line height or column width ... .... It should be remembered that the height of the rows is measured in points, and the column width - in the number of characters set the default font.

To change the width and height of rows and columns, you can simply drag and drop the header borders. The mouse cursor then takes the form of double-headed arrow.

If you see in the cell instead of the values of the symbols #####, then the input data does not fit, and to see them, it is necessary to increase the width of the column.

Double click on the border of the header row or column will automatically set the column width or row height so as to fit all the entries. The same effect can be achieved by using the commands AutoFit column width and row height of the Autofit button menu Format Cells command group.

With a team of default width ... you can change the width of both the worksheet columns.

### 3.4. Hide or show sheets, rows and columns

If we want to remove from the field of view (but does not delete) temporarily unnecessary rows and columns, you can hide them. To do this, select the desired rows or columns, and on the Home tab of the ribbon in a group of commands, click Format Cells. From the menu that appears in the group Visibility select Hide or display, click Hide lines (columns). You can also use the command Hide from the context menu. Hidden rows and columns are not removed from the sheet, but simply become invisible (leaf "composed" as an accordion). This can be quite useful if we do not want to clutter precious screen space with unnecessary data temporarily.

To unhide rows or columns have to select adjacent to them, the top and bottom or left and right, and execute a command line Display (columns) from the same menu, or use the command Show shortcut menu.

Note to display the hidden columns or rows adjacent to the rows or columns of them can not allocate separately, while pressing CTRL. It is necessary to distinguish exactly the range to hit him and hidden rows or columns.

If the first row (column) of the sheet is hidden, you need to select the first visible line (column) and "stretch" the allocation to the area of the column headers (lines), then select the display command on the ribbon or from the context menu.

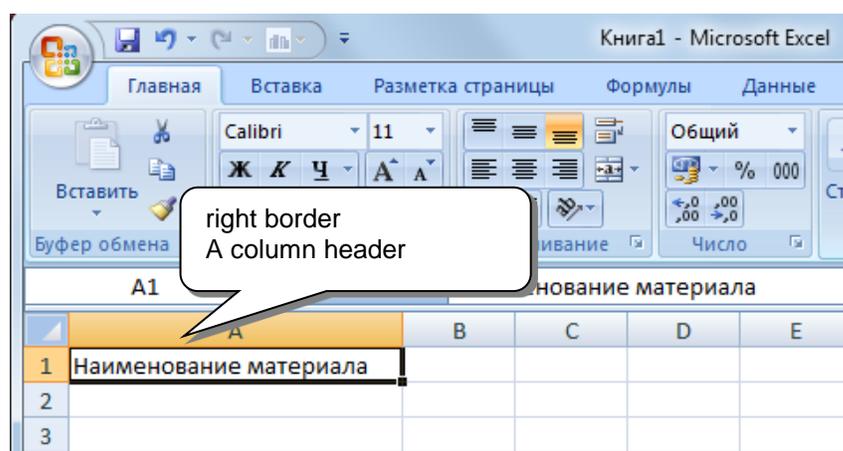
Hide and display can be entire worksheets. This is done on the Home tab, in the tape group commands cells via the menu button → Format → Hide or display the Hide List. Before you display the hidden list, Excel asks his name.

### 4. Entering and editing data

To enter data in a certain cell must go to this cell by using the cursor keys (←, →, ↑, ↓, Home, End) or with the mouse and enter the desired text from the keyboard. When you have entered by pressing the Enter key.

Numerical data in the cell are entered without spaces. The fractional part of the number is always entered, separated by commas (key «.» - point on the numeric keypad is always perceived as the decimal part of the number). 3. If you enter the date as a separator can be a dot slash "Slash", and the point on the numeric keypad displayed on the screen when you type a comma.

It should be noted that if the text does not fit into one cell it is still necessary to enter fully, press the enter, and then change the column width by pulling the right border of the column header. The result is shown in the figure.

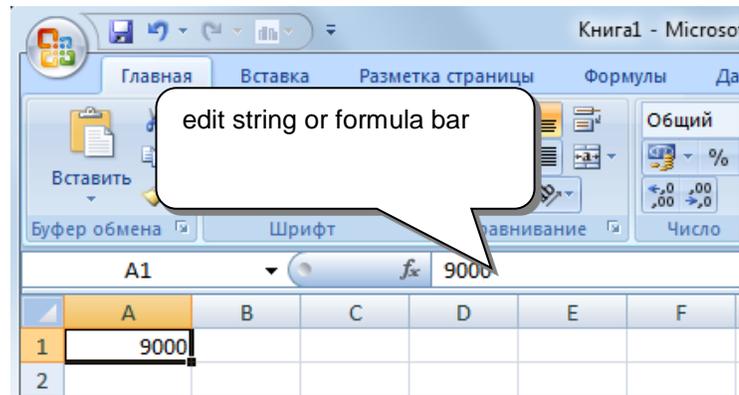


**Pic.** Change column width

If the cell is a multi-line text input each line of text in a cell, you must complete the key combination Alt + Enter. It is necessary to proceed from the semantic significance of lines of text. Cell width and height, alignment data therein, the text formatting is performed later in a separate operation.

To edit data in a cell, you must go to this cell cursor, press the F2, seine cursor to the edit point with the arrow keys, complete the editing by pressing the Enter key.

For easier data entry and editing provides editing bar (formula bar), located at the top of the screen when the toolbar. In the edit line reflects the content of the current cell. If you activate this line with the mouse (to produce single-click on this line), it will modify the insertion point line, after which it will be possible to edit the contents of a cell.



**Pic.** edit Line

## 5. Enter formulas

The simplest way to insert in a cell Excel formula - type it in the formula bar. If the formula is typed and interpreted correctly, its value is calculated. In the formula bar, then displays the text of the formula and the cell - the calculated value.

When typing formulas is important to know that the formula must necessarily begin with an equal sign (=). If you do not enter this character, the rest of the sequence of characters to be received as text and Excel, respectively, is displayed in the cell.

In any formula the symbols + and \* are called operators (ie indicate the actions taken), and the numbers - the operands (ie entities over which action will be performed). In Excel formulas used limited and small set of operators that can be grouped into four main groups:

- arithmetic operators;
- comparison operators;
- Text operator;
- operators links.

How to enter the formula in cell

1. Select the cell.
2. Enter "=" (equal);

3. Enter the cell, arithmetic or logical expression or function. To improve the perceptibility of the formulas recommended to use spaces.

Editing formulas produced in the same manner as the editing of cells (cell activation, pressing F2 or modify activation strings). At the same formula used in cell stain and color names in the cell formula in the edit line matches the color of cell borders, as shown in the figure.

| fx = (12+G2)*5 |   |    |   |   |   |
|----------------|---|----|---|---|---|
| C              | D | E  | F | G | H |
|                |   | 70 |   | 2 |   |

**Pic.** The formula in cell

| fx (12+G2)*5 |           |   |   |   |  |
|--------------|-----------|---|---|---|--|
| D            | E         | F | G | H |  |
|              | (12+G2)*5 |   | 2 |   |  |

**Pic.** The text in cell

### 5.1. Arithmetic operators

The addition operator (+) adds the operands, between which it is located. subtraction operator (-) subtracts the second operand from the first. The multiplication operator (\*) multiplies the operands, between which there is. The division operator (/) divides the first operand by the second. Operator percent (%) divided by 100. The construction of the operand to the power operator (^) raises the operand to the power.

Exponentiation has its own nuances. No sign of extraction among operators of the root, but not all users know that removing the roots of any degree can be achieved by exponentiation. It's enough to build an operand to the power of a proper fraction, where the numerator is one and the denominator - the degree of the root, you want to extract. For example, to extract the square root (the root of the second degree) of 25, 25 should be raised to the power of 1/2. And in order to extract the cube root (the root of the third power) of 27, 27 should be raised to the power of 1/3.

| fx =25^(1/2) |   |   |
|--------------|---|---|
| D            | E | F |
|              | 5 |   |

**Pic** Rootsquaring

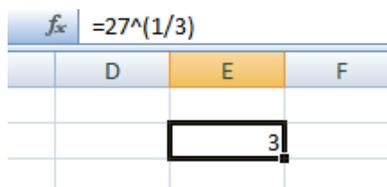
| fx =27^(1/3) |   |   |
|--------------|---|---|
| D            | E | F |
|              | 3 |   |

**Pic** Removing the cube root

## 5.2. Comparison Operators

Comparison operators let you perform a comparison of the two operands that results in a logical TRUE or FALSE.

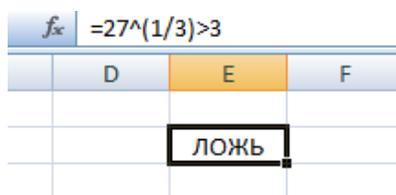
When compared with the operator = (equal to) the compared values are equal, the result is TRUE, otherwise - FALSE.



| fx =27^(1/3) |   |   |
|--------------|---|---|
| D            | E | F |
|              |   |   |
|              | 3 |   |

**Pic.** Compare for equality

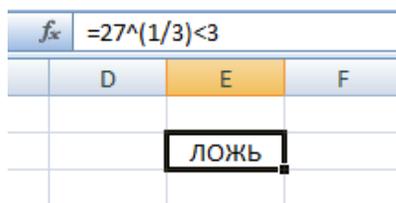
When compared with the operator > (greater than) the left operand is greater than the right, the result is TRUE, otherwise - FALSE.



| fx =27^(1/3)>3 |      |   |
|----------------|------|---|
| D              | E    | F |
|                |      |   |
|                | ЛОЖЬ |   |

**Pic.** Using the operator "more"

When compared with the operator < (less than) the left operand is less than the right, the result is TRUE, otherwise - FALSE.



| fx =27^(1/3)<3 |      |   |
|----------------|------|---|
| D              | E    | F |
|                |      |   |
|                | ЛОЖЬ |   |

**Pic.** Using the operator "less"

When compared with the operator >= (greater than or equal to) the left operand is greater than the right operand or equal to, the result is TRUE, otherwise - FALSE.

|                      |          |        |   |
|----------------------|----------|--------|---|
| <i>f<sub>x</sub></i> | =5^2>=24 |        |   |
|                      | D        | E      | F |
|                      |          | ИСТИНА |   |

**Pic.** Using the operator "greater than or equal"

When compared with the operator <= (less than or equal to) the left operand is less than or equal to the right, then the result is TRUE, otherwise - FALSE.

|                      |         |        |   |
|----------------------|---------|--------|---|
| <i>f<sub>x</sub></i> | =23<=24 |        |   |
|                      | D       | E      | F |
|                      |         | ИСТИНА |   |

**Pic.** Using the operator "less than or equal"

When compared with the operator <> (not equal) compared values are not equal, the result is TRUE, otherwise - FALSE.

|                      |         |      |   |
|----------------------|---------|------|---|
| <i>f<sub>x</sub></i> | =23<>23 |      |   |
|                      | D       | E    | F |
|                      |         | ЛОЖЬ |   |

**Pic.** Using the operator "is not equal to"

### 5.3. Text operator

Text operator in Excel only one - a & (ampersand). It serves to bring together (concatenation), several text values into one.

|                      |                                   |          |                   |   |
|----------------------|-----------------------------------|----------|-------------------|---|
| <i>f<sub>x</sub></i> | ="Говорите, пожалуйста, "&"тише!" |          |                   |   |
|                      | D                                 | E        | F                 | G |
|                      |                                   | Говорите | пожалуйста, тише! |   |

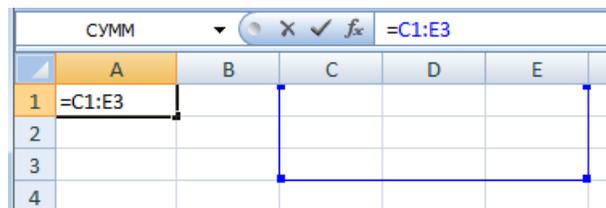
**Pic.** String concatenation

## 5.4. links Operators

All of these operators allow you to insert a table of simple formulas, producing calculations with constants or constant text values. However, at the level of transactions with text and numeric constants Excel inferior in its ability to just school calculator. True Excel computing power is revealed when you start to use in reference formulas.

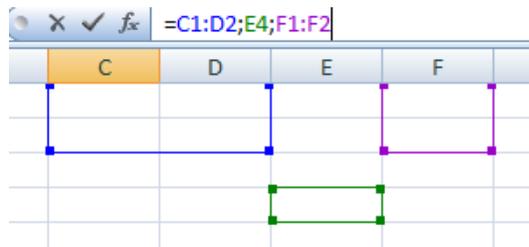
Operators of links in Excel two - this range operator (:) and the union operator (;).

The range operator (:) is used to specify a range of cells. The statement specifies the top left and bottom right \ cell allocated range.



**Pic.** Using a range operator.

Combining operator (;) is used to combine in a single link or several ranges of cells.



**Pic.** Using a combination of the operator.

Links to Excel allow you to include in the formula the values contained in other cells. The values in other cells may be the result of calculation formulas, which in turn refer to the third cell. Thus, it becomes possible to create very sophisticated computational structures. Thus references to other cells in the formula are equivalent insert is not constant, but variable. Changing the manually or automatically values in those cells that are linked to, and you change the final result of the calculation formula.

## 5.5. Relative and absolute references

Those references that were used in this example are called relative, they point directly to a specific cell by its address (C6, D9), but if you copy a link to another cell, the address change. It is fixed with respect to the cell in which the formula is and will always point either above or below, right or left on the same number of columns and rows.

Relative references are saved, if you copy the contents of a cell, but if you move the cell containing the link (by dragging and dropping or cutting and pasting a combination of operations), the link becomes absolute.

Absolute link- is a link that always points to the same fixed cell no matter where and how you copy or move it. If you want to link to was absolute, you will need when entering the reference in the formula bar to indicate this by using the dollar sign (\$) before each of the coordinates of the reference, for example, \$ A \$ 1. In addition, you can use this label only one of the coordinate reference. Then the part of the reference will be relative and will remain part of the absolute, for example, or the A1 \$ A \$ 1. In the case, when you do one of the absolute coordinate reference, the reference will always point to the same fixed column or on the same fixed line. Quickly switch with relative references to absolute or partially absolute can be made while in the formula bar by pressing the F4 key. This results in the following cycle through:

A1 → \$ A \$ 1 → \$ A1 → A \$ 1 → A1.

## 5.6. References to cells in other worksheets and in other books

In order to insert a reference to a cell that is in the current book, but on another sheet, you need to enter in the formula bar as a link

Pagename! Cell\_reference

In order to insert a reference to a cell that is in another workbook, you need to enter in the formula bar as a link

[Imya\_knigi] pagename! Cell\_reference

For example, the link located in the cell on Sheet1 in Book1 book and pointing to a range of cells, located in the Contacts list in the test book, looks as shown in Fig.

This entry means that the test book is located in the same directory as the book Book1. However, if the book to which you refer, is located in a different directory, you should specify the full path to access it directly in the formula. That will look like previous reference to a cell in a book that is in the directory

C: \ My \ Docum:  
= C:! \ My \ Docum \ [test] Contacts C1: C3

### **3. The purpose of activity of students in class:**

#### **The student should know:**

1. The main structural elements of the spreadsheet interface.
2. Basic terms of an Excel spreadsheet.
3. The principle of a spreadsheet.
4. How to enter data, format the data in the cells.
5. How to select, copy, and delete data in the cells.

#### **The student should be able to:**

1. To have the basic tools to process text and numerical information.
2. To enter and edit data using the editing line and directly into the cells.
3. Perform calculations by entering formulas, copy, delete information.
4. Asking the desired format in spreadsheet cells.
5. Hiding rows and columns

### **4. Learning content:**

1. Structure of the spreadsheet. Various operations in Excel.

#### **2. Window MS Excel 2010.**

- 2.1. Working with the ribbon.
- 2.2. Setting the status bar.
- 2.3. Office Tab.
- 2.4. Worksheets.

#### **3. Work with cells, rows and columns of the table.**

- 3.1. Insert rows, columns, cells, and their removal.
- 3.2. Moving the rows, columns, cells of data.
- 3.3. Changing the column width, row height.
- 3.4. Hide or show sheets, rows and columns.

#### **4. Data entry and editing.**

#### **5. Enter formulas.**

- 5.1. Arithmetic operators.
- 5.2. Comparison Operators.
- 5.3. Text operator.
- 5.4. Operators references.
- 5.5. References and names.
- 5.6. Relative and absolute links.
- 5.7. References to cells in other lists, and in other books.

### **5. The list of questions to test the level of knowledge:**

1. What you can list basic Excel-2007 Technology?

2. How is the input and editing of data in Excel-2007? The process differs from the similar process in Word?

### 6. The list of questions to check the final level of knowledge:

1. Define the spreadsheet.
2. What is the sequence of operations to be performed by the user to enter formulas?
3. How to place the text in two lines in a single cell?
4. List the main methods for isolating cells.
5. List the main ways of copying the cells.
6. How is the cell formatting?
7. Which group of formulas exist. Briefly characterize.
8. What is the absolute reference?
9. What is the relative reference?
10. What is the use autofill and how it is carried out?

### 7. Create a document type and format in accordance with the model:

Create and format the table below "Calculation monthly hospital board. " Perform necessary calculations values of table cells marked with the "?" On the following formulas. Created table should be placed on a single typewritten sheet book formata.Posle this sort the data in alphabetical order by "Name" column and filter the table in the column "Position".

#### РАСЧЕТ ЗАРАБОТНОЙ ПЛАТЫ КЛИНИЧЕСКОЙ БОЛЬНИЦЫ

| Месяц | Год  | Ф.И.О.         | Должность      | Оклад | Сумма вычета | Раб. дней в месяце | Отраб. дней | Начисленно | Социальный налог 13% | Сумма к получению |
|-------|------|----------------|----------------|-------|--------------|--------------------|-------------|------------|----------------------|-------------------|
| 1     | 2    | 4              | 5              | 6     | 7            | 8                  | 9           | 10         | 11                   | 12                |
| май   | 2001 | Иванов И.И.    | Гл. врач       | 2 000 | 400          | 22                 | 22          | ?          | ?                    | ?                 |
| май   | 2001 | Петров А.П.    | Зам. гл. врача | 1 500 | 400          | 22                 | 20          | ?          | ?                    | ?                 |
| май   | 2001 | Федоров И.А.   | Леч. врач      | 1300  | 400          | 22                 | 19          | ?          | ?                    | ?                 |
| май   | 2001 | Сомов С.П.     | Леч. врач      | 1300  | 400          | 22                 | 22          | ?          | ?                    | ?                 |
| май   | 2001 | Николаев А.Б.  | Леч. врач      | 1300  | 400          | 22                 | 20          | ?          | ?                    | ?                 |
| май   | 2001 | Коновалов М.И. | Леч. врач      | 2 000 | 400          | 22                 | 15          | ?          | ?                    | ?                 |
| май   | 2001 | Федосеев А.А.  | Ст. сестра     | 1100  | 400          | 22                 | 22          | ?          | ?                    | ?                 |
| май   | 2001 | Агапова Л.М.   | Санитар        | 1000  | 400          | 22                 | 20          | ?          | ?                    | ?                 |
|       |      | <b>ИТОГО:</b>  |                |       | ?            |                    |             | ?          | ?                    | ?                 |

Формулы:

$$\text{Графа10} = \text{Графа6} * \text{Графа9} / \text{Графа 8}$$

$$\text{Графа11} = \text{Графа10} * 0,13$$

$$\text{Графа12} = \text{Графа10} - \text{Графа11}$$

**Requires:**

1. Calculate the "Total" row.
2. Perform a payroll for the company for June 2000
  
8. Independent work of students:  
Learn the basic principles of creation, spreadsheet, enter a formula in MS Excel 2007.
9. Hronokarta training session:
  1. Organizing the time - 5 minutes.
  2. Monitoring of knowledge - 30 min.
  3. Analysis of the theme - 20 min.
  4. Practical work - 30 minutes.
  5. Wrap-up sessions - 10 min.
  
10. A list of textbooks for the class:
  1. AN Stepanov Computer science. Textbook for high schools. 4th izd.g. St. Petersburg, Peter., 2006;
  2. Esaulenko IE, Semenov SN Basics of practical informatics in medicine; Voronezh, 2005;

## **Theme 4: "Standard software. Microsoft Excel. Using the built-in statistical functions to solve medical problems "**

### **1. Scientific and methodological support of the theme:**

To study the basic Excel functions and how to use them in tabular calculations.

To perform calculations in Excel formulas, you can also use the built-in Excel functions. Excel functions used to calculate the arithmetic and logical expressions, operations on the data. There are also functions to work with dates and times.

To develop and consolidate the skills to create and edit charts and graphs in Excel in accordance with the requirements.

To solve the communication problems it is necessary to provide tabular information in graphical form, facilitates the perception of information, simplifying the process of comparing dissimilar data. For this purpose, various means, the main of which graphs and charts. Although graphs and charts can be quite effective means of communication (to promote understanding of the material), but they are also able to easily enter the recipient information misleading if the wrong type is selected graphical tool or graphic design is incorrect.

Given the opportunities Microsoft Excel program in the field of mathematical and statistical calculations, it is often necessary to display the results graphically. This allows you to solve a variety of problems. Microsoft Excel has extensive capabilities for graphical representation of information, ease of creation and modification. Diagrams are a means of visual data and make it easier to perform comparisons, identify patterns and trends in data.

### **2. Brief theory:**

#### 1. The concept of function.

Expressions that are used in the calculation of functions, called function arguments. The arguments of the function may be different expressions, reference data ranges, as well as other functions. Excel Function arguments are enclosed in parentheses, and are indicated by a semicolon ";".

The order in which the arguments must follow function, called the function syntax.

Name of the function and its syntax format up function.

The most common functions to Excel format

= <Function name> (<argument list>)

function name should not contain spaces and must begin with a letter. Gaps between the function name and the parenthesis are not allowed. Parentheses are used to determine the beginning and end of the argument list,

and should be paired. Gaps in front brackets and after the brackets are not allowed.

The argument list can consist of different types of expressions. The type of each expression in the argument list must be a valid argument for this in accordance with the syntax.

As is known, any Excel formula begins with an equal sign followed by the arithmetic, logical, or any other expression in the composition of which may include Excel functions. If the function is at the beginning of the formula, then it must be preceded by an equal sign.

The functions is an argument to another function or a part of its expressions, is called nested. In Excel, you can use up to seven levels of nested functions.

Each built-in function belongs to any category.

### **1.1. Basic Excel functions.**

According to the type of data being processed can cause the following classification embedded Excel functions.

1. Mathematical functions - the most frequently used functions for the processing of numerical values.
2. Logic functions are designed to provide conditional calculations in mathematical expressions and processing of logical expressions.
3. Text functions used for text information
4. Functions for date and time.

Completely lead syntax and description of built seems redundant, as meaning most of the features evident from their names. Full description of the syntax and a built-in function is recognized when it is selected wizard dialog functions (as shown in Fig. Above).

The following groups can be distinguished among the basic mathematical functions:

- Function type conversion and bring them (CEILING, FLOOR, ROUND, ROUNDUP, ROUNDDOWN - rounding operations TRUNC - discarding the fractional part, the whole - the transformation to an integer).
- Trigonometric functions (SIN, COS, TAN, ASIN, ACOS, and others.);
- Logarithmic (EXP, LOG, LN, LOG10);
- Arithmetic (sum, make, sign, ROOT, LEVEL, THE FACT MOD);
- Array processing functions (SUM, PRODUCTIVITY, SUMSQ, SUMPRODUCT, SUMIF - different kind of sum; MDETERM, MMULT - matrix operations).

Logic functions (AND, OR, IF NOT, TRUE, FALSE).

Basic text functions:

LEFT, RIGHT, MID - allocation of a certain number of characters per line.

LEN - length of the string.

VALUE - convert text to a number.

T - converts a number to text.

TEXT - converts a number to text and format it.

REPEAT - repeats a given text a specific number of times.

Recipe - converts all uppercase letters in line.

LOWER - Converts all lowercase letters in a row.

TRIM - deletes from the text extra spaces, except spaces between words.

Functions of "Date and Time"

In Excel, the date and time have an idea in a single data type (type "Date and Time"), representing a certain number. date and time as the representation of a whole number is necessary to simplify the operations with date and time. For the user, the numeric representation of date and time is transparent, i.e. The date and time are recorded in Excel cells in the usual human form. If you select a group of cells that contain the date and time, and set the cell format as "Total" (Format  cells...  View  General), it will be reflected numeric representation of the date and time instead of the traditional. To go back to the traditional representation of the date and time, you must also select a group of cells and assign them the type of "Date and Time" (Format  cells  View  date and time).

TODAY - returns the current date.

YEAR DAY, MONTH - return respectively the year, day, month as a single number.

DATEVALUE - Converts a date in the text representation of a numeric type "Date and time".

Date - returns the date in the numeric format on the basis of parameters year, month, day.

Time - returns the time in the format of the date as a number of parameters on the basis of the hour and minute.

Second, minute, hour - returns from the format "Date and Time" seconds, minutes and hours respectively.

Special Categories embedded Excel functions.

1. Financial functions (see. Section 3 of this book).

2. Statistical functions (MIN, MAX, AVERAGE, COUNTIF).

3. Functions for working with databases.

4. Functions to work with references and arrays.

1.2. The most commonly used built-in functions.

Here is the syntax and meaning of some commonly used built-in functions.

SUM - summation of cell values

Syntax:

SUM (number1; number2; ...)

where number1, number2 ... - a specific number, the cell range or the name of the range.

Since the addition of cell values using the SUM function is one of the most common tasks in Excel to perform this task, there AutoSum tool.

To use the AutoSum tool, you must move the cursor to the cell that contains the sum. Next, activate the tool and click the mouse a certain range, and then press Enter.

You can carry out a similar operation in another way: select a range of cells are integrable with the final row / column and press Alt + =.

IF - performing operations in accordance with condition

Syntax:

IF (boolean; znachenie\_istina; znachenie\_lozh)

IF function returns znachenie\_istina if the condition is true and znachenie\_lozh if the condition is false.

COUNTIF - the number of non-empty cells in the specified range that meet specified criteria.

Syntax:

COUNTIF (range, criteria)

where the interval - cell area, which counts the number of cells; criterion - the criterion in the form of a number, expression, or text that defines which cells need to count. For instance, "> 2500".

SUMIF - the amount of cell values that meet certain criteria.

Syntax:

SUMIF (range, criteria, summ\_interval)

where the interval - cell area, for which the criterion is calculated; criterion - the criterion in the form of expression, or text; summ\_interval - cells for summation.

MAX - the maximum value from a list of numbers.

Syntax:

MAX (number1, number2, ...)

where number1, number2 ... - a specific number, cell area or range names.

MIN - minimum value in a list of numbers.

Syntax:

MIN (number1, number2, ...)

where number1, number2 ... - a specific number, cell area or range names.

MODE - the most common number

Syntax:

MODE (number1; number2; ...)

AVERAGE - arithmetic mean

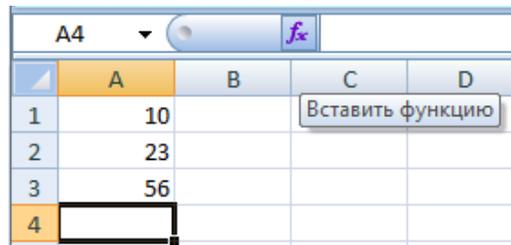
Syntax:

AVERAGE (number1, number2, ...)

### 1.3. Writing and editing functions.

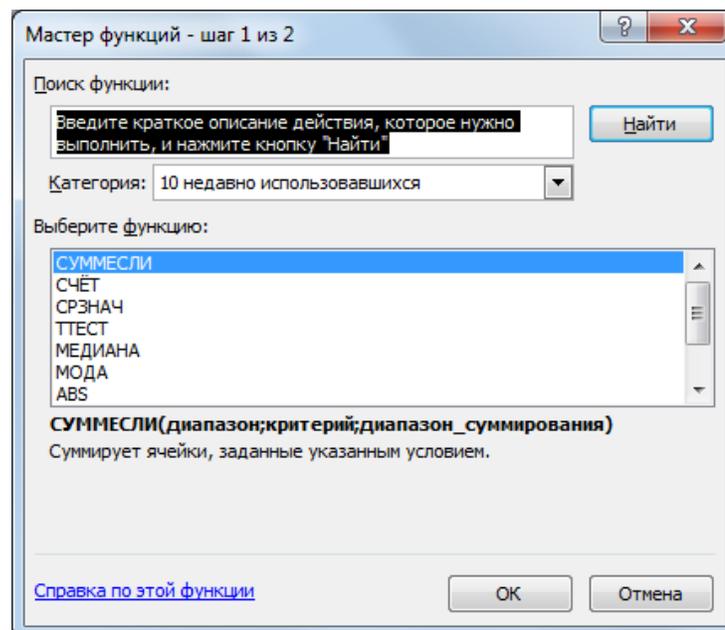
You can enter functions in a worksheet directly from the keyboard or by using the menu command Insert function. When you enter the function from the keyboard is better to use lowercase letters. When the function input is completed, Excel will change the letters in the function name to uppercase, if it was entered correctly. If the letters are not changed, then the function name is entered incorrectly.

If you select a cell and select Insert Function command, Excel displays the dialog box Function Wizard. A little faster, you can achieve this by pressing the icon functions in the formula bar.



**Pic.** Insert function.

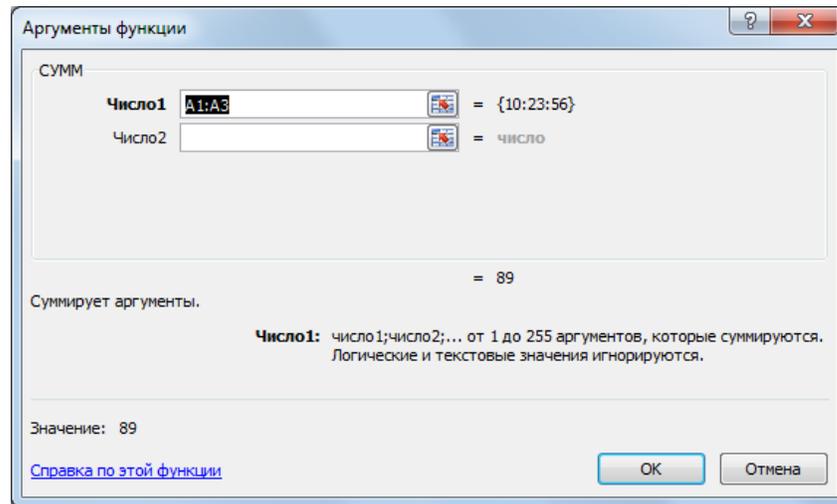
To open this window, you can also use the Insert Function button on the Standard toolbar.



**Pic** Dialog Box Function Wizard

In this window, first select a category in the Category list, and then in alphabetical list function, specify the desired function.

Excel enters the equal sign, function name, and a pair of parentheses. Then Excel opens a second dialog box Function Wizard.



**Pic.** Select function arguments

The second window of dialogue Function Wizard contains one field for each argument of the function selected. If the function has a variable number of arguments, this dialog box when the water expands additional arguments. Description of the argument, that the field contains an insertion point, is displayed at the bottom of the dialog box.

To the right of each field argument displays its current value. This is very handy when you're using references or names. The current value of the function is displayed at the bottom of the dialog box.

Click OK, and create a function appears in the formula bar.

| A4 |    | fx =СУММ(A1:A3) |   |   |  |
|----|----|-----------------|---|---|--|
|    | A  | B               | C | D |  |
| 1  | 10 |                 |   |   |  |
| 2  | 23 |                 |   |   |  |
| 3  | 56 |                 |   |   |  |
| 4  | 89 |                 |   |   |  |

**Pic.** SUM function.

## 2. Use of the analysis packet

Analysis package is an add-Excel- set of tools and instruments that extend the standard capabilities of Excel related data analysis.

Possibilities of data analysis add-in package:

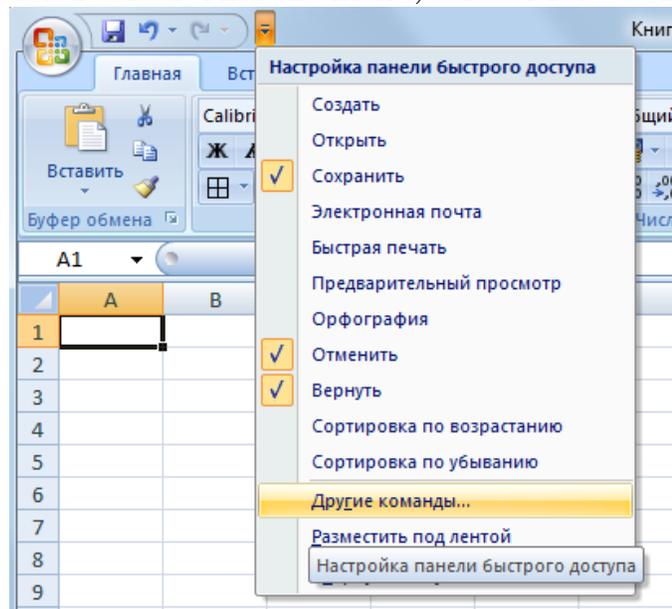
1. Univariate analysis of variance.
2. Two-factor analysis of variance with repetitions.
3. Two-factor analysis of variance without repetition.
4. Correlation.
5. Covariance.
6. Descriptive statistics.
7. Exponential Smoothing.
8. Dvuhvyborochny F-test for variances.

9. Fourier analysis.
10. Histogram.
11. The moving average.
12. Generating random numbers.
13. Rank and percentile.
14. Regression.
15. Selection.
16. Paired Two Sample t-test for average.
17. Dvuhvyborochny t-test with equal variances.
18. Dvuhvyborochny t-test with different dispersions.
19. Dvuhvyborochny z-test for means.

To use one of the tools for packet analysis studied data should be presented in a table, where the columns are the corresponding figures. When you create an Excel spreadsheet information is entered in the individual cells. The set of cells containing the analyzed data is called input interval.

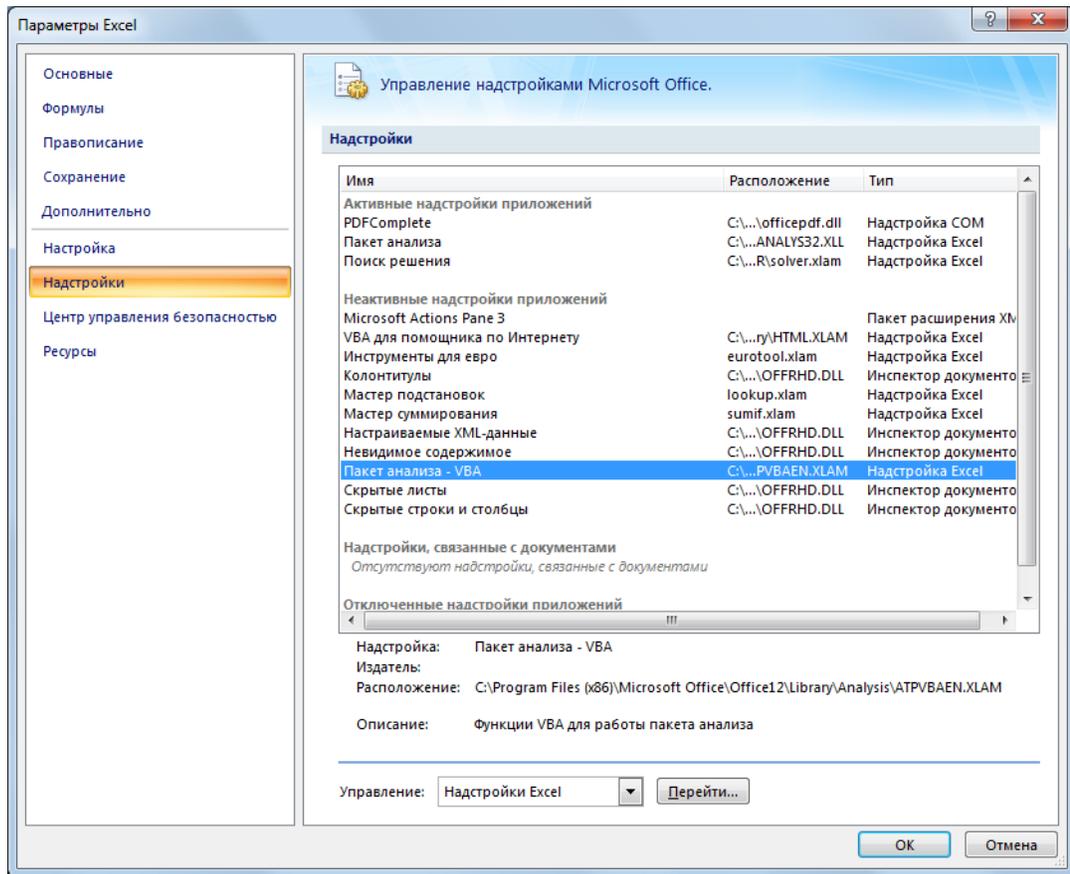
To use a set of tools and analysis tools package is necessary to make its installation. Complete these steps:

Open the Quick Access Toolbar. And the menu, select More Commands.



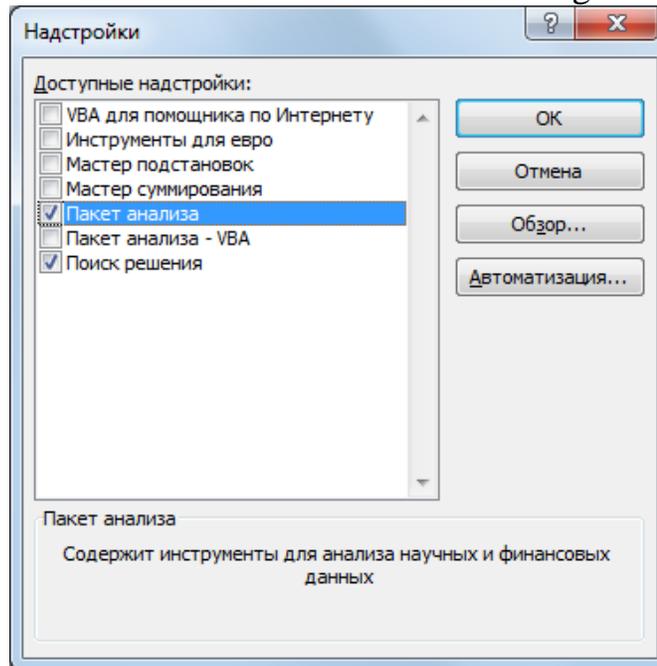
**Pic.** Opens the Excel Options

You will see the Excel Options dialog box, in the right window, select the VBA function analysis package.



**Pic** Configuring Packet Analysis.

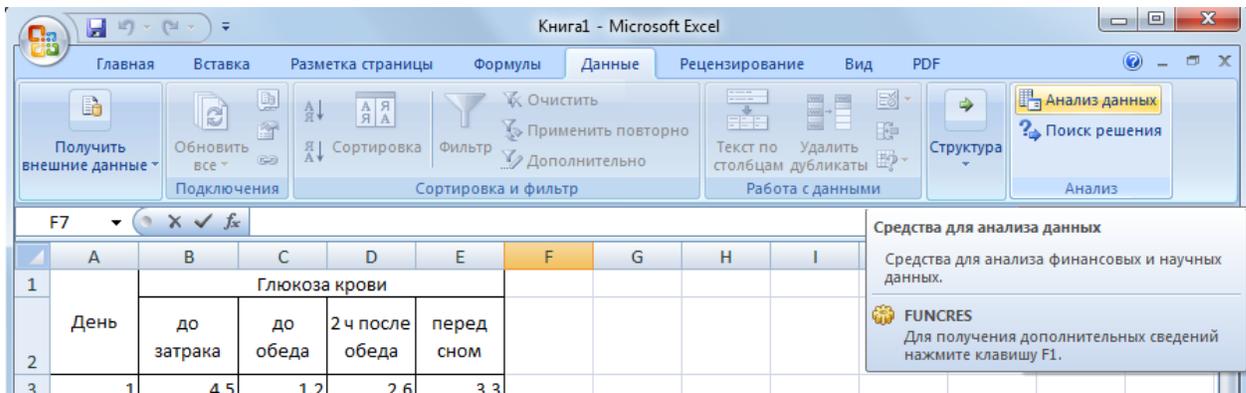
Click the button Go and click on OK. Add-ons dialog box will appear.



**Pic.** Settings dialog box.

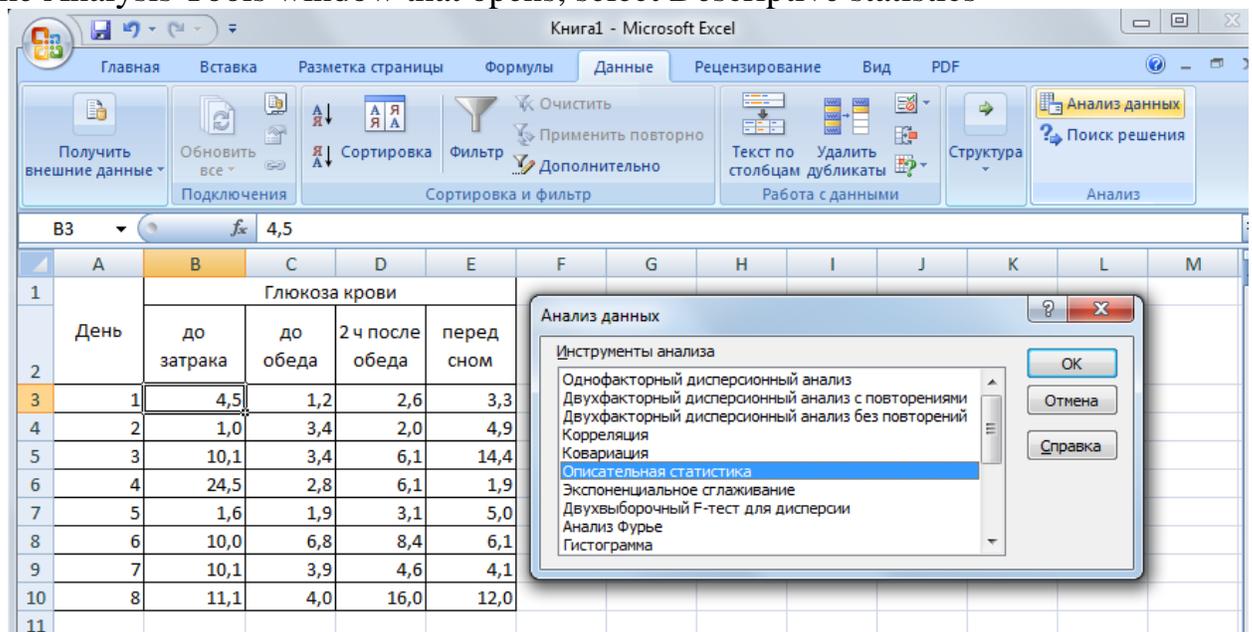
Put a check box package analysis and confirm your selection by pressing the OK button. Thus established analysis package.

For further work on the ribbon, select the Data tab. And selects the data analysis function.



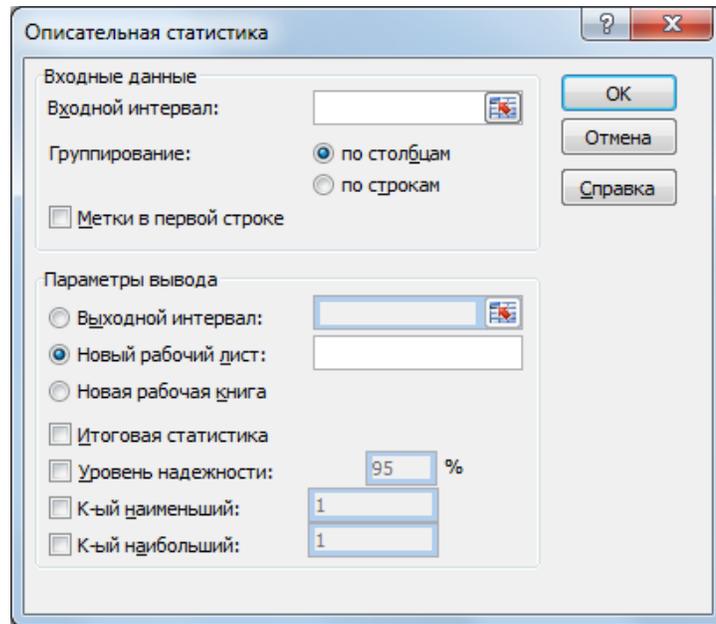
**Pic.** Call functions data analysis

Next, choose the command data analysis → → analysis of the data. In the Analysis Tools window that opens, select Descriptive statistics



**Pic.** Working with the function of Data Analysis

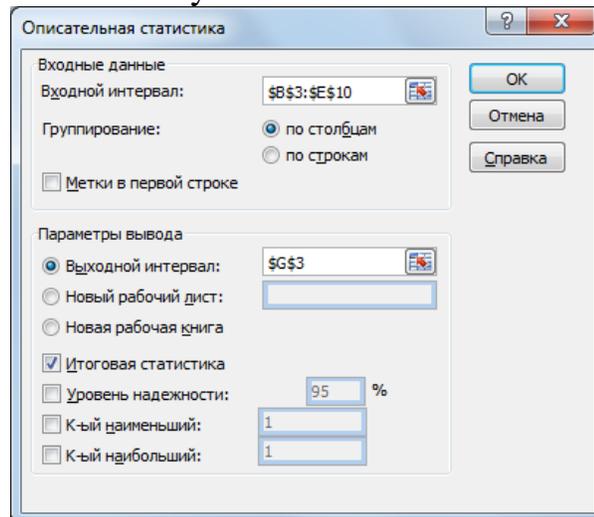
Appears Descriptive Statistics dialog box.



**Pic.** Descriptive statistics dialog

Fill in the statistical parameters as follows:

In the Input range - a range of cells with data for statanaliza, in the output range - the address of the cell, which can be written analiza.V parameters output result set check box in the Summary Statistics and click on OK.



**Pic.** Entering data Descriptive statistics dialog

As a result of underlying transactions get calculated indicators of descriptive statistics.

| Глюкоза крови |             |          |                 |            |          |          |          |          |          |          |          |          |  |
|---------------|-------------|----------|-----------------|------------|----------|----------|----------|----------|----------|----------|----------|----------|--|
| День          | до завтрака | до обеда | 2 ч после обеда | перед сном |          |          |          |          |          |          |          |          |  |
| 1             | 4,5         | 1,2      | 2,6             | 3,3        |          |          |          |          |          |          |          |          |  |
| 2             | 1,0         | 3,4      | 2,0             | 4,9        |          |          |          |          |          |          |          |          |  |
| 3             | 10,1        | 3,4      | 6,1             | 14,4       |          |          |          |          |          |          |          |          |  |
| 4             | 24,5        | 2,8      | 6,1             | 1,9        |          |          |          |          |          |          |          |          |  |
| 5             | 1,6         | 1,9      | 3,1             | 5,0        |          |          |          |          |          |          |          |          |  |
| 6             | 10,0        | 6,8      | 8,4             | 6,1        |          |          |          |          |          |          |          |          |  |
| 7             | 10,1        | 3,9      | 4,6             | 4,1        |          |          |          |          |          |          |          |          |  |
| 8             | 11,1        | 4,0      | 16,0            | 12,0       |          |          |          |          |          |          |          |          |  |
|               |             |          |                 |            | Среднее  | 9,1125   | Среднее  | 3,425    | Среднее  | 6,1125   | Среднее  | 6,4625   |  |
|               |             |          |                 |            | Стандарт | 2,628786 | Стандарт | 0,591834 | Стандарт | 1,601388 | Стандарт | 1,551375 |  |
|               |             |          |                 |            | Медиана  | 10,05    | Медиана  | 3,4      | Медиана  | 5,35     | Медиана  | 4,95     |  |
|               |             |          |                 |            | Мода     | 10,1     | Мода     | 3,4      | Мода     | 6,1      | Мода     | #Н/Д     |  |
|               |             |          |                 |            | Стандарт | 7,435328 | Стандарт | 1,67396  | Стандарт | 4,529408 | Стандарт | 4,38795  |  |
|               |             |          |                 |            | Дисперси | 55,28411 | Дисперси | 2,802143 | Дисперси | 20,51554 | Дисперси | 19,25411 |  |
|               |             |          |                 |            | Эксцесс  | 2,285054 | Эксцесс  | 2,085355 | Эксцесс  | 3,336288 | Эксцесс  | 0,172582 |  |
|               |             |          |                 |            | Асимметр | 1,20379  | Асимметр | 0,971928 | Асимметр | 1,711417 | Асимметр | 1,179375 |  |
|               |             |          |                 |            | Интервал | 23,5     | Интервал | 5,6      | Интервал | 14       | Интервал | 12,5     |  |
|               |             |          |                 |            | Минимум  | 1        | Минимум  | 1,2      | Минимум  | 2        | Минимум  | 1,9      |  |
|               |             |          |                 |            | Максимум | 24,5     | Максимум | 6,8      | Максимум | 16       | Максимум | 14,4     |  |
|               |             |          |                 |            | Сумма    | 72,9     | Сумма    | 27,4     | Сумма    | 48,9     | Сумма    | 51,7     |  |
|               |             |          |                 |            | Счет     | 8        | Счет     | 8        | Счет     | 8        | Счет     | 8        |  |

**Pic.** Results Descriptive statistics.

### 3. Diagrams.

Diagram - is a way of visualizing the information given in the form of a table of numbers. Demonstration of data using charts is more intuitive and effective for sensing.

Create a chart

Charts are based on data contained in the worksheet, so they must be entered before creating the chart. Dynamic Charts in Excel, t. E. Are automatically updated when the data changes on the basis of which are built. The diagram can be placed both on the data sheet, or on a separate sheet (taking the entire sheet).

Default chart consists of the following elements:

- Rows of data - is the most valuable, because visualize data;
- Legend - contains the name of the series and an example of their registration;

- Axis - specific price range with intermediate divisions;
- The area of construction - is the backdrop for a series of data;
- The grid lines.

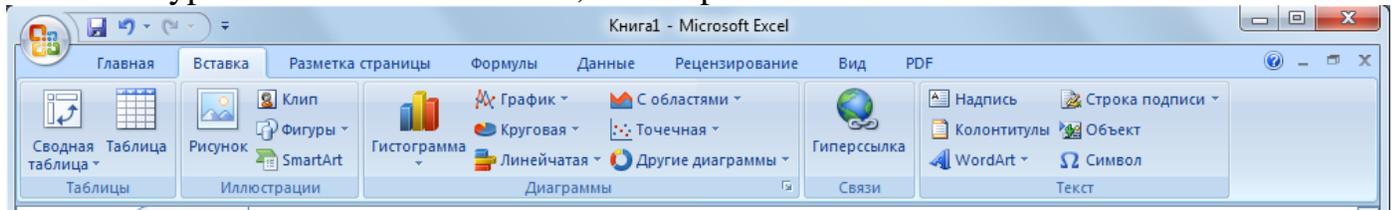
Besides the above-mentioned objects, such as can be added:

- The names of the chart;
- The lines of the projection - descending from the data series on the horizontal axis line;

- The trend line;
- Signatures of data - numeric value for the number of data points;
- And other infrequently used items.

### 3.1. Adding charts.

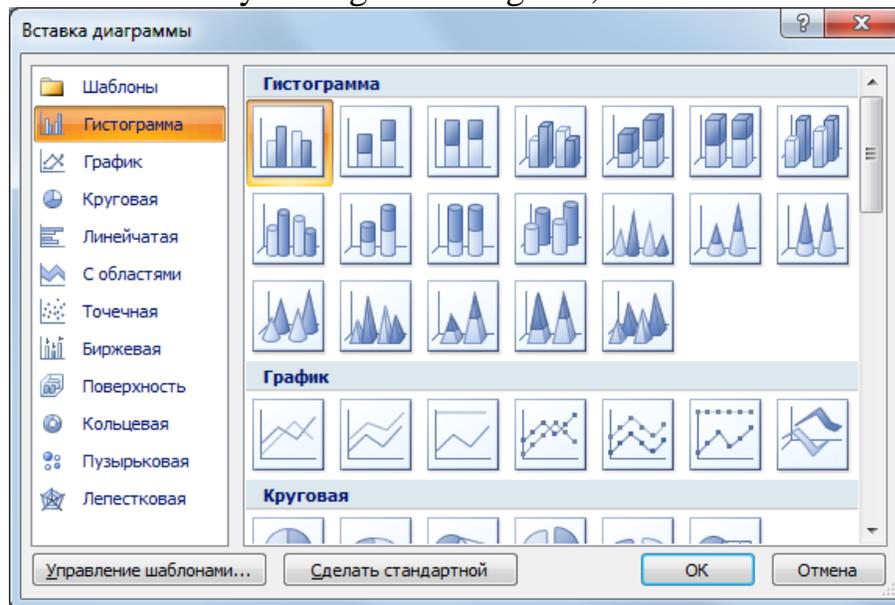
To create the chart is necessary to pre-select the data range, click the desired chart type button on the Insert tab, Charts panel.



**Pic.** Box charts.

The selected graph will be built immediately on the sheet.

Also, a chart can be added by calling the dialog box, insert the chart.



**Pic.** Dialog Box chart.

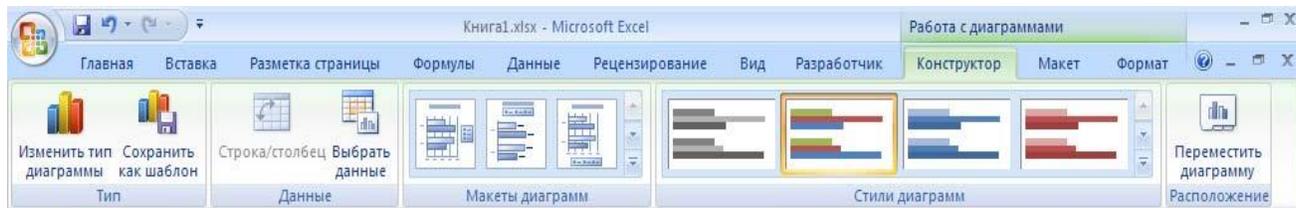
In this window, choose the desired chart type and its species.

At the same time on the tape main menu contextual tool Working with diagrams containing tabs: Design, Layout, and Format. These tabs are located basic tools to edit and format the chart.

### 3.2. Changing the chart

The graph can be changed using the buttons like the corresponding panels and context menu items by pressing the right button on the selected chart element.

Design tab consists of panels: The type of data, the layout diagram, chart style, location. Basic operations performed by these tools: Changing the chart type and location of its data and style.



**Pic. tab Designer**

Panel type is designed to change the type of the diagram. Save as template allows you to save for later use by the user change the chart.

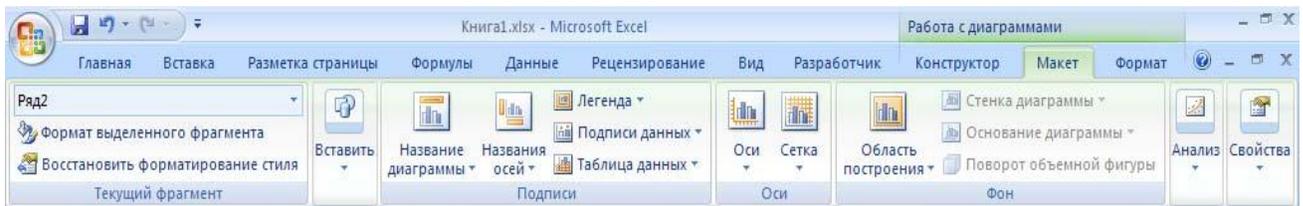
On the panel, you can select new data or correct the selected data range (add / delete rows of data), data interchange in a row on the data in the column.

The panel layouts diagrams can apply one of the available layouts design diagrams of this type.

Styles panel diagrams allow us to apply the styling of the whole diagram.

Location panel is designed to change the location of the chart: move to another worksheet or placed on a separate.

Layout tab contains a panel: current track, Insert, Signature, Axis, Background, Analysis, Properties. These tools are designed to add and customize individual chart elements.



**Pic. Layout tab**

Current track panel lets you select a diagram element (diagram elements in the list) and format (format of the selection button) or return to the original formatting of the form (the Restore button style formatting).

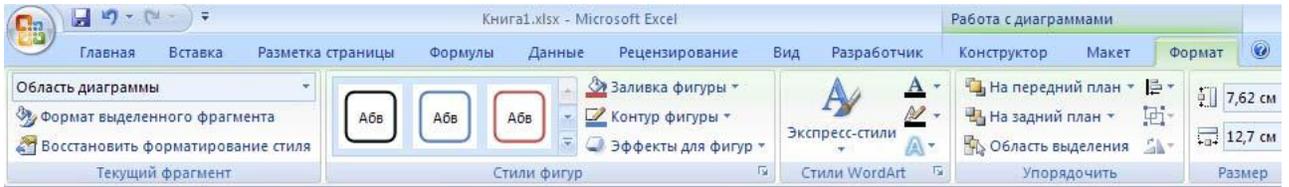
Insert Panel need to insert graphics, figures and inscriptions in the chart.

Signatures panel allows you to add and place in the chart corresponding to the signature elements: chart title, axis titles, legends, data table.

With the axis of the panel in the chart shows the main axis and grid lines.

Background panel is designed for adjusting the parameters of the field of construction, as well as three-dimensional charts elements (Chart Wall, Chart Floor, D Rotation).

Format tab panel includes: current track, Shape Styles, Styles of the WordArt, Sort size tools to format individual chart elements.



**Pic.** Format tab

Panel Current track works similar to the same panel in the Layout tab, and formats the selected item.

On the Shape Styles panel, you can configure the desired design style, set the fill color fringing (circuit), the effects of the selected diagram element.

WordArt Styles panel lets you specify the layout of text elements present in the chart (the signature of the axes, titles, legends, etc.).

Arrange panel allows you to control the placement of objects (charts) on the sheet relative to each other.

Panel size is accurate to define the size and scale of the chart.

### **3.3. Move, copy, delete charts**

To move the chart sheet to another location, you need to select it and drag the left mouse button. To move a chart to another sheet, you must use standard commands for cutting out (Home → Clipboard → Cut or the keyboard shortcut Ctrl + X) and paste (Home → Clipboard → Paste or key combination Ctrl + V). To move the chart and placed on a separate sheet you need to use the command

Working with Charts Designer → → → Location Move the chart.

To copy a chart sheet to another location, you must move the chart by holding down the Ctrl key, a new place to get her copy. To copy the chart, located on a separate page, you need to move Ctrl-tab of the sheet, resulting in the book will be added to the sheet with a copy of the chart. Also can be used to copy the standard Copy command (Home → Clipboard → Copy or the keyboard shortcut Ctrl + C) and paste (Home → Clipboard → Paste or key combination Ctrl + V).

To delete a chart select it enough and press the Delete key. To delete a chart on a separate sheet to click on the sheet tab and right click on the shortcut menu, choose Delete.

## **4. The most commonly used types of charts.**

In Excel, use the following chart types:

- histogram;
- Schedule;
- The pie chart;
- Line Chart;
- Area Chart;
- Scatter
- Stock market chart;

- Surface chart;
- Doughnut;
- Bubble chart;
- Radar.

#### 4.1. Histograms

In the diagrams of this type of axis OX of, or categories axis is horizontal, axis OY - value axis - vertically. The histogram has seven subtypes, of which it is always possible to choose the most suitable type for the graphic display of the available data:

- a group - displays the values of different categories;
- the accumulation of - displays the contribution of each category of data in the total;
- normalized with accumulation - indicates the proportion (%) of each category of data in total;
- the volume with the group;
- the accumulation of volume;
- volume normalized to the accumulation;
- volume histogram.

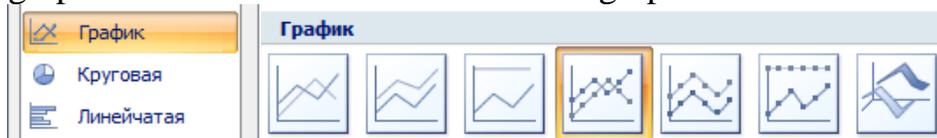


**Pic.** Types of histograms.

With the pie chart can be displayed only one data series, each element of which corresponds to a certain sector of the circle. The area of the sector as a percentage of the area of a circle is equal to the share of total cell number in the sum of all the elements.

#### 4.2. graphics

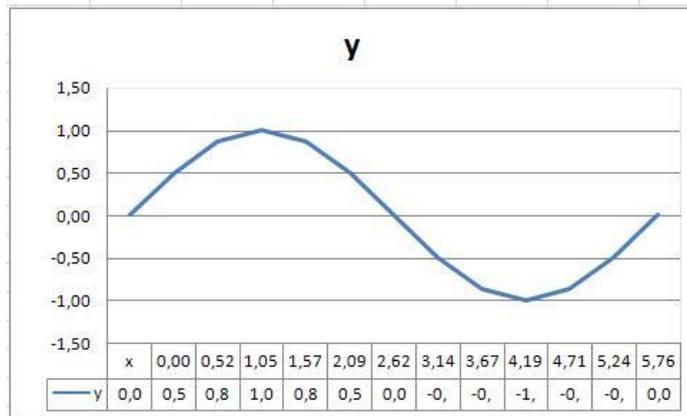
Graphs are commonly used when you want to define the behavior of a function or process. Excel allows you to build a 7 chart types, divided into 3 categories: graph chart with markers and a volume graph



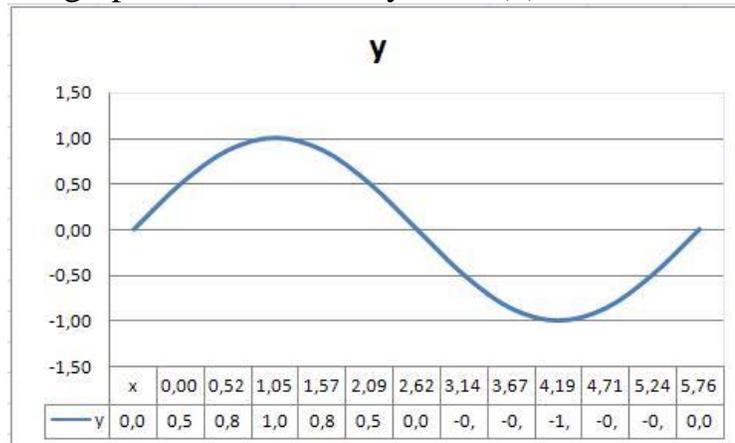
**Pic.** Types of charts

For example, consider plotting  $y = \sin(x)$  in the interval of one complete period. To do this, you need to build a table containing a column of arguments and column values of the function. When plotting points on the set without the use of anti-aliasing some broken line is obtained.

In order for Microsoft Excel 2007 to display on the screen, smooth line, you should enable anti-aliasing mode. To do this, select the charting and cause a number of command Format pop-up menu data. In the window that appears on the tab Line Type, select the option Smooth line and press Close. As a result, the graph of the sine function takes the form shown in Pic



**Pic.** The graph of the function  $y = \sin(x)$  without smoothing



**Pic.** The graph of  $y = \sin(x)$  with anti-aliasing

### 4.3. Pie charts

Circular diagrammy- is a circle divided into sectors (cake), and are used to show the relative values are integrated. The largest sector of the circle should be the first in a clockwise direction from the top. Each circle sector must be marked (required name, value and percentage). If you want to focus on a particular sector, it is separated from the rest.

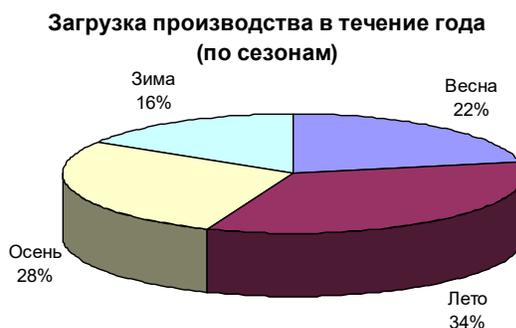
Circular chart type is useful when you want to display the values of each share in the total amount.

We construct a three-dimensional pie chart that displays the loading of production during the year.

|   | А   | В                  |
|---|---|--------------------|
| 1 | Загрузка производства в течение года (по сезонам) |                    |
| 2 | Сезон   | Объем производства |
| 3 | Весна   | 22%                |
| 4 | Лето  | 34%                |
| 5 | Осень   | 28%                |
| 6 | Зима  | 16%                |

**Pic.** The data for charting.

With the pie chart can be displayed only one data series, each element of which corresponds to a certain sector of the circle. The area of the sector as a percentage of the area of a circle is equal to the share of total cell number in the sum of all the elements. Thus, the sum of all shares of seasonal is 100%. Pie chart created on the basis of these data is shown below:



**Pic.** Pie chart.

6 types of pie charts are presented in Excel:

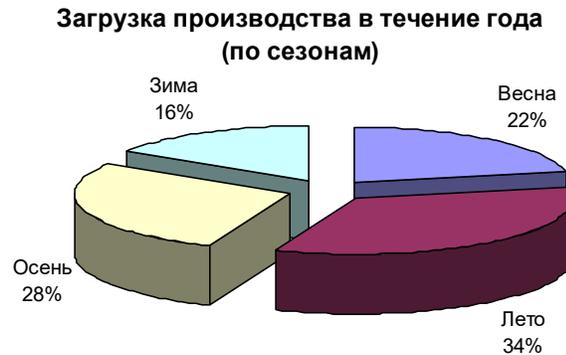


**Pic.** Forms of the pie chart.

- Circular - shows the contribution of each value to the total amount;
- volumetric circular;
- Pie - part of the core values of the charts presented for the second chart;
- circular cut - value sectors separated from each other;
- volumetric cut circular;
- secondary histogram - a part of the basic values of the chart is moved to a histogram.

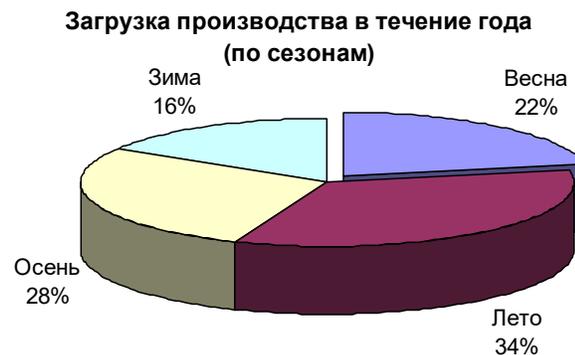
If a pie chart is required to separate sectors, does not necessarily change the chart type. Just select the circle and drag any sector from the center. To

restore the original appearance of the chart, drag the sector in the opposite direction.



**Pic.** Changing the appearance of the pie chart.

It should be remembered that if you want to separate just one sector, it should be made on the two single clicks. The first will provide a series of data, the second - specified sector.

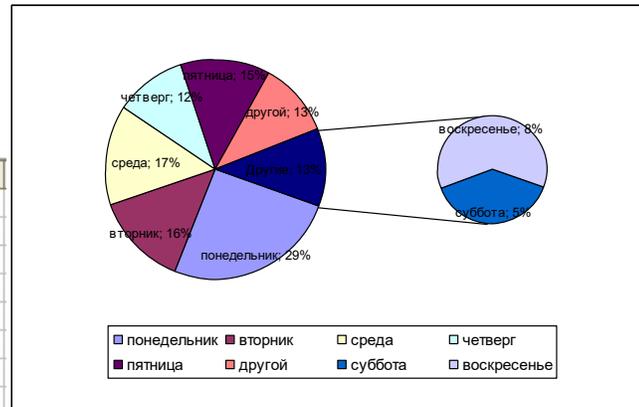


**Pic.** Changing the appearance of the pie chart.

The pie chart sectors  $360^\circ$  can rotate in a circle. To do this, select the Layout tab on the Ribbon and click the selected format.

The secondary pie chart as a bar graph and secondary, allowing some of the data displayed separately in more detail in the minor chart or histogram. Moreover secondary chart diagram is recorded on the primary as a separate fraction. For example, consider a graph that displays sales for the week with the portion attributable to the weekend, taken out in the form of a secondary pie chart. When you select the chart type indicates Pie.

|   | А           | В   |
|---|-------------|-----|
| 1 | понедельник | 29% |
| 2 | вторник     | 16% |
| 3 | среда       | 17% |
| 4 | четверг     | 12% |
| 5 | пятница     | 15% |
| 6 | другой      | 13% |
| 7 | суббота     | 5%  |
| 8 | воскресенье | 8%  |



**Pic. Secondary chart.**

The data are arranged in columns and rows, it can be represented as a scatter plot. Scatter plot showing the relationship between the numerical values in rows or multiple data displays two group numbers as a series of x and y coordinates.

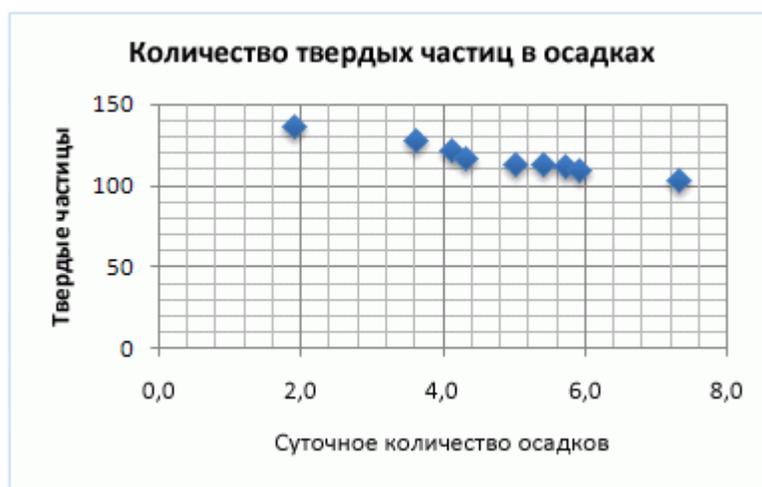
Scatter has two axis values, with some numerical values are displayed along the horizontal axis (X axis), and the other - the vertical axis (Y axis). In a scatter chart, these values are combined into a single point and are displayed at irregular intervals, or clusters. Scatter charts are typically used for illustration and comparison of numerical values, for example, scientific, technical or statistical data.

#### 4.4. Scatter charts

Scatter charts are recommended if:

- You want to change the scale of the horizontal axis.
- You want to use for the horizontal axis logarithmic scale.
- The values on the horizontal axis are arranged irregularly.
- The horizontal axis has lots of data points.
- You want to effectively display data spreadsheet that contains a pair of grouped fields with values, and introduce independent scale scatter plot to display more information about the grouped values.
- You need to show no difference between the data points, and similar in large data sets.
- You need to compare multiple data points without regard to time. The more data that will be used to construct the scatter plot, the more accurate comparison.

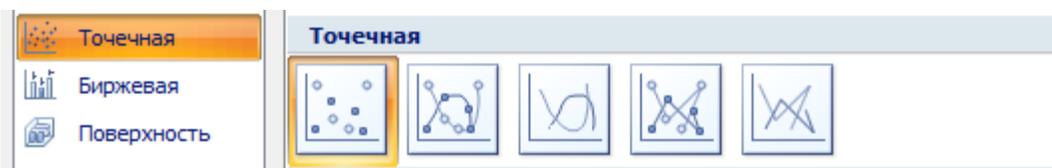
To output the data as a table to place the scatter plot data on the X axis in one row or column and the corresponding data on the Y axis - in adjacent rows or columns.



**Pic.** Scatter chart with markers.

Scatter charts have the following chart subtypes:

- Scatter chart with markers. Diagram of this type allows you to compare a pair of values. Scatter with data markers but without lines should be used when many data points and connecting lines may impede their perception. This type of chart can also be used if there is no need to show a link between data points.
- Scatter chart with smooth lines and scatter chart with smooth lines and markers. The diagram of this type of points are connected by smoothed lines. Such lines may be displayed with or without markers. Smoothes the curve without markers should be used, if the data points are many.
- Scatter charts with straight lines and scatter chart with straight lines and markers. The diagram of this type of data points are connected by straight lines. Direct can be displayed with or without markers.



**Pic.** Types of scatter charts.

### 3. The purpose of activity of students in class:

*The student should know:*

1. How to call the master functions.
2. The intended use is "Built-in functions".
3. Categories of built-in functions.
4. What is the range finder.
5. What is the range of data.
6. How to call "Charting Wizard."
7. Appointment of the tool "Chart Wizard."

8. Types of graphs and functions.
9. What is a "number".
10. What is the range of data
11. What is the "Legend"

***The student should be able to:***

1. Imet skills in MSEXCEL program.
2. Umet use the tool "Built-in" for the calculation of various kinds of indicators.
3. Use "Chart Wizard" tool for the construction of various types of graphs.

**4. Learning content:**

1. The concept of function.
  - 1.1. Basic Excel functions.
  - 1.2. The most commonly used built-in functions.
  - 1.3. Writing and editing functions.
2. Use of the analysis packet
3. Diagrams.
  - 3.1. Adding charts.
  - 3.2. Changing the chart
  - 3.3. Move, copy, delete charts
4. The most commonly used types of charts.
  - 4.1. Histograms
  - 4.2. graphics
  - 4.3. Pie charts
  - 4.4. Scatter charts

**5. The list of questions to check the initial level of knowledge:**

1. What is the use autofill and how it is carried out?
2. How is the input of formulas in a table cell?
3. What are the ways to place text in the table cells?
4. List the main ways of copying and isolation cells.
5. Remove the cells and data cells.
6. Adding cells
7. Filling cells
8. What is the hidden rows or hidden columns?
9. Identify and describe two basic ways how to temporarily remove the information contained in the specific rows (columns) of the table?

**6. The list of questions to check the final level of knowledge:**

1. What is the built-in Excel function?
2. Describe the classification of built-in features on the types of data being processed.
3. What can be used as arguments to the built-in function?
4. What types of built-in functions related to specific areas.

5. What is the range finder? Describe the work with him.
6. Using the AutoSum tool.
7. Describe the form you built in Excel functions.
8. Describe how to perform the work. How should the work be framed? How should I present the results of the work done.
9. Why do we need to build charts and graphs?
10. What is the number of data?
11. Describe the process of creating a chart or graph?
12. List the required elements of any design graphics and diagrams?
13. How is the change in the parameters to create a chart?
14. How do I change the font of the text information in the chart?
15. What is the area of the chart? How to resize it?
16. How do I change the type and color of the line on the graph of the chart?
17. Why is the standard way to create a chart or graph is almost always needs work?
18. Describe how to perform the work. How should the work be framed? How should I present the results of the work done?

### **7. The practical part:**

1. Create a document type and format in accordance with the model using the formatting tools.
2. Рассчитат given to the practical task performance with the use of built-in features, and plot the function:

### **Option 1. Neobhodimoe time to perform 20-30 minutes**

**Baseline data are presented in the following table:**

| <b>№</b> | <b>Ф.И.О. Сотрудника</b>      | <b>Должность</b>  | <b>Оклад</b> |
|----------|-------------------------------|-------------------|--------------|
| 1        | Иванов Иван Иванович          | Директор          | 5 000        |
| 2        | Сидоров Петр Ильич            | Главный бухгалтер | 4 000        |
| 3        | Федосеева Катерина Ивановна   | Бухгалтер         | 2 500        |
| 4        | Петрова Ирина Николаевна      | Бухгалтер         | 2 000        |
| 5        | Макаров Константин Степанович | Кладовщик         | 2 000        |
| 6        | Астапенко Сергей Сергеевич    | Электрик          | 1 500        |
| 7        | Бакланов Алексей Владимирович | Продавец          | 1 500        |
| 8        | Ломакин Геннадий Викторович   | Продавец          | 1 500        |
| 9        | Валерьянов Николай Игоревич   | Грузчик           | 1 000        |
| 10       | Ромашова Татьяна Владимировна | Продавец          | 1 200        |

It is required to determine the following parameters:

Payroll for the enterprise; the maximum and minimum salary; average salary; the number of employees with a salary of less than a certain amount; Payroll staff with a

salary of less than a certain amount; the proportion of employees with a salary of less than a certain amount, in the total payroll.

*8. Hronokarta training session:*

1. Organizing the time - 5 minutes.
2. Monitoring of knowledge - 30 min.
3. Analysis of the theme - 20 min.
4. Practical work - 30 minutes.
5. Wrap-up sessions - 10 min.

**9. Independent work of the student.**

Learn the basic principles of the functions of the Master (text and logical) principles charting in MC Excel 2007.

**10. A list of textbooks for the class:**

1. AN Stepanov Computer science. Textbook for high schools. 4th izd.g. St. Petersburg, Peter., 2006;
2. Esaulenko IE, Semenov SN Basics of practical informatics in medicine; Voronezh, 2005;

## **Topic 5: "SUBD MS Access. Organization of databases: by entering data; using a wizard; using the constructor, by importing the spreadsheet data; the creation of multi-table database to solve medical problems "**

### ***1. Scientific and methodological support of the theme:***

This policy tool as a working environment database development and programming for their Microsoft Access package has been selected, which is part of the Microsoft Office suite. The main reason for such a choice - the prevalence of this environment and the availability of its development for the non-programmer-users. Microsoft Access is currently the most popular desktop database management system (DBMS table). The term "board" here means the ability to create and use databases on a personal computer. If you have the necessary skills and background knowledge, anyone can create on your PC database and successfully use it in your everyday tasks. Currently, a large number of databases, accounting systems and analysis of the economy performed using Access. Database Applications built using this environment, now used in medicine. Of particular value is the knowledge of this environment for medical practice: there are a lot of data processing tasks that such a popular tool as Microsoft Excel can not cope or its use will not be effective for these tasks. Such tools as Access will allow in this case, clearly structured and well-organized work with a lot of medical information tables.

### ***2. Brief theory:***

#### ***1. Concepts Databases***

Development of computer technology was carried out in two main directions:

- the use of computer technology to perform numerical calculations;
- The use of computer technology in information systems.

Information system - a combination of software and hardware, methods and people who provide collection, storage, processing and delivery of information for the task. In the early stages of information systems used file processing model. In the future, the database began to be applied in information systems. Databases are a modern form of organization, storage and access to information. Examples of large-scale information systems are the banking systems, train tickets and ordering systems, etc.

Database - an integrated set of structured and interrelated data organized according to certain rules, which include the general principles of description, data storage and processing. Typically, the database is created for the domain.

Specialization - this is part of the real world, to be studied in order to create a database to automate the management process.

A set of principles that define the organization of logical data storage structures in the database are called data models.

There are 4 main data model - lists (flat table), relational databases, hierarchical and network structures.

For many years, mainly used in flat table (flat DB) type in Excel lists. Currently, the most widely used in the development of database received a data model. The relational data model is a collection of simple two-dimensional tables - relationships (English relation.), i.e. The simplest two-dimensional table is defined as the ratio (lots of similar accounts united by one theme).

From term relation (ratio) comes the name relational data model. In the relational database using multiple two-dimensional tables in which rows are called records and columns are fields between records which connections are established. This organization of data allows data (records) in a table associated with the data (records) in the other tables through a unique identifier (key) or key fields.

## ***2. Basic concepts of relational databases: normalization, communication and keys***

### ***2.1. The principles of normalization:***

1. In each table, the database should not be repeating fields;
2. In each table must have a unique identifier (the primary key);
3. Each primary key value must comply with sufficient information on the type or nature of the object table (for example, information about the progress of the group or student);
4. Change the values in the table fields should not affect the information in other fields (except for changes in the key fields).

### ***2.2. Types of logical connection.***

Communication is established between the two general fields (columns) of the two tables. There is an attitude of "one-to-one", "one-to-many" and "many-to-many".

The relationships that can exist between the records of two tables:

- One-to-one relationship, each record in one table corresponds to one record in another table;
- one-to-many relationship, each record in one table corresponds to the number of records to another table;
- Many-to-one basis, a plurality of records from one table corresponds to one record in another table;
- Many-to-many, many records from one table corresponds to multiple records in the other table.

Type of relationship created in connection depends on how you define linked fields:

- The ratio of "one-to-many" created in the case where only one of the fields is a field or a unique primary key index.
- The ratio of "one-to-one" is created in the case when both fields are linkable key or have a unique index.

- The ratio of "many-to-many" relationship is actually two "one-to-many" third table where the primary key consists of the foreign key fields of the other two tables

### **2.3. Keys.**

The key - a column (may be multiple columns) to be added to the table and can be linked to records in another table. There are two types of keys: primary and secondary or external.

Primary key - it is one or more fields (columns), the combination of values that uniquely identify each record in the table. The primary key does not allow Null values and must always have a unique index. A primary key is used to link tables with foreign keys in other tables.

External (secondary) is a key-one or more fields (columns) in the table, containing a reference to a field or primary key field in another table. A foreign key specifies how to join tables. Of the two are logically related tables called a primary key table or the master table and another table of the secondary (outer) key or a subordinate table. Database allow us to compare the related records from both tables and bring them together in the form of a report or request.

There are three types of primary keys: the key fields of the counter (counter), and simple key composite key.

Counter field (data type counter). field data type in the database, where each record added to the table in the field is automatically entered a unique numeric value.

Simple key. If the field contains unique values, such as codes or part numbers, then this field can be defined as the primary key. As a key, you can specify any field that contains the data if the field does not contain duplicate values or Null.

Composite key. In cases where it is impossible to guarantee the uniqueness of the values of each field, it is possible to create a key that consists of several fields. Most often such a situation arises for the table that is used to connect two tables with a many-to-many.

It should again be noted that the primary key field should be only unique values in each row of the table, ie match is not permitted, and in the secondary or foreign key values match lines permitted in the table.

If you are having difficulty with the choice of a suitable type of the primary key, as the key is advisable to choose a field meter.

Programs that are designed to structure the information, placing it in the tables and data manipulation are called database management systems (DBMS). In other words, the database are designed to create and maintain a database and data access. Currently, there are more than 50 types of databases for personal computers. The most common database types are: MS SQL Server, Oracle, Informix, Sybase, DB2, MS Access, etc...

### **3. Create a database. design Stages**

Creating a database begins with the design.

Stages of database design:

1. Investigation of the domain;

2. Data Analysis (entities and their attributes);
3. Defining relationships between entities and the definition of primary and secondary (external) keys.

The design process is determined by the structure of a relational database (tables structure, their structure and logical connections). The table structure is determined by the composition of the column, the data type and size of the columns of the table keys.

By the basic concepts of database model "entity - relationship" include: entity relationship between them and their attributes (properties).

**Essence** - any concrete or abstract object in the subject area. Essence - this is the basic types of information that are stored in the database (table in a relational database is assigned each entity). For entities may include: students, customers, departments, etc. A copy of the nature and type of the essence - it is a different concept. The concept of an entity type refers to a set of homogeneous individuals, objects or events, acting as a whole (eg, student, client, etc.). entity instance includes, for example, to a particular person in the set. The type of entity can be a student, and a copy of - Petrov, Sidorov, etc...

**Attribute** - this property is in the nature of the subject area. His name must be unique for a particular entity type. For example, the essence of the student the following attributes can be used: name, surname, patronymic, date and place of birth, passport data, etc. In a relational database attributes are stored in the table fields.

**Communication** - the relationship between the entities in the domain. Links are connections between the parts of the database (in a relational database - a connection between table entries).

**Entity** - This data, which are classified by type and communications show how these types of data are correlated to one another. If you describe some subject area in terms of nature - communication, we get the entity-relationship model for this database.

### **3. Microsoft Access 2007.**

The application Microsoft Access 2007- This desktop relational database management system (RDBMS), designed to work on a standalone personal computer (PC) or a local area network that is running Microsoft Windows family of operating systems.

Database Microsoft Access 2007 provides powerful, convenient and flexible means of visual design objects with the help of wizards that enables the user with minimal surface preparation pretty quickly create a complete information system at the level of tables, queries, forms and reports.

The main features Microsoft Access 2007 database include the following:

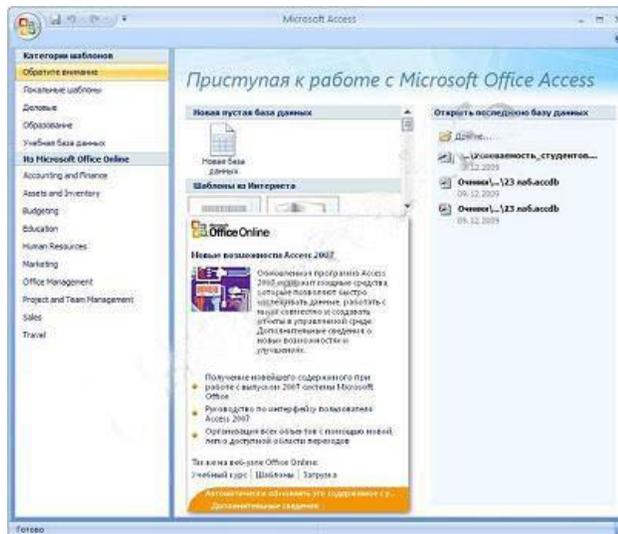
- Design of basic facilities - two-dimensional table with fields of different data types.
- Create relationships between tables, with support for data integrity, cascading updates fields and cascade delete records.
  - Entering, storing, viewing, sorting, changing, and sample data from tables by using different means of controlling information, indexing tables, and the algebra of logic device.
  - Creation, modification and use of derived objects (queries, forms and reports).

In Microsoft Access 2007 database, you can create:

- Table - two-dimensional table, which is used to store data in relational databases. The data is stored in the records, which consist of individual fields. Each table contains information about entities of a certain type (eg, students).
  - request-tool for the selection of data that satisfy certain conditions. Since only necessary information can be selected from the database using queries
  - Shape - a tool that simplifies the process of entering or changing data in the database table that provides data entry staff low qualifications.
  - Report- tool that allows you to extract from the base of the right information and present it in a form convenient for perception, as well as prepare a report to be printed, which is decorated accordingly.
  - Pages - the data access page is a special Web-page that is used to view and work on the Internet or intranet data that is stored in Microsoft Access databases or database MS SQL Server.
  - Macro - set macros created by the user to automate certain functions.
  - The modular object containing Visual Basic program in the language used in some cases for data processing.

MS Access 2007 user interface - is a program that implements a dialogue in the process of the user with the Access 2007 application.

When you run Access 2007, the application will be displayed new home page  
Getting Started with Microsoft Access 2007

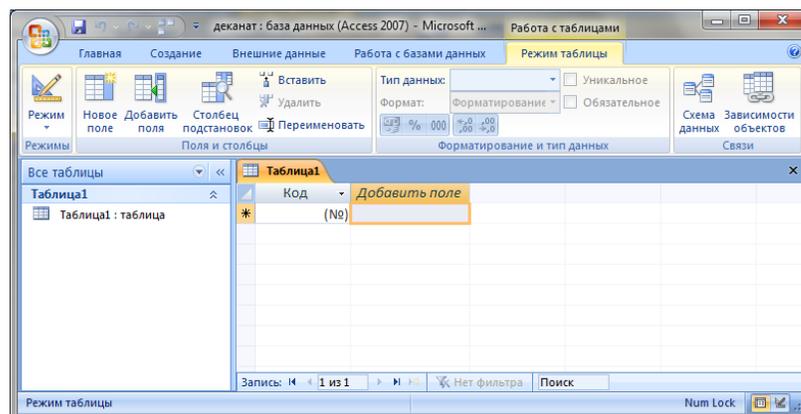


**Pic. Home Getting Started with Microsoft Access 2007**

When you create a template-based database, you can select the desired pattern on the page Getting Started with Microsoft Access 2007 from the category templates or templates from Microsoft Office Online.

To create a new empty database, you must click on the icon Blank Database under New empty database, the right of the application window will appear a text field with the file name: Database dannyh1.accdb and folder icon to save the file to the desired directory. By default, the file name, directory name, and the disk where the file will be saved. The file name, directory, and disk storage file can be changed. It should be noted that Access 2007 for new default database uses the Access 2007 file format (.accdb).

After selecting the folder, disk, file, and database formats, you need to click on the New button. The database file with the selected name will be saved in the specified folder, and open Microsoft Access 2007. This window is the application window displays the Database window with the assigned name on the Mode tab and the new table is empty table named Table1 in Datasheet view. Next, go to the Design mode and create the structure of the first database table.



**Pic.** Tools and Microsoft Access 2007 window.

Consider Microsoft Access 2007. application window In the top part of the window: Office Button, the Quick Access Toolbar with icons (save, undo), title bar buttons and window resizing.

Below is a belt, which consists of tabs (Home, Create, External Data, working with databases and other tabs, which appear depending on the operating mode). In Access 2007 application apply contextual tools that appear when working with a particular object. For example, when working with the table appearing contextual tools for object Table titled Working with tables that have two tabs: Datasheet and Design.

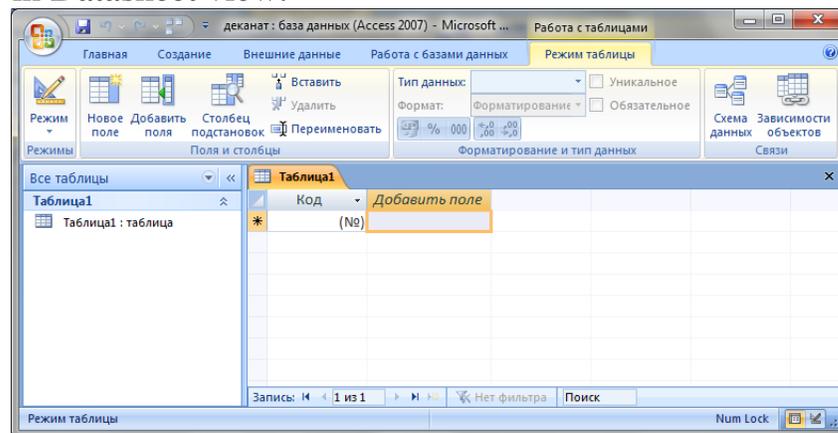
On the Ribbon displays specific commands sets depending on which tab is selected. Groups of commands on the selected tab are grouped by workflow. So tab displays the mode tables group commands View, Fields and columns, formatting, and data type Link. The names of the listed groups of commands are displayed at the bottom of the tape.

Under the belt are located on the left navigation pane, and the right of editing window that displays an editable object. In the navigation pane contains all the Access objects (tables, forms, queries, reports, etc.). In the All Access objects you can select the desired object. When you double-click on the object name in the navigation pane, this object will be displayed in the editing window. Access the bottom window is the status bar and buttons display modes.

**5. Create a database (tables and relationships between them) in Access 2007**

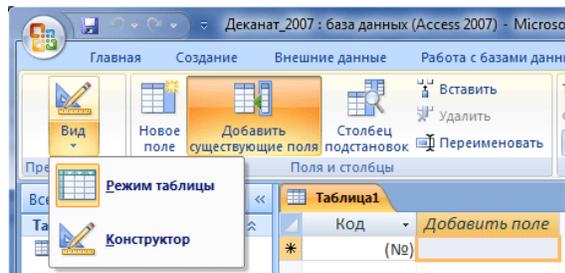
Create a new database under the name of the emergency room.

When you create a new empty database Access 2007 application window opens on the contextual tab mode table. The window displays a new empty table named Table1 in Datasheet view.



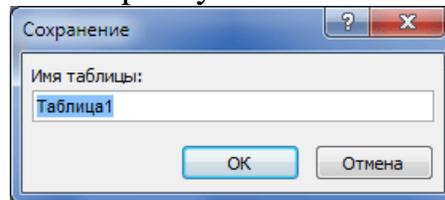
**Pic.** The new empty table.

Next, go to the Design mode and create the structure of the first database table. To do this, click on the icon and choose View Designer mode.



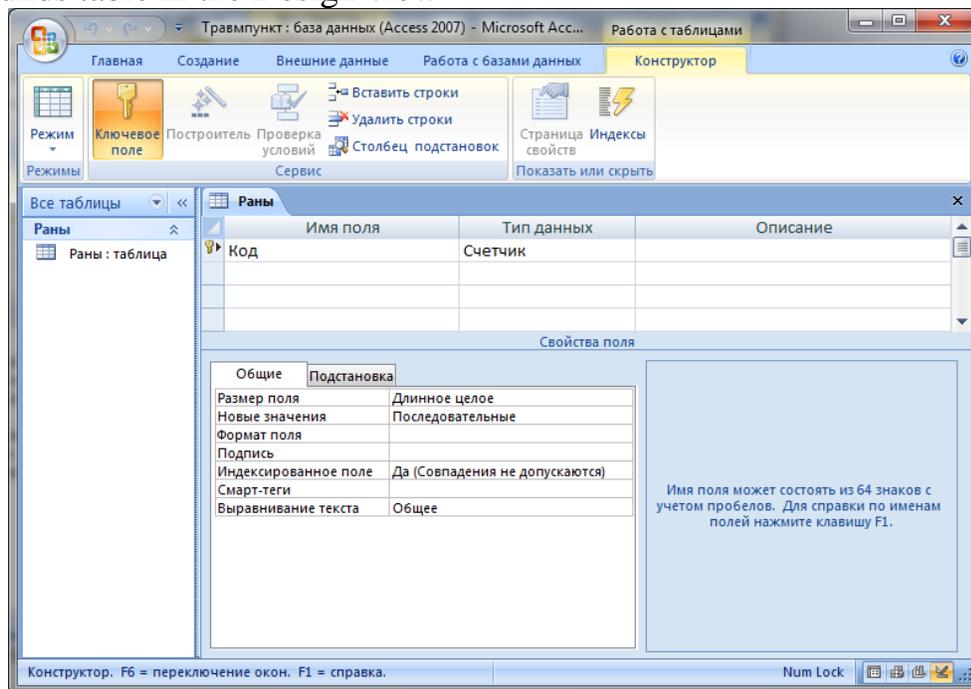
**Pic.** Regime change.

Saving window opens in which to specify the name of wounds and click OK.



**Pic.** Save dialog box

Open Wounds table in the Design view



**Pic.** Injury Table in Design view.

Composition (structure) of the table defined in the project table that has three columns:

- The field name;
- The data type;
- Description.

Data types must be selected from the drop-down list:

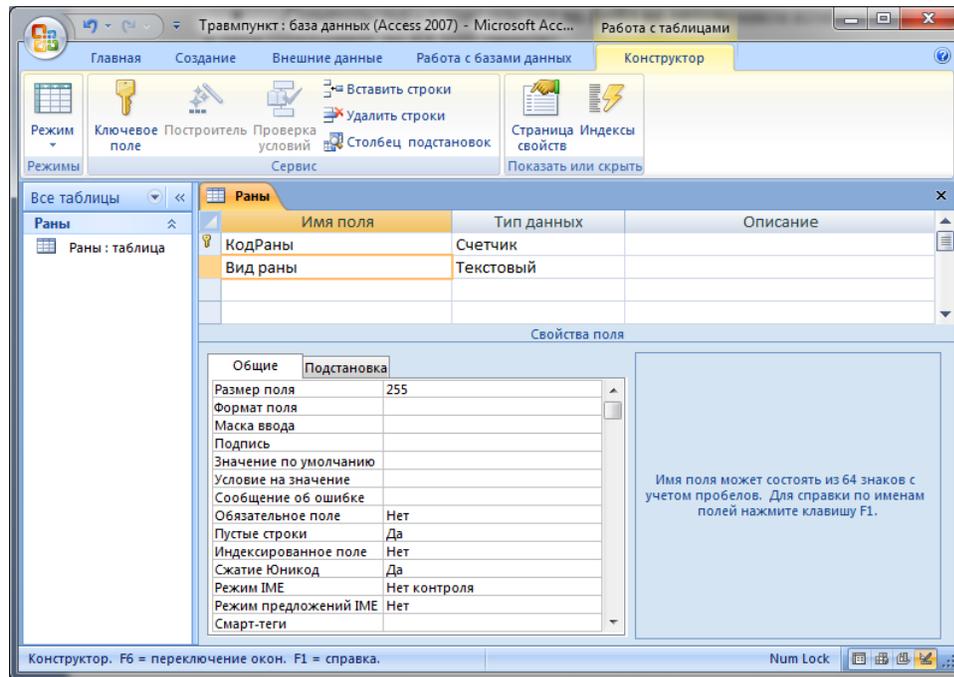
- Text - alphanumeric data (up to 255 bytes)
- Field memoran- long text or numbers, such as notes or descriptions (up to 64,000 bytes)
  - Chislovoy- text or combination text and numbers (stores 1, 2, 4 or 8 bytes)
  - Date / Time - the date and time (8 bytes)
  - Denezhnyy- used for monetary values (saves 8 bytes)
  - Counter - automatic insertion of unique sequential (incremented by 1) or random numbers when adding entries (4 bytes)
  - Logical - data, taking only one of two possible values, such as "Yes / No" (1 bit)
  - Field object OLE - to insert the following objects: drawings, pictures, diagrams, etc. (Up to 1GB)
    - Hyperlink - address links to a file on a standalone computer or network (stores up to 64,000 characters)
    - Master podstanovok- creates a field that allows you to select a value from another table or from a list of values using a combo box. When this option is selected in the list of data types, a wizard for automatic determination of the field.

In the field of properties designate the properties for each field (for example, size, format, an indexed field, etc.).

When you create the first column of the table structure of the input field name, then you must press the Enter key, and select a data type. Then type in the third column of the field description.

Create a table structure wounds. Injury Table contains two fields: View and KodRany wounds. In the first column row Field Name, enter ID Wounds (KodRany) and press Enter. The cursor moves to the column data type. Access assigns a default data type -Schetchik. Press the Enter key, the cursor moves to the column Description, enter the description of the data, if necessary.

The first line of the table (KodRany field) Access by default assigns the primary key field. For a primary key field in the properties is set to be indexed fields: Yes (Coincidences are not allowed). Next, fill the second row (the second field in the table), the field name - view of the wound, the data type - text.

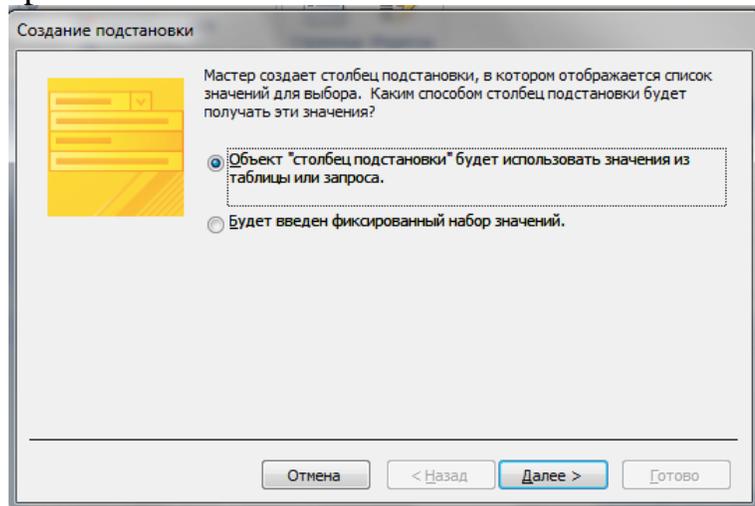


**Pic. Table Wounds**

Then create a second table structure Patients. Patients table includes five fields: KodPatsienta, Last Name, First Name, Date and Type of wounds.

It should be noted that the structure of the table for the field of view of patients wound (secondary key) to set the value of the indexed fields: Yes (Coincidences are allowed) and the type of data the Wizard substitutions.

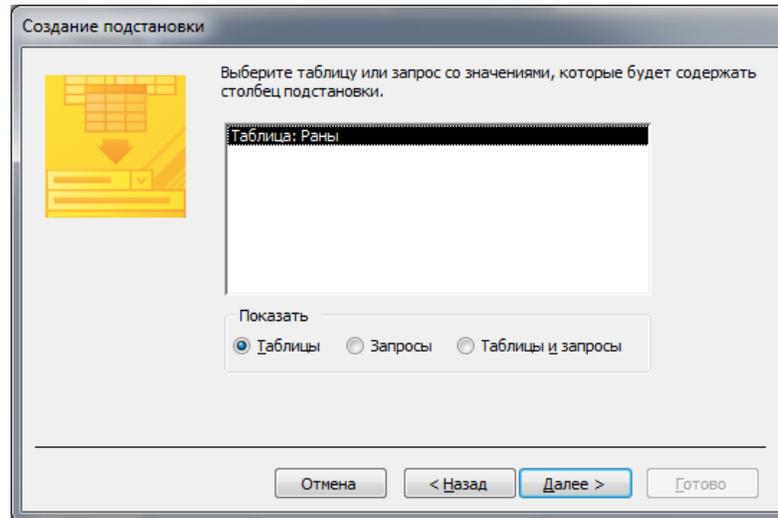
When choosing a data type Lookup Wizard, Wizard called substitutions and a dialog box opens



**Pic. Dialog Creation substitution.**

In our case, in this window you need to select Object "column of substitution" (to use the values from a table or query) and click Next.

The next step is to select an object from which the data will be selected. In this case, we choose a table wounds.



**Pic.** Selection table for a substitution.

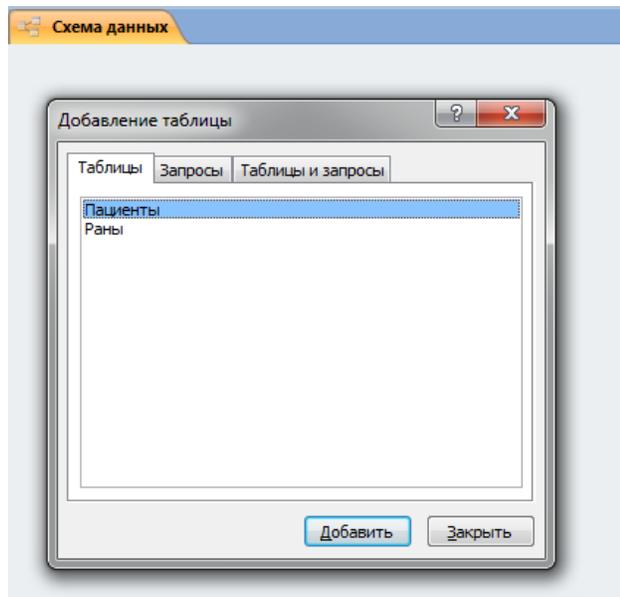
Next you need to choose which values are displayed in the column substitution. For our table just select the field type wounds

#### **6. Set the logical connections in the Access 2007 database.**

Logical connections are established between the same database fields Access 2007. Data Communications data tables in one table with data in other tables through a unique identifier (key) or key fields. In our case, we need to set up logical links between tables: Wounds and patients.

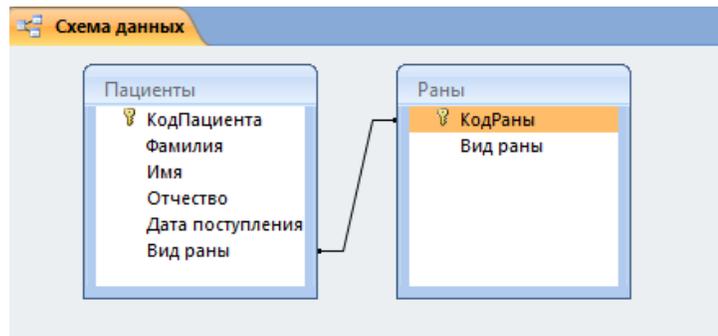
To establish connections using a key field KodRany. For example, between the primary key (KodRany) Injury table and the key secondary (wound type) Patients table set up one-to-many.

Before creating logical connections should be in the edit window to close all the table and go to the tab Working with databases. Then click on the icon of the data scheme in the edit window will appear active dialog box Adding a table against the background of an inactive window data scheme.



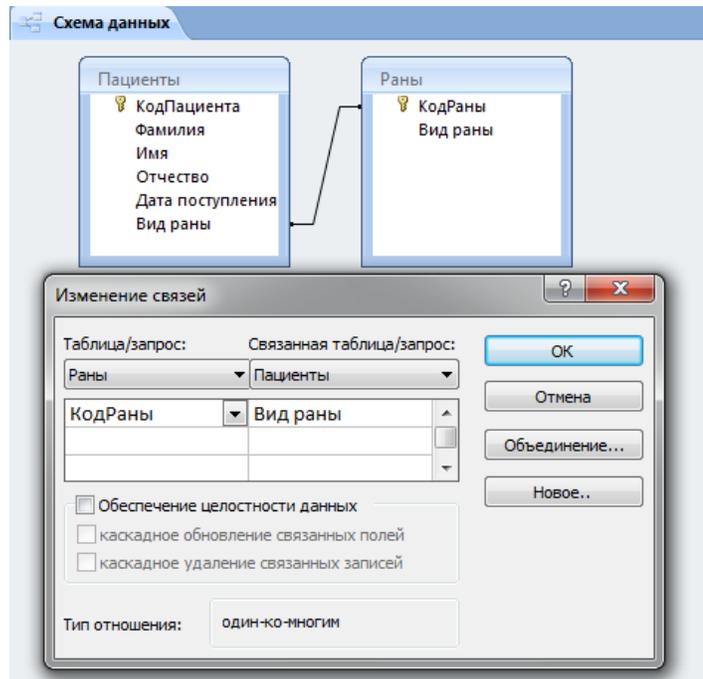
**Pic.** "Adding a Table" dialog box.

In the Add tables necessary to select table names and click the Add button, all tables will appear in the data scheme. After that you need to close the dialog box.



**Pic.** Window data scheme.

When using the Lookup Wizard relationship between the respective fields of tables created automatically. Next, you need to click on the link, right-click and select Change Us ... As a result of this operation will be a window Changing relations.



**Pic.** The dialog box Change Association.

In the resulting dialog box, Change the links you need to install the boxes: To ensure data integrity, cascading updates related fields and cascade delete related records to ensure that the set type of relationship one-to-many, and then click Create.

After installing the relationships between tables, you must close the window scheme data. Next, you need to carry out filling all the tables. Filling it is advisable to start with the wounds of the table as a field KodRany Wounds table is used as a substitution column fields table wounds of the patient.

## 7. Filling of the Access 2007 database tables.

Tables DB Access 2007neobhodimo fill data in a certain sequence. First, you need to fill in the main table, and then subordinates.

The drop-down list of data for secondary keys only appear if when you create the structure of tables in the slave mode, the constructor for the fields of secondary keys selected data type Lookup Wizard.

Consider filling the wounds of the table. In the Database window in the emergency room facilities choose Wounds table, and execute on it, double-click. The editing window will appear Wounds structure table in Datasheet view. The new table consisting of a single blank line.

Filling is done through the records (the rows). Counter Field (KodRany field) is filled in automatically. Move to the next field by pressing the Tab key. After entering the first record cursor moves to the next record. After filling the wounds of the table is as follows.

| КодРаны | Вид раны      | Добавить поле |
|---------|---------------|---------------|
| 1       | Огнестрельная |               |
| 2       | Резаная       |               |
| 3       | Колотая       |               |
| 4       | Рубленая      |               |
| 5       | Ушибленная    |               |
| 6       | Рваная        |               |
| 7       | Разможенная   |               |
| 8       | Укушенная     |               |
| *       | (№)           |               |

**Pic.** The completed table Wounds

Similarly, the table is filled Patients. It should be noted that in the table Patients Field filled wound type drop-down list.

| КодПациен | Фамилия | Имя     | Отчество   | Дата поступ | Вид раны   | Добавить поле |
|-----------|---------|---------|------------|-------------|------------|---------------|
| 1         | Хубулов | Казбек  | Петрович   | 25.03.1998  | Резаная    |               |
| 2         | Петрова | Зинаида | Алексеевна | 05.06.1990  | Колотая    |               |
| 3         | Засеева | Фатима  | Артуровна  | 02.12.1994  | Ушибленная |               |
| *         | (№)     |         |            |             |            |               |

**Pic.** Students completed table.

It should be noted that in 2007 Access databases are various methods for moving the table. Transitioning from record to record, you can use: arrow keys; Record buttons from the area, located at the bottom of the table in Datasheet view; Goto Find the group, located on the tape. To move from field to field (left to right) used the Tab key and Enter, and in the opposite direction Shift + Tab.

Search data in the table a large amount, it is possible to carry out search team located at the bottom of the table in Datasheet view, or click Find to find the group, located on the tape. To change the data fields you want to use, click Replace in the Find group, located on the tape.

### **3. The purpose of activity of students in class:**

#### **The student should know:**

1. The main structural elements of the database interface Assess.
2. Basic terms Assess.
3. Stages of database design.
4. The principle of operation of the database.
5. How to enter information, create tables.

#### **The student should be able to:**

1. Design Databases.
2. Work MS Access 2007.
3. Create a database.
4. To present data in tabular form.
5. Identify the key fields.
- 6. Create a multiple-database.**
4. Learning content:
  1. Concepts Databases
  2. Basic concepts of relational databases: normalization, communication and keys
    - 2.1. The principles of normalization:
    - 2.2. Types of logical connection.
    - 2.3. Keys.
  3. Create a database. design Stages
  4. Microsoft Access 2007.
  5. Create a database (tables and relationships between them) in Access 2007
  6. Set the logical connections in the Access 2007 database.
  7. Filling of the Access 2007 database tables.

**5. The list of questions to test the level of knowledge:**

1. What is the Databases Management System database?
2. What is MS Access 2007?
3. The main elements of MS Access 2007 working window?

**6. The list of questions to check the final level of knowledge:**

1. What is a database?
2. What is MS Access 2007?
3. List the basic MS Access 2007 features.
4. Describe the working window Microsoft Access 2007.
5. Define the table, normalization, communication and keys.
6. Give the definition of the essence, attributes and domain.
7. Describe the kinds of logical relationships. What are they installed?
8. What is the key. Describe the kinds of keys.
9. List the steps of database design.
10. Main features of the database MSAccess 2007.
7. To study the theoretical material, examining all the examples in it the solution of typical problems.
  1. Create an Access database.
  2. On the basis provided in the embodiment of the job description of a database to create a table. Names created tables must match the names of the tables (entities) listed in the job variant.

3. In each table to create a field. The names of the fields and their data types must be appropriate to the description in the embodiment.

4. Create relationships between tables in accordance with the assignment plan. In addition, for each link to install support for data integrity.

5. Create a lookup field in the tables where appropriate.

Check the database schema: make sure that the diagram shows all tables and relations between them.

### **Option 1**

Dana fragments of database tables. Create a trauma center database and fill in data.

Where required, create a lookup field for the convenience of filling tables.

Wounds

## **Topic 6: "Standard software. Presentations in MS Power Point environment. Interface, the main elements and options for the solution of health problems "**

### **1. Scientific and methodological support of the theme:**

Microsoft PowerPoint program - a powerful and at the same time quite easy to learn tool for creating electronic presentations designed to visualize the work of the artist (or artists group) attention of other people.

The presentation consists of successive frames called slides. Each slide contains various types of information: text, images, audio and video files.

### **2. Brief theory:**

#### **1. The concept of presentation and slides**

A PowerPoint presentation called Documents. Any PowerPoint document is a set of separate but interrelated frames called slides. File usual presentation Microsoft PowerPoint extension .pptx. In the process of creating presentation slides can rearrange, delete, add new ones or just change the content of existing slides.

Presentation - way of presenting information. Multimedia presentation created to support the report, and should be, above all, informative. Information should be presented in the most vivid and convincing manner. For this purpose, graphics, video and audio information. The main ideas are reflected in the text fragments. They are usually small.

Although PowerPoint has its own means to create objects of different types (text, tables, graphics, etc.), thanks to the tight integration with other components of Microsoft Office, the user is able to use already tried and tested materials. For example, text can be prepared in the text editor Word, the formula - in Microsoft Equation application tables - into Microsoft Excel spreadsheet application, the chart - in Microsoft Graph application, art titles - in Microsoft WordArt application.

Obvious advantages of electronic presentation:

#### **• The sequence of presentation.**

With the help of slides, replacing each other on the screen, hold the audience's attention is much easier. Unlike conventional slides, passed through an overhead projector, screen presentation allows you to quickly go back to any of the questions already examined or even change the order of presentation;

#### **• Ability to use the official cribs.**

Presentation - this is not only what the audience sees and hears, and notes for the speaker: what not to forget how accents.

#### **• Multimedia effects.**

Slide presentation - not just an image. As there can be elements of animations, audio and video clips. They are able not only to significantly beautify the presentation, but also enhance its informative value.

#### **• copied.**

Copies of electronic presentation are instantaneous and do not differ from the original. If desired, each listener can get your hands on all the materials shown.

- **Portability.**

CD with presentation compact. In addition, the presentation file can be sent by e-mail, published on the Internet.

## **2. Types of presentations**

- The presentation of the scenarios (for WEB-pages).
- Interactive presentations running under user control.
- Continuously running presentation.

Presentations can have different objectives. In line with this are the following types of presentations:

- Business and marketing presentations.
- Educational presentations.
- Support of research reports.

## **3. Steps for creating presentations**

### **Stage 1**

First you have to understand what you are going to present itself?

Demonstrate you can create a presentation on a computer monitor, on a projection screen in the Internet Web-page as well as through transparent banners or standard 35 mm slides.

### **Stage 2**

Once you have decided, then what you actually want, it is necessary to outline the general presentation of the plan, then:

Firstly, you can easily calculate how much you need to create slides.

Secondly, you will see clearly, with a slide on which you will move. For example, during the slideshow, you need to go back to the previously shown slide or give a choice of transition from one slide to another ...

Third, you will clearly understand whether you fit the standard slide layout or you will have to make their own.

Fourth, you will realize that you need to prepare in advance - what pictures, what music, etc. you may need ...

Fifth, you will be able to find their way in the selection of animation effects.

### **Stage 3**

Directly editing and layout slides. That is, the content of the slide text, add the necessary images, tables, charts ...

### **Step 4**

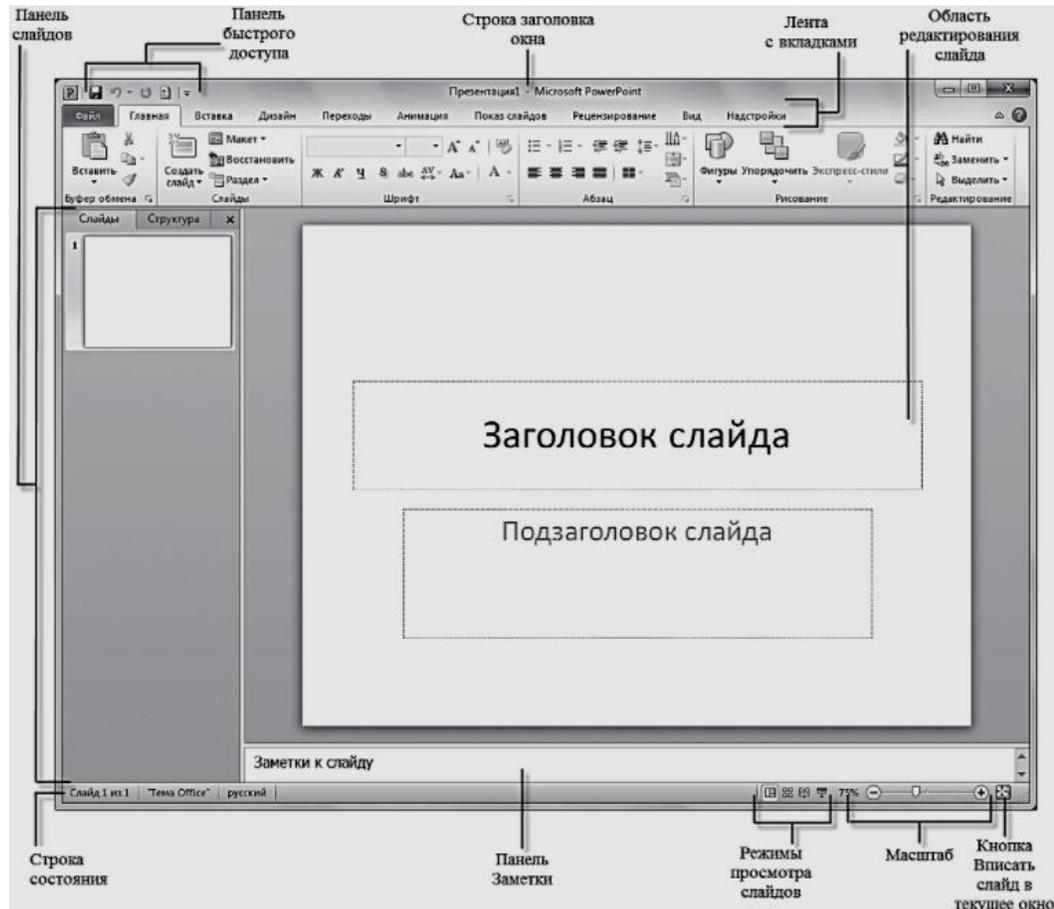
Adding multimedia effects - sounds, animation setting. Setting interactivity - working with the control buttons, creating and configuring hyperlinks.

## Step 5

Check the presentation performance. Packaging for transport to the place of presentation or printing.

### 4. The main elements of MS PowerPoint 2010 program working window.

So, open the PowerPoint program and look at the main elements of its interface:



**Pic.** PowerPoint program window

In PowerPoint 2010 window provides the following elements:

- Window title bar containing the name of the file;
- Quick Access Toolbar, which are located most frequently used commands Save, Undo and Redo. At its discretion, you can add or remove teams, included in this list. Simply click on the drop down menu with additional set of tools, and select the desired;
- Feed with tabs - one of the main elements of the PowerPoint interface. The tabs contains all the tools necessary for the manipulation of the slides;
- the editing area of the slide - the main part of the window, which will be carried out all operations on the presentation;
- scrolling line, via which the movement in the presentation;

- Status bar - located in the lower left corner of the document and contains basic information about the current slide: slide number, subject, language;

- adjustment of the scale of a slider with which you can increase or decrease the scale of the presentation in the workspace;

Fit slide button in the current window. With this function you can arrange the slide so that it was completely visible on the screen without scrolling slide further;

- Slide show mode button. Switching between them changes the presentation on the screen: the normal editing mode, slide sorter, a demonstration in a separate window, and display mode.

### **5. The default mode NORMAL**

Now consider the default Normal mode settings, in which all the basic steps in the initial phase of creating a presentation. When operating in this mode, the screen is divided into four areas:

- the editing area of the slide;
- Notes to the slide area;
- Slides tab;
- Structure tab.

PowerPoint presentation - a set of slides on which you place various types of information: pictures, diagrams, sound files. As you have seen, the slide - the main element in PowerPoint, with whom you will work directly. Open a new PowerPoint document editing area, you will see the title slide. It is usually placed general information about the entire presentation: title, author's name, the time and place of creation and so on..

Data is entered in the Title field and the slide in the slide subtitle. As a rule, each slide should have only the main points or footholds presentation. Any PowerPoint presentation implies clarity and simplicity, so do not overfill the slide text information. Additional information better inform orally during the presentation of the report or in the form of handouts, printed for the students.

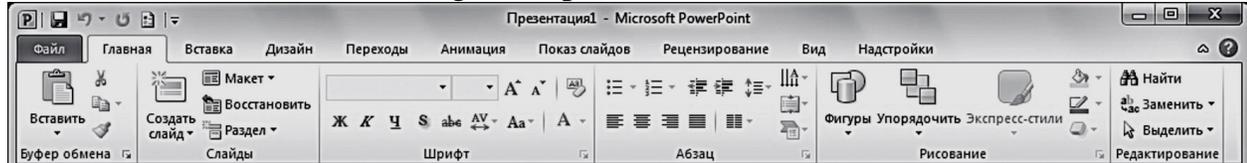
In the notes to the slide, you can enter the necessary information for each slide individually. Audiences these notes will not be visible, and you, in turn, do not forget any details would be reported.

On the Slides tab on the left side of the window as thumbnails displayed a small copy of the slides that make up the presentation. This allows you to quickly navigate to them, delete or add a new slide.

Click on any slide, and it immediately appears in the editing area in the center of the screen. On this panel, you can easily move between slides, as well as to change their position. To do this, simply click on the slide and hold the left mouse button, drag it to another position.

### **6. Work with tabs**

Ribbon with tabs located along the top of the screen below the title bar.



Pic. Ribbon with tabs

Immediately after the launch of the program at your disposal will be ten tabs, which are located all the tools you need to work with slides:

- File;
- Home;
- Insert;
- Design;
- Transitions;
- Animation;
- Slide Show;
- Review;
- View;
- Settings.

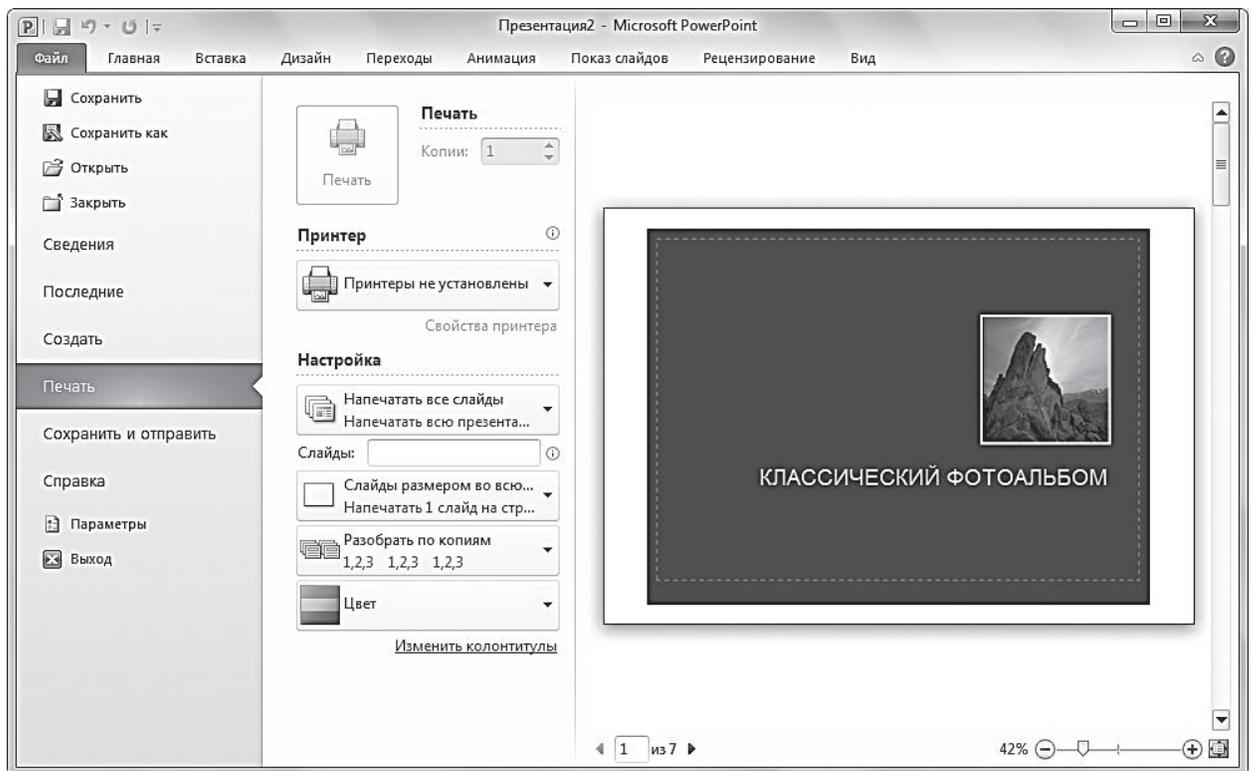
Consider the major ones.

### 6.1. The File tab

On the File tab is a standard set of operations performed with the file in PowerPoint.

Use the controls on this tab you can:

- learn the basics of the presentation file in the Details section: who and when created, size, number of slides, etc .;.
- Keep finished presentations in the selected folder on your computer's hard drive using the Save or Save As;
- close the presentation team close and open the command Open, indicating that opens in the Open dialog box the path to the appropriate file;
- The last section to view the presentation, on which work was carried out in recent years;
- Create presentations from templates and themes suggested in the Create;
- print the presentation, after setting the print settings in the print;
- save presentations with certain parameters and perform other operations using the controls, see Save and Share



**Pic. Print Settings tab Settings File**

Also, you can access to reference materials, the parameters of the program and complete the work with PowerPoint 2010.

## 6.2. Home tab

Home tab contains the elements of creation and formatting of objects: slides, sections of text, graphics, lines, labels, various geometric shapes, etc. When you start the PowerPoint program and opening the default presentation file Home tab is active..

Use the controls on this tab you can:

- create a new presentation slides by clicking the Create a slide or slides to add a certain structure, using the arrow button under the Create a slide and selecting the layout of the proposed set;

- perform cut, copy and paste objects from the Clipboard group controls. Perform a quick format on the model for all slide text elements: positioning the pointer over the sample and click the Format button on the model, select the desired portion;

- organize the slides in sections by clicking sections, creating a whole presentation of the structure and thereby emphasizing each thematic area of the report;

- perform text formatting: set the desired font for the slide titles, or a paragraph, change alignment, add drop shadows, as well as to give the text list view with the help of groups of elements font and paragraph;

- insert into the slides figures, such as rectangles, circles, lines, arrows, callouts formula or by selecting them from the list in the group drawing and formatting. These graphics give visibility speaker speech, make it more interesting, and also allow the design to adhere to the entire presentation in the same style. Use the Quick Styles button, you can select a suitable fill shapes. Arrange button allows you to distribute the slide several shapes, group them into a common graphical object for ease of movement and other operations;

- to search for the desired slide in the presentation by introducing a combination of letters or phrases in the box caused by clicking Find, and perform text replacement and allocation

### **6.3. Insert tab,**

On the Insert tab, the controls are arranged to insert all the necessary structures which gives clarity in the presentation speech speaker and allows the listener to get the most complete picture of the subject disclosure.

Use the controls on this tab you can:

- add to the slide table, specifying the desired number of rows of columns by using the button Table;

- placing images: drawings from the file, pictures, screen shots, photos;

- create your own photo album by creating a wizard, called by clicking the album. In the image, you can choose the necessary dialog box, from the hard disk, place them in the correct order, add a signature, select a layout and perform other settings;

- add illustrations in the form of figures of presets, SmartArt graphics or charts. It should build on the goals, which will serve as illustration of the data. This may be a block-diagram representation of a visual simple list or chart showing a comparison of certain data;



**Pic.** Example of inserting images in the slide by using the Insert tab tool

add links in the presentation and active regions, as well as special characters;

- insert such informative text elements such as date and time, descriptions, headers, footers, etc. They are combined into a group text..;

- add multimedia objects to a presentation by choosing Video and Sound.

In this case, you must specify the path to the file on the hard disk or select it from the Office Online resource collection.

#### 6.4. tab Design

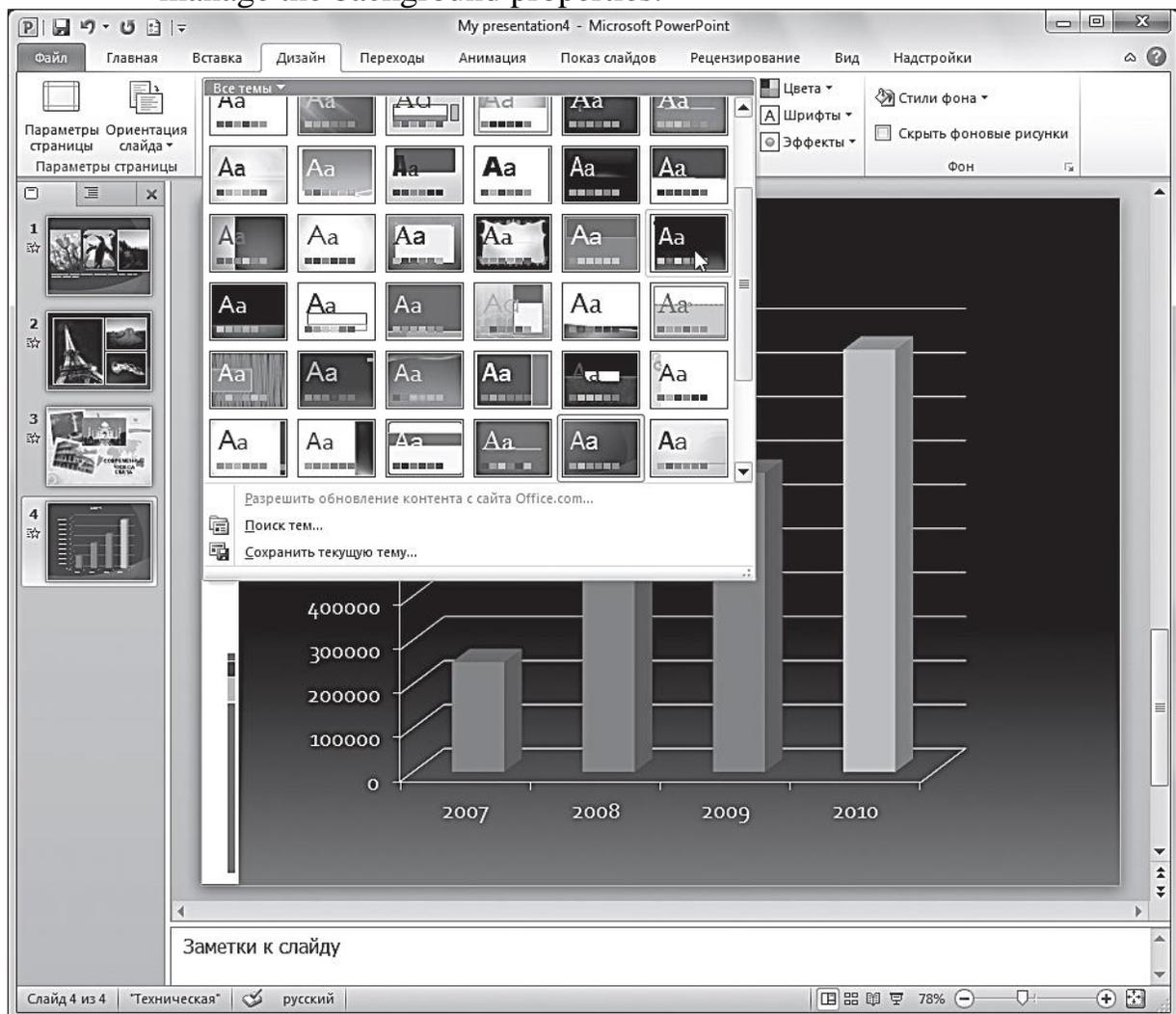
Design tab is designed to develop the overall presentation of the concept: the selection of the most appropriate general style, color schemes for a slide, composition.

Use the controls on this tab you can:

- select suitable PowerPoint presentation themes designed by professional artists and designers. To try this or that subject, move the pointer on the appropriate thumbnail in the collection (Group Topics) and pay attention

to how to change the appearance of the document. Assigning a new theme leads to a change in the fundamental properties of the document: headers, tables, charts, shapes, and other objects. .. The combination of colors, the general background, the object's fill, font, text, etc. kept in the same style;

- use the built-in themes as the basis for creating your own. To do this, select a theme, it is sufficient to change the existing or set new parameters: colors, fonts, effects, background style, etc. Then you can save the settings as a new theme in the collection, select the Save current theme in the list of the thumbnail;
- Select the size of the presentation slides when preparing to print, set the offsets from each end using the Page Setup command;
- change the location of the slide on a sheet by typing the slide orientation;
- manage the background properties.



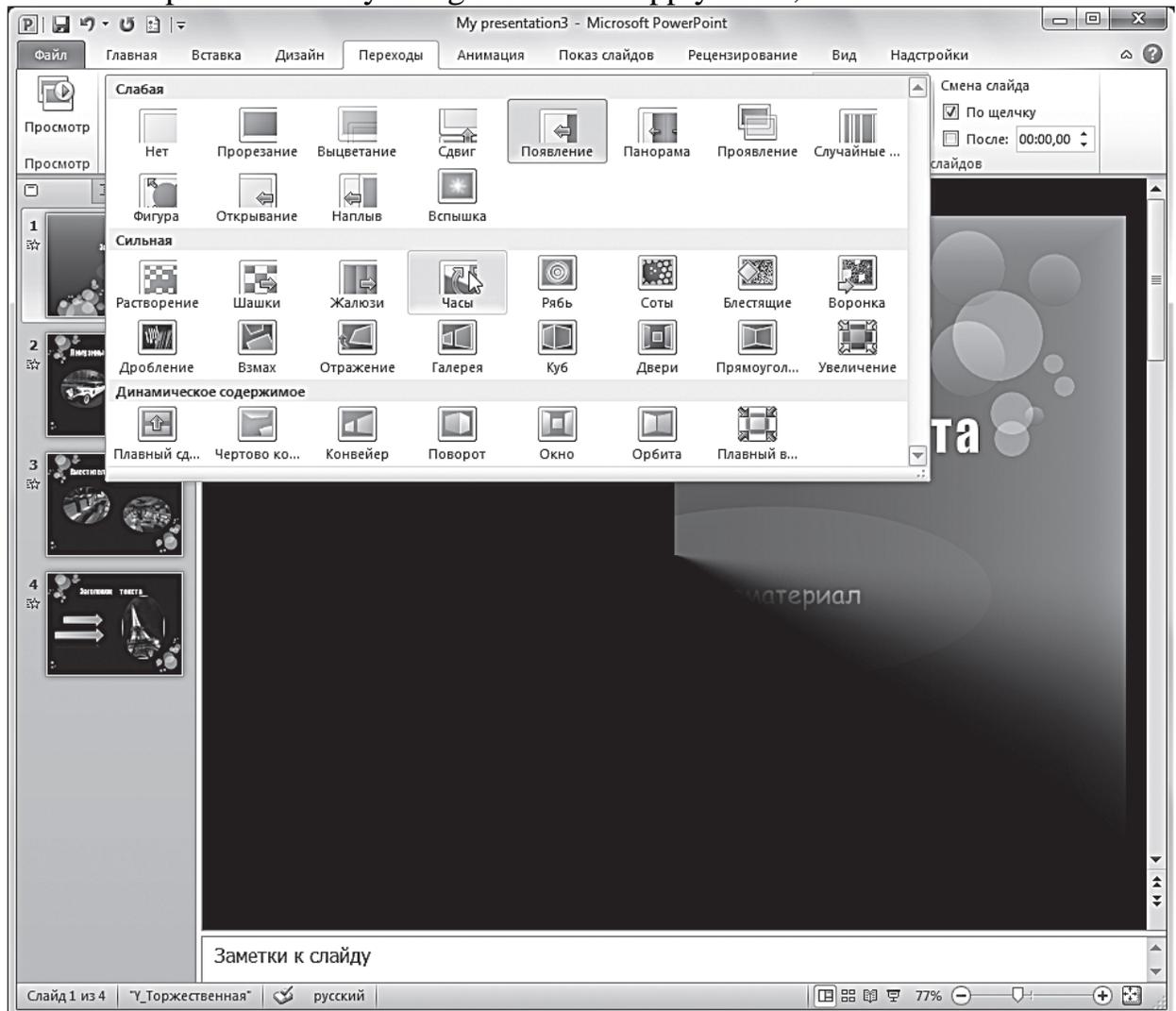
**Pic** Changing the design of a presentation using built-in themes  
PowerPoint Design tab

## 6.5. Transitions tab

In Transitions tab contains tools to configure a smooth transition effects between slides, allowing to capture the viewer's attention.

Use the controls on this tab you can:

- Select your favorite transition effects presented in the group go to the slide. Previous slide can gradually dissolve, giving way to the next, the frames can be changed each other with a shift from the bottom or in the form of a certain movement pattern (cube, clock hands, opening doors, and so on. D.). To access the entire collection of effects, you need to click on the button. The selected effect is applied to the current slide, but it also can be assigned to all slides in the presentation by using the button Apply to all;



**Pic.** Collection tab effects Transitions

- view and set parameters for the selected effect by clicking Effect Options. Quick view the effect on the slide is done by clicking on his name;
- connecting to the slide audio files using the Sound drop-down list.

When you click on the appropriate button opens a list of sound effects from the

Microsoft Office Collection. audio playback is performed when the mouse pointer on its name;

- customize the duration of the transition effect with the input fields with the meter length. To do this, simply enter in this field the desired value from the keyboard, or increase / decrease the value using the buttons;

- a way to define slide transition on the screen during the demonstration. If you check the On Click, then the transition to the next slide will be performed at the click of a mouse. If you check after and specify the time interval between slides, the transition will be carried out automatically;

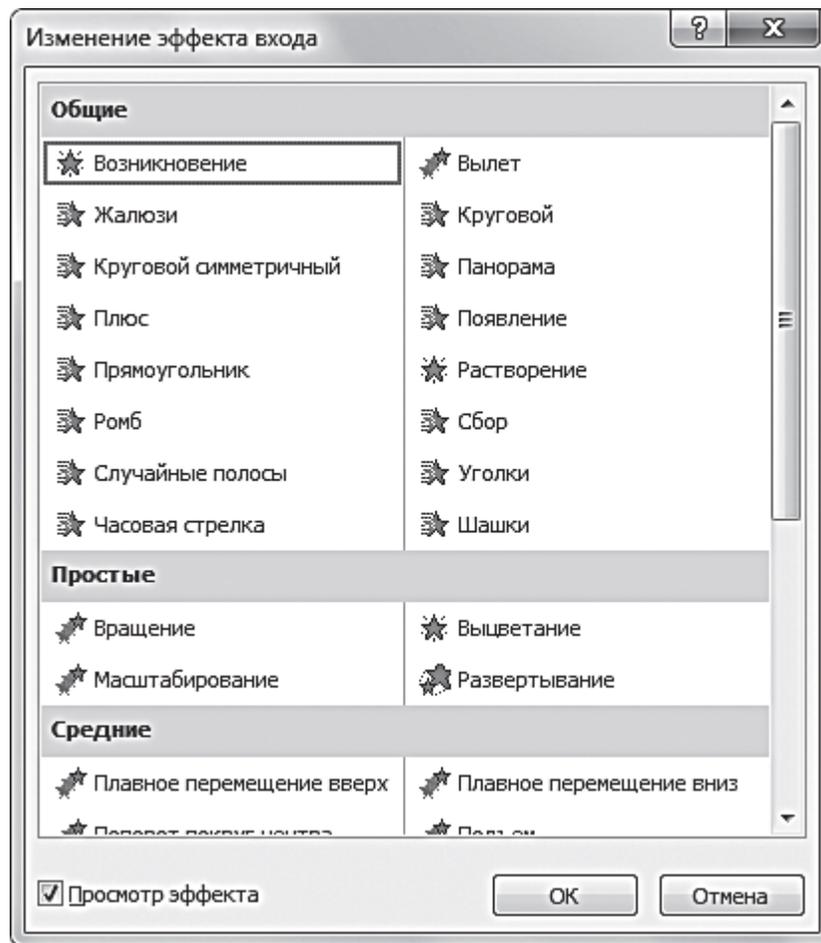
- Perform viewing the current slide, click the Browse button. This function allows you to play in the work area of the slide being subjected to the transition effect and sound.

### **6.6. Animation tab**

Items located in the Animation tab, enable prepdnosimye make the material more lively and intense. Animation Schemes - is embedded in PowerPoint ways that define the appearance of content on the slide screen during the demonstration presentations.

Use the controls on this tab you can:

- opt for the selected objects on the slides animation scheme from the samples provided in the list of styles of animation. For example, the title of the slide can fly in on a slide, picture may appear to the rotation, the individual list items -.. Acquire transparency, etc. To open a collection of effects, you need to click on the button animation style, or use the Add button animation. The effects are grouped by type appear on the screen: Entrance, Emphasis, Exit, traverse paths. To open the additional effects of the same type (for example, the entrance effects) is sufficient to execute the command Styles animation → Extra entrance effects. In this case a window opens with an extended list of effects;



Pic. Change login dialog box effect

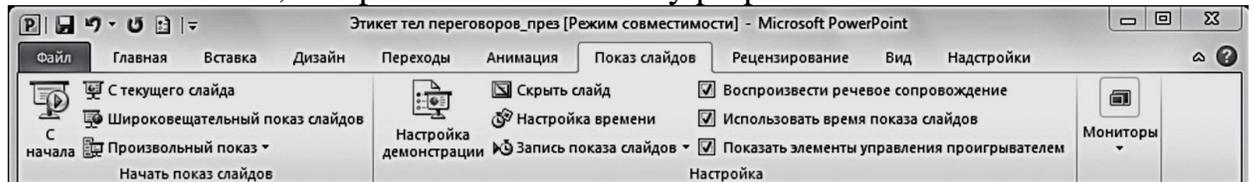
- view and set the parameters of the selected effect by clicking the effect parameters. Quick view the effect on the slide is executed when the mouse pointer on its name;
- change the method of starting the animation duration, pause, next start in the group slide show time;
- display / hide the bar field of animation, useful during rehearsals and presentations at work with a lot of effects;
- view the animation effects of the current slide by clicking the View tab in the animation or animation. When viewing all of the effects in the order established for them are displayed in the workspace window.

It must be remembered that you should not overload the separate presentation of various special effects. Especially if it reveals any specialized subject of professional activity of the company. It suffices to use one or two effects to logically separate steps presentation. Caution viewers in this case should focus on the theme of the material presented.

Using more useful when demonstrating effects photos, panoramas and colorful images, since it makes viewing fun and exciting, and the presentation - bright and catchy.

## 6.7. Tab Slideshow

Slide Show tab contains elements designed to view your finished presentation in full-screen mode, and perform the necessary preparations for the show.



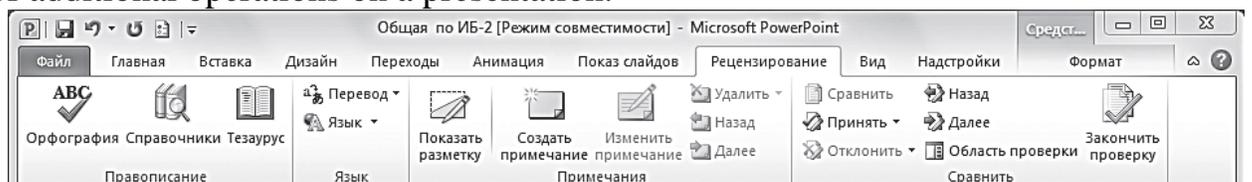
**Pic. Tab Slideshow**

Use the controls on this tab you can:

- start slide show from the first (title) slide by pressing From the beginning to check all submitted in the presentation material, a general impression, notice errors and vague language to see whether in order properly placed slides observed whether their logical sequence and .. etc. slide Show can also be run with an open window in the working team of the slide from the current slide;
- set the parameters to display a dialog box, the local team demonstration Setting: specify the type of display control slides that you want to demonstrate a way to the slide show, the color of the laser pointer, etc .;
- hide selected slides by choosing Hide Slide. This feature allows you to leave a significant slide in the overall presentation of the structure, but did not include them in the demonstration;
- Record the time that will be spent on each slide demonstration. To do this, use the command time setting, helps identify too simple slides or information overload, as well as to determine the time needed to explain each slide (if the demonstration commented rapporteur);
- change the screen resolution by selecting the desired value in the Resolution drop-down list.

## 6.8. tab Review

On the Review tab located control elements for the review and implementation of additional operations on a presentation.



**Pic. tab Review**

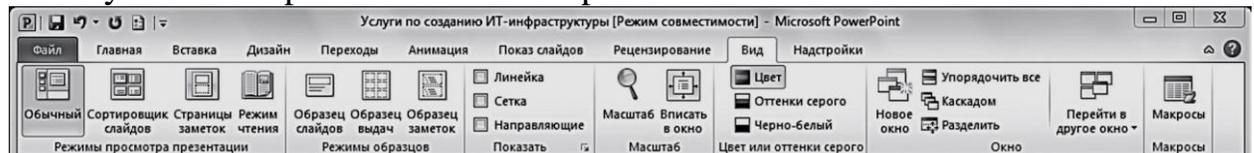
Use the controls on this tab you can:

- check the spelling using the Spelling tool
- replace the incorrectly-sounding concepts similar in meaning synonymous via Thesaurus- function is to avoid repetitions and fuzzy formulations;

- Use a built-in interpreter (Translation team), without resorting to the opening of additional dictionaries. This function can be performed for the translation of the selected text, and for an instant translation of the word / phrase in a tooltip;
- add notes to the text objects by selecting Create a note and move on to the next / previous note. These features can be extremely useful when working with presentation of several authors or reviewers;
- compare and merge presentations version with the command Compare. After the merger of the procedure on the right side of the working window displays the scan area - Corrections panel, which will present information about all the differences found: removing and adding slides, drawings and other objects, as well as changes in the text.

### 6.9. View tab

View tab contains commands with which you can change the viewing modes of presentation, configuration samples, as well as the team, causing the auxiliary tools for optimization of multiple PowerPoint files at a time.



**Pic.** View tab

Use the controls on this tab you can:

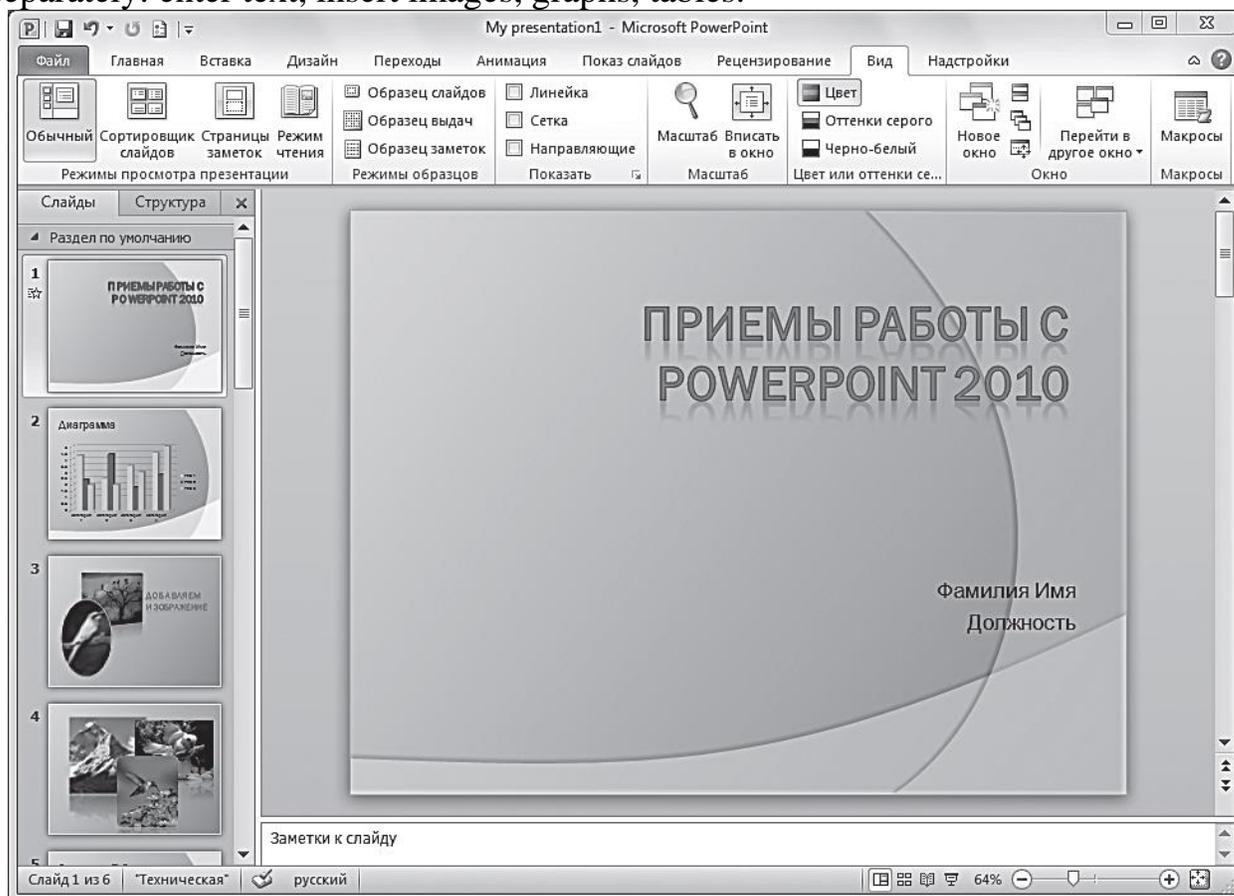
- Slide to change the current display mode: Normal, Slide Sorter, Notes Pages, reading mode;
- use and create design patterns: Slide Master, Handout Master, Sample notes;
- display additional elements to align objects on the slide: the vertical and horizontal lines, the grid guide. To do this, check the appropriate boxes;
- establish convenient scale display by choosing Zoom and Fit to window;
- set color gamut slides by one of the following: Color, Grayscale, Black and white. This feature is useful when you want to print color presentations on a black and white printer;
- organize representations for open files, PowerPoints commands group window;
- open a list of macros for their implementation, creation and deletion by clicking Macros. Macro is used for automation of work and at the same time is a set of commands and instructions.

## 7. Slide show

In the program there are PowerPoint slides view modes: Normal, Slide Sorter, Notes Pages, Reading Mode.

To go to any of these modes, on the View tab, click one of the buttons in the group view the presentation modes. Depending on the mode change window view presentation and layout of its basic elements. View Modes are designed for a more comfortable working with the slides at different stages of the presentation.

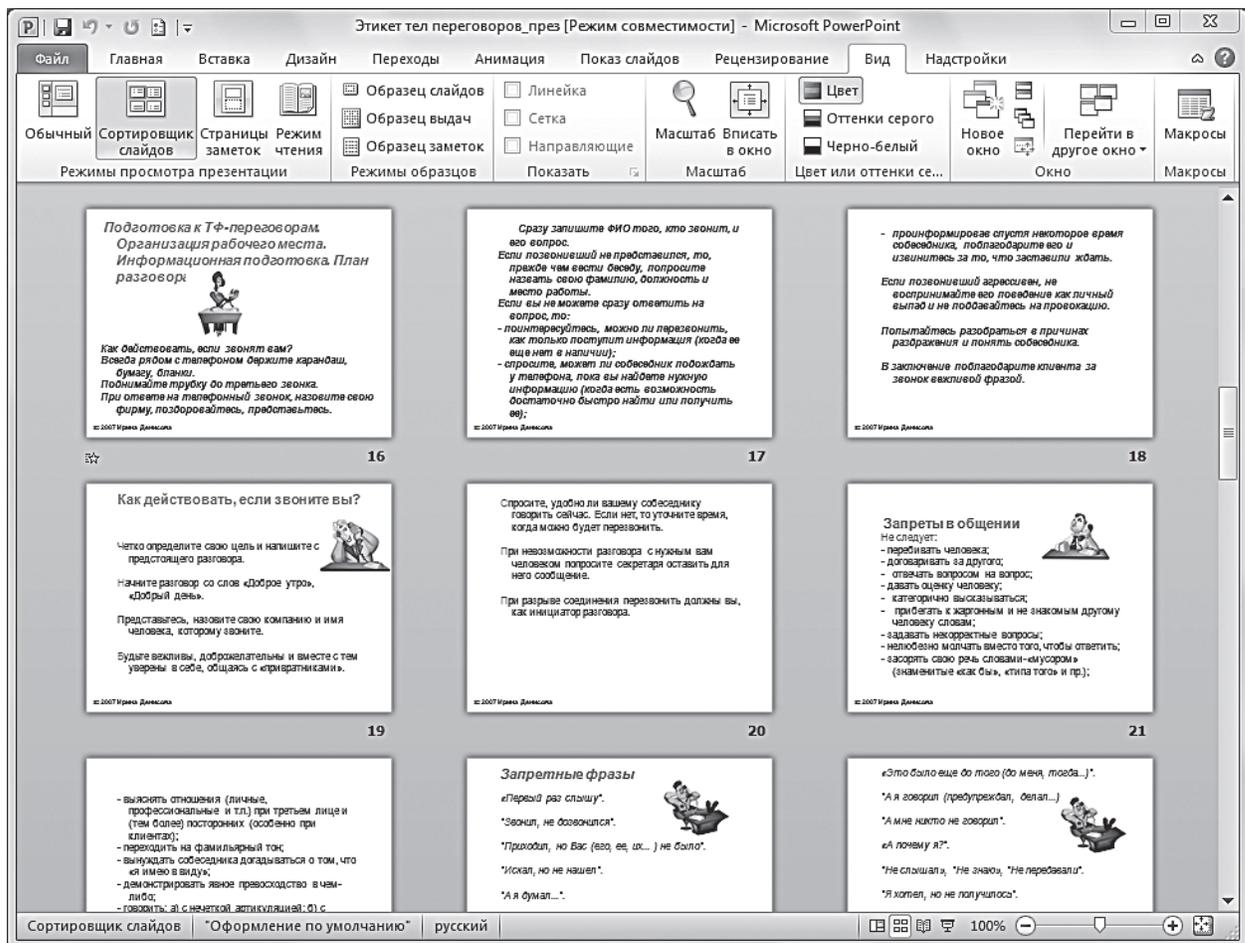
Normal - this is the main mode in which you create and edit all of the slides that make up the presentation. In this mode, you are working with each slide separately: enter text, insert images, graphs, tables.



**Pic.** Presentation Mode Normal

Slide Sorter - This mode is useful for editing a finished presentation. Turning to him, you will see on the screen all the slides in the order in which they appear on the screen when presenting the presentation. In the lower left corner of each slide under the specified sequence number.

In addition, in this mode it is possible to assess whether in the style of a feature slides, slides combine thematic groups by adding a partition function, see the effects of transitions and animations, as well as learn a demonstration of each slide (animation icon appears under the slide).



## Pic. Demonstration in Slide Sorter

Note pages - mode for printing handouts with the author's notes to slides. These notes can be added to fit the slides as you edit the presentation in normal mode, or make notes on this page, in the top half of which displays a thumbnail of the slide, and in the lower part shows the area equal in size to the slide notes.

Reading Mode - in this mode is performed to demonstrate the presentation in a window managed user: Displays the title of the program window and the status bar.

## 8. Creating a Presentation

### 8.1. Create a new presentation

Creating a presentation with a completely clean slate means to develop their own original project using PowerPoint software tool using a creative approach to the process.

This option is the most time-consuming because you have to create their own slide, they have a variety of objects, to think through the entire structure of the presentation and its design.

To create a new presentation, follow these steps.

1. Open the File tab, and then click Create in PowerPoint 2010.

2. Select the new presentation, and then click Create.

A new presentation is created automatically, and when you start PowerPoint 2010 program.

In the central part of the window displays a simple slide that contains the following service elements:

- Slide the title;
- subtitle slide.

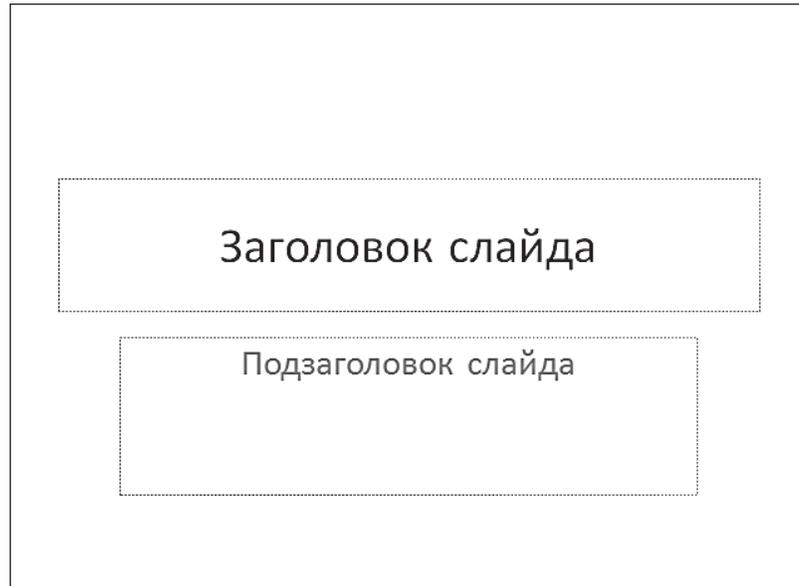
Below is a window to the slide notes.

This slide is the title slide of the new presentation, which specifies the name of the presentation and explanatory information, such as speaker name or company name.

To enter the information on the title slide.

1. The slide displayed in the central part of the window, click on the title of the slide labels, and enter the name of the presentation, such as "APM Doctor."

2. Click on the slide labels Subtitle and enter additional information.



**Рис.** Title slide

At the top of the window is a tabbed ribbon tools. The whole central part of the window is occupied by the current slide image. On the left is a list of slides that make up the presentation. This area is called, as we have said, the slide panel and can be represented by a thumbnail slide (Slides tab) or in the form of the document structure (Structure tab).

## **8.2. Add a slide**

As mentioned above, a new presentation initially contains only a single title slide. Slide you can add to your presentation in two ways.

Method 1: On the Home tab is the command Create a slide, which is a double-button drop-down list.

1. Click on the upper part (icon) creates a new slide using the default layout.

2. Click on the bottom part (the name with an arrow) opens a menu containing a list of built-in standard PowerPoint layouts

2010 and additional commands. slide layout determines the layout of the alleged members of the current slide (the main text, bulleted lists and headings, tables, charts, graphics, sounds, movies, pictures, and so on. d.). Select the appropriate layout.



**Pic.** Selecting the layout for the new slide

Fig. Selecting the layout for the new slide

**Method 2:** On the Slide pane, set the pointer to the position where you want to add the slide, right-click and select New slide.

You can change the slide layout, and after it is created. To change the layout of the current slide, do one of the following:

- On the Home tab of the ribbon, click Layout, select the gallery to uncover the appropriate occasion slide layout and click its thumbnail;
- panel slides open the context menu for the desired slide, click Layout, and then the appropriate option.

### 8.3. Placing objects on the slide

When a new presentation already has a number of slides, you can start filling it with material. Adding objects on the slide can be carried out with the help of teams tapes after using fillers placed in the slide layout.

The layouts can be arranged following text and object placeholders:

- text;
- drawings;
- Picture SmartArt;
- The screen shots;
- diagram;
- tables;
- scheme;
- multimedia clip;
- Pictures;
- films;
- sounds.

All built-in slide layouts (except the Blank slide layout) contain aggregates content.

Text placeholders are displayed as dotted rectangles with a title slide or a text element. Clicking on an inscription activates input field values. Type or paste the text you want from the clipboard.

The object placeholders are displayed as dotted rectangles with icons object (table, chart, Smart-Art drawing, drawing from a file, picture, multimedia clip). For example, if you want to insert a slide image from a file, click on the icon

Insert Picture From File brings up a dialog box for specifying a file stored on the hard drive or removable media. If you want to add a picture, click on the icon will open an additional picture area to search for images contained in the library of Microsoft Office clips.

To add an object to the slide with the help of tools tape, follow these steps.

1. On the Slides pane, select the slide you want to add an object
2. Click on the control tape on the Insert tab, and then click to insert the desired object:

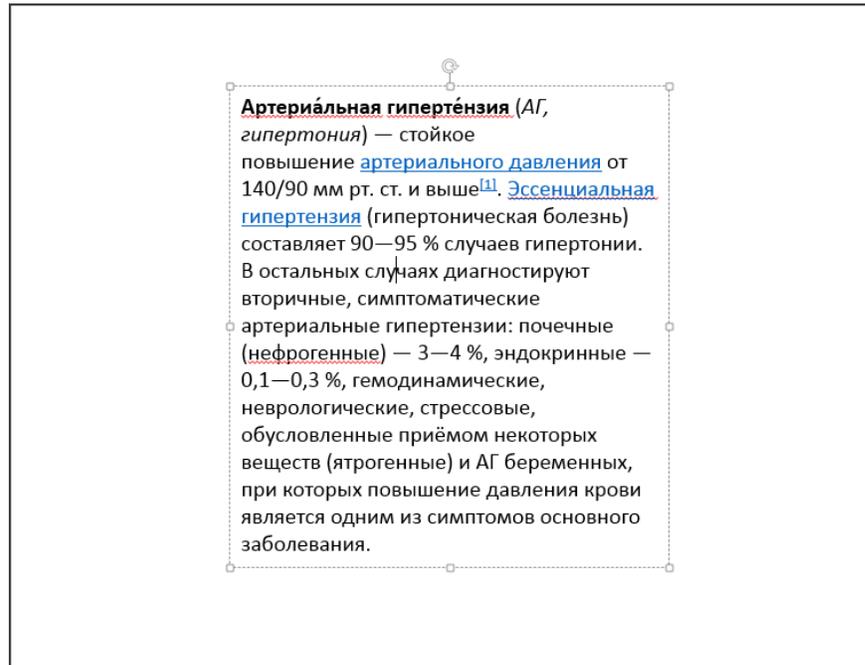
- if you want to add a text box, click on the item inscription, the mouse pointer on the slide label its location and boundaries, then type or paste the text from the clipboard;

- If you need to add a picture from a file, click on the element of Figure, in the dialog box, select the folder, select the image you want and click Insert.

Alternatively, you can open the presentation of the current window at the same time and a Windows Explorer window, find the desired image in Explorer and drag it to the Stage presentations, hold down the left mouse button;

- for the selection of a graphic image, you can use Microsoft Office library of clips. To do this, click on the picture elements, which opened in the Search field, type

in a keyword or phrase, and then click Start. Will be presented images that match the search parameters. Click on the appropriate thumbnail and the screen will be placed on the slide.



**Pic.** Insert a text box into a presentation

The dimensions of an object on a slide, you can change.

1. Click on the object.
2. Move the mouse pointer to any marker on the object frame. The pointer becomes a double-headed arrow.
3. Hold down the left mouse button, drag the cursor, watching the changing dimensions of the object.

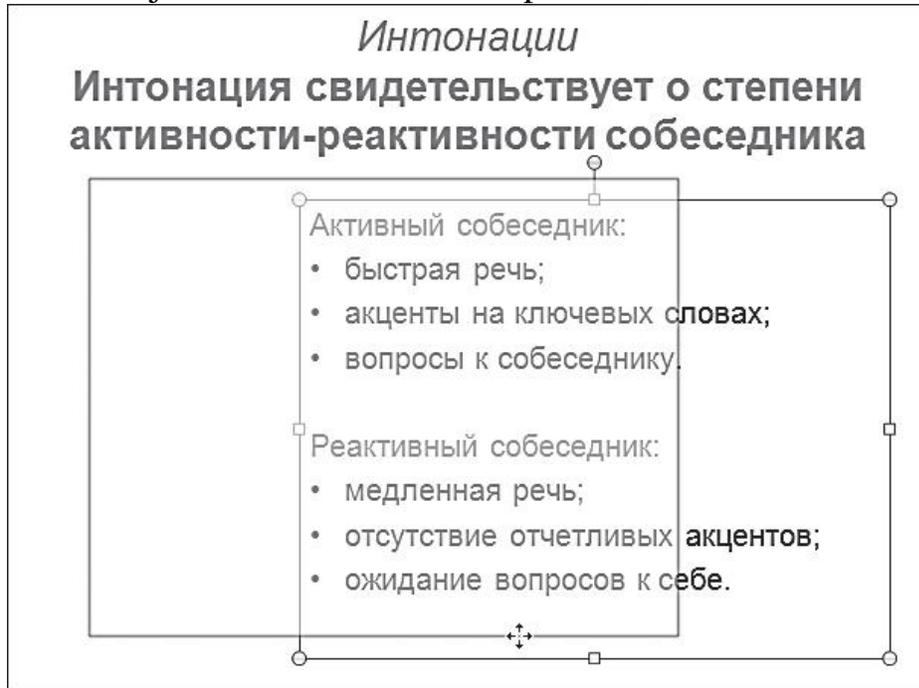
To rotate an object on a slide, follow these steps.

1. Click on the object.
2. Above the frame of the object appears green anchor marker. When you hover the mouse pointer cursor changes to a circular arrow. Hold down the left mouse button, do the roundabout.
3. The object will rotate synchronously. When he takes the desired position, release the mouse button.

Change the position of the object on the slide can be as follows.

1. Click on the object.
2. Move the mouse pointer to an object (or boundary inscriptions) in any place (except the markers), and the pointer changes to a crosswise direction of the arrows.
3. Drag the object, hold down the left mouse button. The movement of the object is accompanied by a picture frame, or translucent.

4. When the object will take the desired position, release the left mouse button.



**Pic.** Changing the position of an object on the slide with the mouse

You can change the order of multiple objects inserted on the slide, so that they partially overlap each other:

- If an object should be placed above another object, click on the right mouse button and on the shortcut menu, click Bring to Front Move → forward;
- if an object must be placed in the foreground with respect to all other objects in a slide, click on the right mouse button and on the shortcut menu, click → Bring to Front to Front.

To delete an object, select it and press the Delete key.

## **9. Creating a presentation using the slides and samples**

Presentations easy to create using the provided library of themes and slide designs.

### **9.1. presentation Design**

When you create a new presentation, you can immediately choose a built-in theme determines the appearance of the document by using background colors, fonts and graphics effects.

1. Click the File tab, and then click Create.
2. In the Available Templates and Themes, click the paragraph Themes.
3. From the options, select the appropriate button and click Create. The window opens with a title slide of the presentation set design, and to all slides created in the process, will be applied a common style.

Themes can be changed at any stage of work on a presentation, looking at them in the gallery on the Design tab, in the Themes group. In addition, you can configure

specific settings of colors, fonts and effects and save them as a new theme in the collection.

## 9.2. Setting the slide master

Another tool in the design of the project can serve as a mode of slide samples. Slide Master allows you to make a schematic sketch of a future presentation, picking up for her theme and simulated occupancy and effects of elements on each slide in isolation.

To customize a slide master, follow these steps.

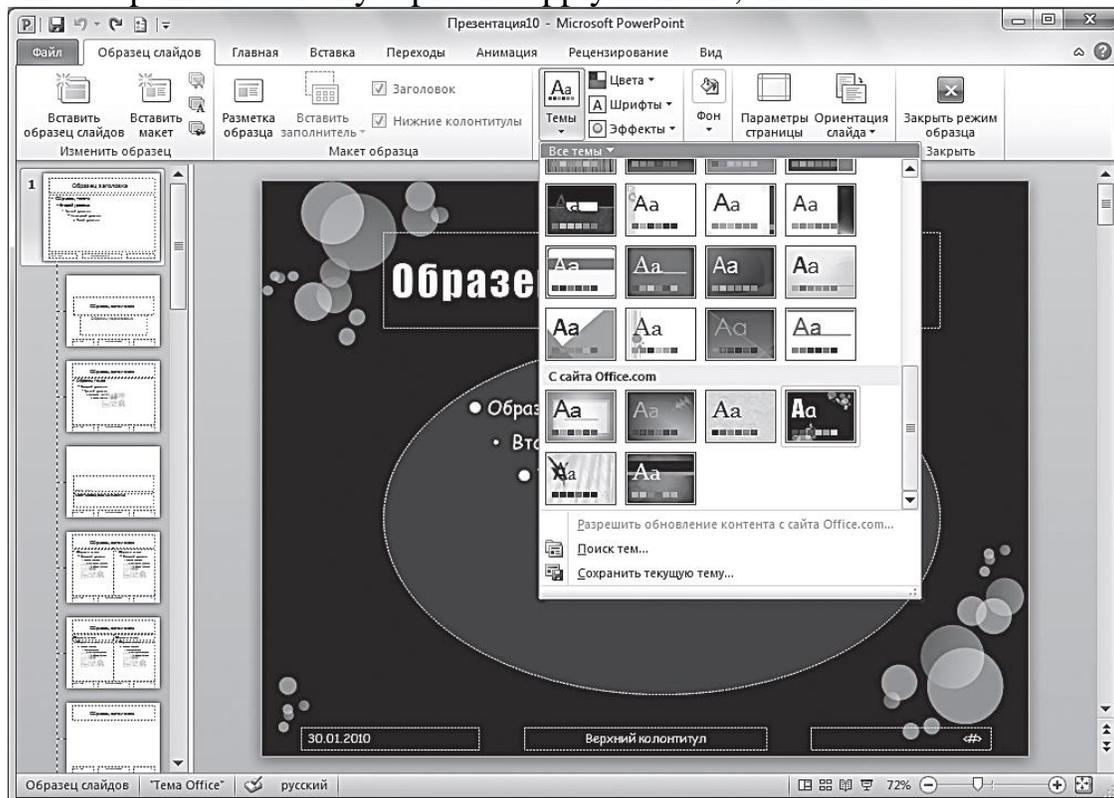
1. Click the File tab, and then select New → New → Create presentation.

2. Click the View tab and click Slide Master in the group of samples modes.

With the tools located on the tape of this mode, you can customize the look of presentations and layouts that you use at work.

4. Click on the Themes button and choose from the collection of the registration.

The appearance of the slide in the work area changes when you hover the mouse pointer over any topic. To apply a theme, click on it.



**Pic.** Setting the slide master. Slide Master Mode

An example of the slide is a slide at number 1 on the left side panel. Under it displayed a slide layouts associated with the parent sample. All models contain the same topic assigned to the model, but have a different

layout elements. If necessary, you can change the location of the elements in its sole discretion, to add a beautiful figure, hats, posters, wallpapers and so on. N.

4. Click Close Master View and continue with the presentation in Normal mode: you can add slides, using models and objects to fill the marked area, formatting, styles to use express, add animation and transition effects.

Note that if the slide master is used after the creation of individual slides in a presentation, some items may not correspond to a single style of design - to disappear from view or to go beyond the boundaries provided for them markup (eg, footers or logos should be configured in a master slide mode ). It is therefore recommended to create a slide master before you start working with them.

### **3. The purpose of activity of students in class:**

#### **The student should know:**

1. Appointment and PowerPoint software features.
2. What are the different kinds of presentations.
3. The steps of creating a presentation.
4. The main elements of the PowerPoint interface.
5. How to create presentations.
6. The process of creating a presentation using the AutoContent Wizard.
7. The process of creating a presentation using a design template.
8. Basics of slides (adding and deleting slides, change the order of slides, change the slide layout).

#### **The student should be able to:**

1. Use of PowerPoint presentations to create opportunities.
2. Create a specific presentation of the structure and the form and give them the best for the perception of appearance.

### **4. Learning content:**

1. The concept of presentation and slides.
2. Types of presentations.
3. The steps of creating a presentation.
4. The main elements of MS PowerPoint 2010 program working window.
5. The default is normal.
6. Work with tabs.
  - 6.1. File tab.
  - 6.2. Home tab.
  - 6.3. Insert tab.
  - 6.4. Design tab.
  - 6.5. Transitions tab.
  - 6.6. Animation tab.
  - 6.7. Slide Show tab.
  - 6.8. Review tab.

- 6.9. Tab View.
- 7. slide show.
- 8. Create presentation.
- 8.1. Creating a new presentation.
- 8.2. Adding slide.
- 8.3. Placing objects on a slide.
- 9. Creating a presentation using the slides and samples.
- 9.1. Design of the presentation.
- 9.2. Setting the slide master.

**5. The list of questions to test the level of knowledge:**

- 1. What is PowerPoint program?
- 2. For what purpose are the presentation?
- 3. What are the advantages of electronic presentations in comparison with other types of presentations?

**6. The list of questions to check the final level of knowledge:**

- 1. What is the PowerPoint presentation file, and which he has an extension?
- 2. Describe the process of starting and completion of the PowerPoint program.
- 3. List the elements of the interface of PowerPoint.
- 4. What are the different kinds of presentations in PowerPoint?
- 5. Describe the steps involved in creating a presentation in PowerPoint.
- 6. What are the different modes of viewing in PowerPoint? Describe them.  
How to switch between modes?
- 7. What kind of objects can be placed on a slide PowerPoint?

**7. Create a presentation**

**8. Independent work of students:**

According to the textbook will learn the basics of creating a presentation in PowerPoint.

**9. Hronokarta training session:**

- 1. Organizing the time - 5 minutes.
- 2. Monitoring of knowledge - 30 min.
- 3. Analysis of the theme - 20 min.
- 4. Practical work - 30 minutes.
- 5. Wrap-up sessions - 10 min.

**10. A list of textbooks for the class:**

1. AN Stepanov Computer science. Textbook for high schools. 4th izd.g.Spb, Peter., 2006;
2. Esaulenko IE, Semenov SN Basics of practical informatics in medicine; Voronezh 2005.

## **Topic 7: "means the Internet to search for professional information on individual sections of medical knowledge. Search engines"**

### **1. Scientific and methodological support of the theme:**

One of the main ways to find information on the Internet is search engines. Materials for the placement of the web are preparing human beings, so it is possible to find just what is published. Today on the Internet about two billion pages. As a result, existing cataloging the web resources has become a serious problem. Despite the fact that thousands of organizations involved in cataloging, the problem does not come close to the resolution, and becomes even more acute. The space is filled with Webbytree than systematized. Any book begins and ends with the contents of the index. Content - is an example of cataloging. The reader chooses a theme and find the page where the topic is covered. Index - is an example of indexing. The reader will find in the index of your search term and get the page number on which it occurs. On the Internet, people are working on the catalogs and indexes are automatically generated. When cataloging the resource experienced editor looks at it carefully, determines which areas of expertise include the resource, establishes its category in the industry and brings life to the catalog.

### **2. Brief theory:**

1. The main types of search engines.

- 1.1. Search directories.

Search directories or Web directories (from the English. Web-directory) appeared almost together with the birth of the Internet. Initially catalogs were simple listing of links on a thematic or alphabetical principle. But as the amount of resources it was clear that it was necessary to identify certain basic headings, and subheadings to them and in which it would be possible to place not only the existing sites, but also to add new electronic resources.

The bottom line is quite simple search directory. Creates a systematic and rubritsirovannaya collection of links to online resources with a brief description of each is included in the resource directory. Catalogues can be divided into general and specialized, with catalogs often differ significantly in resources coverage included in their composition, it can be divided into regional, national and global catalogs.

Making directory can be either semi-automatically or manually. Naturally, the manual work on the classification and annotation resources is valued more. At the same time, it is necessary to take into account that the manual work requires time and effort, so resources coverage Rounds catalogs smaller than can find search engines. But at the same time often the quality of the resources described in catalogs, is higher as search engine spam is eliminated, and preference is given to authoritative resources. To select a

suitable directory of your search task is important to know who and how it works to fill a specific search directory.

Search the directory can be compared with a table of contents of the World Wide Web. The site is divided into sections, each site has a brief description, but the content itself, of course, remains on the sites themselves, and not transferred to the directory.

Directories are very different in their characteristics. Choosing the right web directory is necessary to pay attention to the following features:

- **coverage** of the resources that are included in the database (you can find two or three well-known to you the popular site, and try to find one or two of the little-known);

- **the quality or rather** the selection stringency sites introduced into the directory (is essential level of professionalism of the editors and the degree of commercialization of inclusion in the site directory);

- **accuracy** of annotations (annotations are important sites by the creators or editors specially written)

- **The replenishment rate**, which is very essential at the present rate (some editors catalogs declare daily or weekly replenishment base directory).

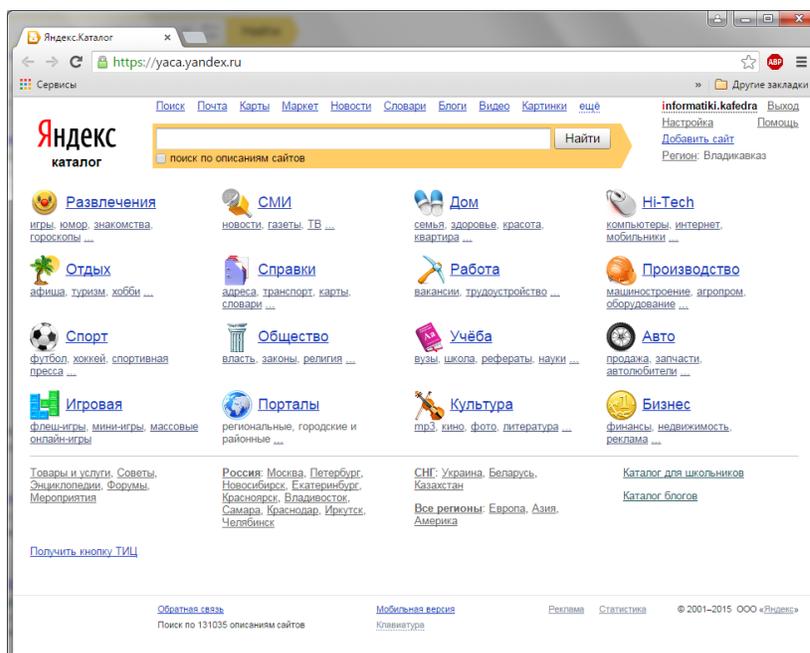
Why catalogs if there is search engines? - you ask. The answer to this question was already obvious. Search engines are looking for electronic documents, search the catalogs looking for, above all, sites, with, you can find thematically related sites. Thus, a particularly convenient to use if you are not interested in an answer to a specific question, and a selection of websites on a particular topic. Sometimes, for example, in the case of the "hidden web", directories are the only way to search for resources that do not fall in the index search.

To use the web directory is not necessary to reinvent the search query. According to the catalog, you can navigate through the links heading categories, reflecting the category tree. Inside each category of sites can usually be sorted alphabetically, by creation time, attendance or credibility (each directory editors opinion that is the most essential feature).

People sometimes do not distinguish between directories on search engines and directories as you can usually look at the request of the keywords. But it is important to understand that when accessing the web directory search is performed only on the names and descriptions of resources included in the data directory.

### **Catalog Yandex**

Catalog Yandex is a leading Russian-language directory. Turning resource directory occurs as free, and in commercial terms. **Catalog Yandex** is built on the principle of categorization of the facet, the essence of which is that every resource is not one group gets (based on themes), and once in a few, with additional features designed to clarify and limit the electronic resources based on the needs of the user. Thus, in addition to the catalog Yandex theme sites classified by the region and the nature of the information provided.

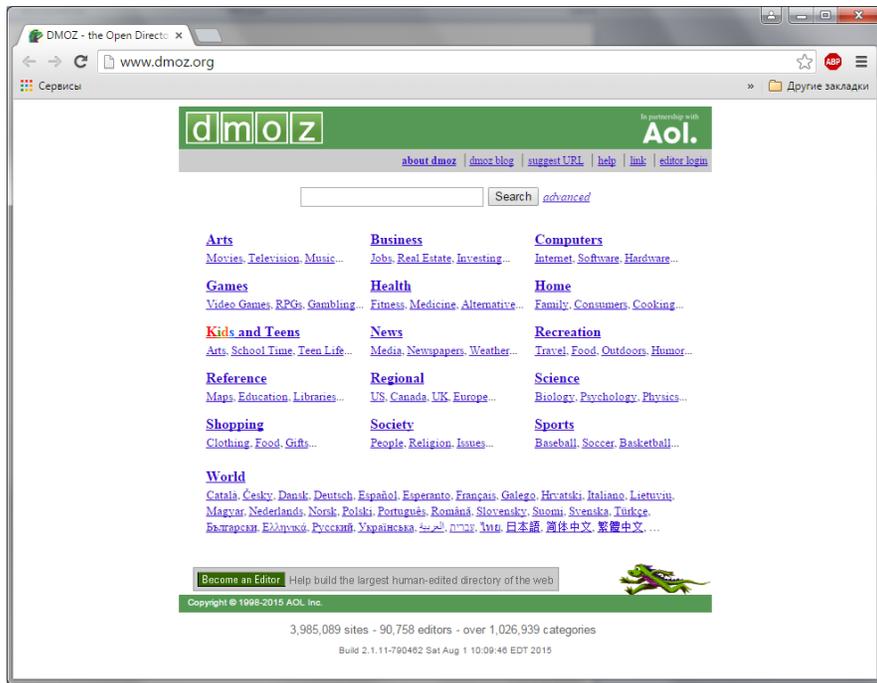


**Рис.** Yandex catalog

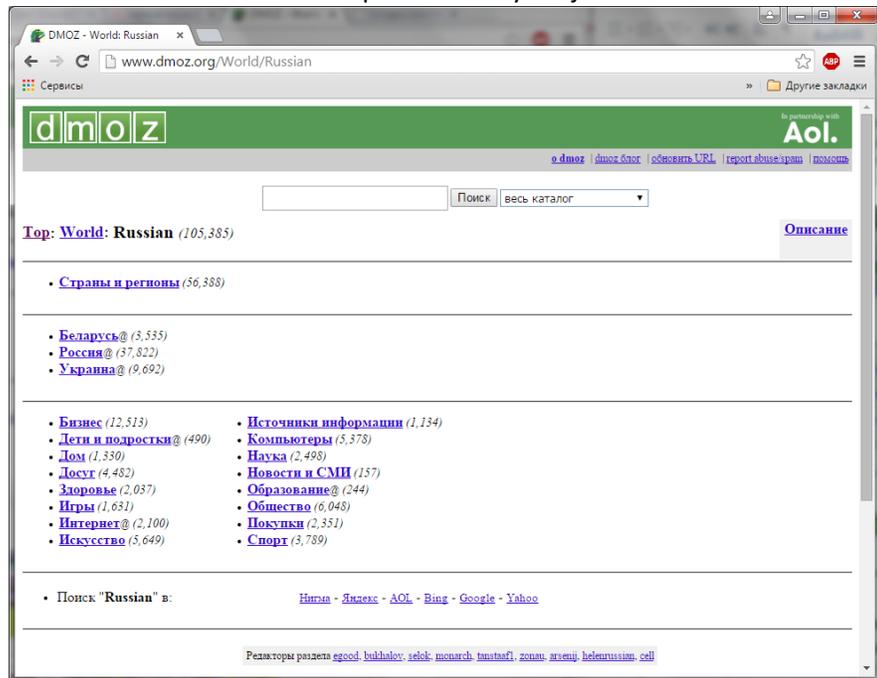
Yandex catalog provides basic navigation capabilities in the catalog: search sites and heading on request, run on sections of the catalog, each level is different titles scale as well as select additional sites faceted characteristics: region and type of information.

### **Open Directory Project (ODP).**

ODP - the leading international volunteer project to create an all-inclusive search engine directory. The essential difference is the ODP directory editorial board: thousands of professionals, volunteers from different countries are registered as ODP editors. The main objective of the editors - to distinguish quality from poor resource and give a true and appropriate brief description of reality sites in its area of interest. Anyone can recommend the site into one of the categories of directory-headings ODP, but before the publication of such a request shall check and approve the column editor. Also, anyone can become a co-editor of one of the headings of the directory, it is necessary to submit a special application and recommend three sites on the desired category, is not described in the catalog. After checking an experienced editor, you can get to work. This collective work to protect a catalog of search engine spam, which is designed to fool the search engines and users, as well as to improve the quality annotations, which are sites.



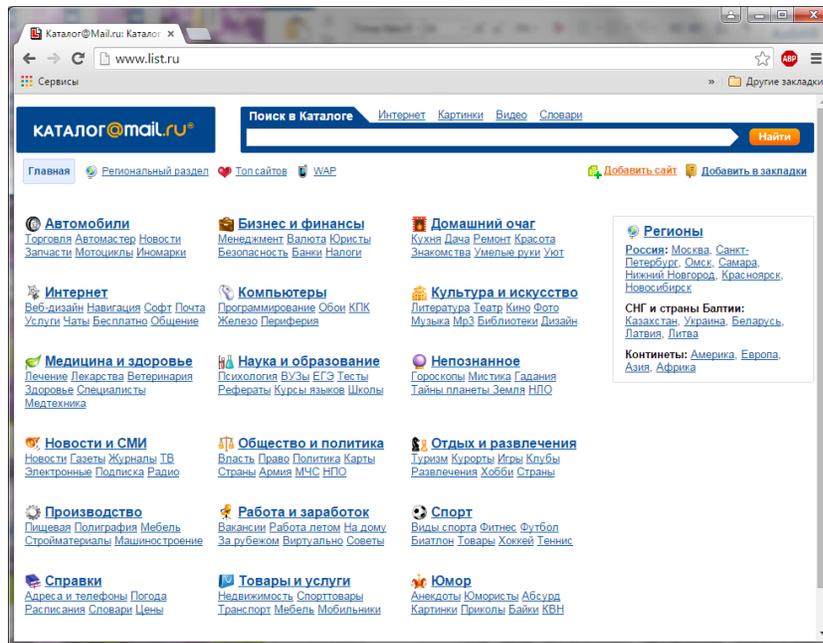
**Pic.** Open Directory Project



**Pic.** The Russian-language version of the Open Directory Project

## List.ru

Catalog List.ru one of the most famous in RuNet. With it you can perform full-text search for resources by their names, descriptions and keywords. To search the Internet using the Google database. Issuance of search results is carried out according to the categories: Server name, a brief description. The ability to sort servers in each category, alphabetically, by adding time on transitions.



**Fig. Mail.ru catalog**

## 1.2. rating system

Rating System - a variation of the search directory, which provides for the organization issuing the number of visitors hits. That is, the main criterion is the popularity of the resource, which, alas, is not always indicative of its usefulness, content and informative value. Therefore, rating systems are best suited for search of entertainment and news content. An example of a rating system is a well-known portal alexa.com assess the popularity of Internet resources.

## 1.3. search indexes

Search indexes - a computerized system. They are able to operate without human intervention, and because of their knowledge of the true network resources much more. ProindeksirovannyhWeb number of pages can be measured in hundreds of millions. Job search pointer occurs in three phases, of which the first two are preparatory and invisible to the user. Please search pointer collects all the information from WorldWideWebi uses for this purpose a special program similar browsers. The specified page is copied to the search index server, and then there are all the hyperlinks that are on it, on those in their URL-addresses, and copied resources found there, and so on. D.

After copying razyskannyhWeb resources to the search engine server begins the second phase of work - indexing. The indexed database - a kind of dictionary. It is necessary to ensure that the search engine can quickly respond to user requests. Modern systems give answers in a fraction of a second.

At the third stage, the client request processing and issuance of search results to him in the form of hyperlinks list. These links can be used to navigate to interesting resources. For example, simply enter a word in the search field

football and Russian search engine will give thousands of links, grouping them by 10 - 20 pieces on the displayed page. The user needs to go in the first ten links, expired at the moment, it is very annoying, if there are links straight to the neighboring files of the same server. The worst option, when a row are a few links that lead to a single resource, but located on different servers.

All the search engines get their initial information from the same Web-space, so the original database they can be relatively similar, but the third stage, the issuance of the search results appear her best personality traits. The sort operation of the results is called ranking. Each found the Web-page, the system assigns a certain rating, which should reflect the quality of the material. High ratings obtained pages that keyword used in the query is included in the header. rating level rises, if the word is found on the Web-page a few times, but not too often. Favorably influences the rating of occurrences of the word in the first 5 - 6 paragraphs of text - they are considered the most important for indexing.

Very well, if the keywords used in the query, enter the alternative text accompanying the pictures. For search engine this is a sure sign that this page exactly matches the request. Another indication of the quality of Web-pages is the fact that it has a link to any other Web-pages. So, this Web-site is popular and has a high rate of citation.

The need for ranking search results is evident. Without it, customers would be drowned in a stream links offered. However, there is a negative side: each search engine has its own ranking of the policy and it is possible that the views of the founders of the search engine is not quite the same as the client's views.

Before you start looking, you need to clearly articulate the purpose of the search, and also try to pick up all sorts of word forms and other variants of the wording of the request. This may, in some cases significantly speed up the search, but also give a lot more options, of which it is already possible to choose the most suitable. In addition, if you know in advance what kind of company, company or organization belongs to the resource of interest, you can try to go to the official page of the company. Typically, large companies address in tune with their names, for example [www.pepsi.com](http://www.pepsi.com), [www.gaz.ru](http://www.gaz.ru), [www.motorola.ru](http://www.motorola.ru).

## **2. Four types of search**

All search pointers implement multiple search algorithms.

**Simple Search.** With a simple search query in the box to type one or more words that describe the content of the document. Receptions simple search in different search their systems.

**Advanced Search** - always involves a request from a group of words that are associated with logical operators. The main advantage of the expanded search that entry rules keywords and Boolean operators in different systems either identical or very similar.

Contextual search - useful kind of research that is not implemented in all search indexes. Contextual search to match exact phrases or groups of words in search engines, including this method, the key phrase is in quotation marks.

Special search. With this kind of search teams sought additional information in the different search engines, these commands on your own.

### **3. Search techniques in the «Google» system**

Google -one of the fastest search engines. Today, the word most people Googledlya represents the largest web search engine. By the way, one of the two creators of the server became our compatriot Sergey Brin.

Google's interface can be customized in different ways. Google is able to "talk" to the seventies. Interestingly, there was a place on the list for most of the languages of the former Soviet Union, including, of course, the Ukrainian and Russian! To convert your Google interface once is enough to select the desired item in the menu Language settings - to further their own page will be loaded into the "right" mode. By the way, with the Russian language Google copes fine, not enough unless the favorite yandexovskogo Quest with word forms. That is, typing a Google query "big elephant", you will find only those pages on which both words are in the nominative case. "Elephant, Elephant, Elephant on" and other forms will not be found. However, due to the fact that Google is not just for .mobi area, both domestic search engines, and with all the information space web, thanks to it you can find a lot of new resources.

Google is working much faster than their peers, and most importantly, the results have a high degree of relevance (relevance of search results to the real state of affairs on the web). Unlike other search engines, in the "top ten" of the results issued by Google, you will not find any information garbage and random sites: place the site in the list is directly linked to the number of links to it from other servers of similar subjects.

An interesting feature of Google is the presence of a second button next to the search box. If the first button launches the traditional mechanism, the second button once will transfer the user to the site, which, according to Google, it best fits the needs.

Finally, the third and the main trump Google has become well-thought-out set of search services. On Google today offers visitors the following:

Traditional search on the Internet sites and pages included in the database in an automatic mode with the help of "spider." In addition to the simple search and advanced yet available - in this mode you can, in particular, make a selection of documents in a particular language, specify how many results will be displayed on the page. Finally, you can search within a single site or page.

When working with the standard search box, you can use search operators:

+ (AND) - to search for pages that contain all the words: beatles + lennon  
- (NONE) - to search for pages that contain the first of these words, but not containing the second: gates - bill

OR- to find pages that contain either one or the second one separated by the operator of words and combinations: oshoORrajneesh

"" - To find pages with these unbreakable phrases: «rollingstones»

Search the catalog. Not long ago, Google has got its own directory, which has already made a few hundred thousand pages and sites from around the world. "Locale" system applies here: in addition to the main catalog, Google puts you even "local".

Search newsgroups. Becoming the owner of the famous archive DejaNews mailings, Google was able to please its visitors the opportunity to find information in the newsgroups. Today, thanks to Google, you can find any message sent to one of the hundreds of thousands of newsgroups in the past five to seven years.

Image Search. Found images can be, among other things, sorted by size, display only a list of the required image format.

Finally mention another important trump Google- opportunity to work with all of the server services without calling on his page. Especially for those who have to send to Google a dozen times a day, server makers have come up with a special search bar GoogleToolbar, which is built into your browser and constantly looming in front of your eyes.

You get like a second address field in which you can type the text of the request. Next to the panel provides a quick search buttons across the web, and on the current site. Finally, the panel has a special indicator that allows to evaluate the popularity of a site or a page on which you are at this moment.

To install the Google Toolbar, you must go to his personal website at <http://toolbar.google.com>. and then just follow the detailed installation instructions.

Words, Google development is in full swing and, if the pace will continue, "the search engine number one" to secure for Russia this server, at least, the Google has long been recognized as a favorite. By the way, and you can use Google to search for Russian-language pages located outside Russia - so you can find documents, which can not cope even Yandex.

#### **4. Search techniques in «Yandex» system**

Yandex - a search engine that can be found on your request in the Russian part of the Internet the most suitable Web-pages, news, images, encyclopaedia articles or goods, to answer the question about the weather or cultural events.

Search Single slovu.V the search field the search term entered and click "Find." The words are sought, taking into account all possible word forms. If the search word forms are not required, it can be canceled by putting "!" Before the word.

Search for a group of words. If words are separated by a space, then the sought documents that are found in one sentence all the words entered. In order to strictly ensure the occurrence of words in a sentence, it is necessary to put a sign "+" together

with the word in front of them, to which it relates (+ be + + or not). A little trick. The same result can be achieved by setting the "binding" of the word in quotation marks: "To be or not to be"

**Search citations.** If you want to find the exact quote, just ask the search phrase in quotation marks. This query all pages are found, in which you have the correct quote.

**Searching for a name.** Words with large and small letters are considered different forms of the same words, so do not care what the register used in the query. The exception is the operator of the exact shape. Upon request, "Meadows" will find all documents containing this word form in any case, and "Luzhkov" on request - only documents in which there is a form of "Luzhkov" with a capital letter. This is useful if the required proper name coincides with the common phrase, for example, a group of black coffee.

Receptions exclude words from your search. To exclude documents that meet the definition of a word, precede that word: "-" sign without spaces (strict exclusion of proposals); the sign "~" (non-strict exclusion of proposals); sign "~~" (with the exception of the whole document) .For example, if you need a description of Paris, not many travel agencies offer, ask inquiry guide to Paris - agentstvo -tur.

Searching results. In Yandex search results page has a text explaining the search results and links, making it possible to sort the found or refine the query.

Search within results. If the request Yandex has found a lot of documents, but on a broader topic than you would like, you can shorten this list, specifying the request. Another option - to include in the box results in the search form to specify additional keywords, and the next search will be carried out only on the documents that were selected in the previous search. For example, to find pages about the air conditioning - funds intended for hair care (instead of HVAC equipment), you can request air conditioning, to determine the search area. And then, checking the results, - the word "hair".

Parallel searches. Yandex is able to search not only websites, but also news, products, images, etc. When you specify a query, the search is conducted simultaneously in all "parallel" database, and if something is found, Yandex will display the information in search results. In the right column - products and pictures at the bottom or top of the page - news, dictionaries, maps, poster, weather. And all this - one request! At the top of the list of found documents issued statistics query words and documents found.

Related documents. Link "Related Documents" allows you to find pages that are similar to your choice and can respond to the request as well. If the page-tag has already been removed from the site, Yandex will display a message: "The requested (e) the document (s) could not be found (s)." By default, the link is not displayed, you can turn it on display in the search

settings. You can also search for similar documents in the form of an advanced search.

Another site. Link "Even from the site" allows you to see all the documents from the site that match the query. You can also set restrictions on a site in the form of an advanced search.

Sort the results. You can sort the results page in one of two ways:

- The degree of compliance with the request (relevance);
- The last-modified date of the document.

Default sorting is by relevance, by date and sorting is needed, as a rule, only when you are looking for the most recent documents.

Other search engines. If Yandex response to your inquiry proved insufficiently precise, try to formulate the request otherwise, or set it to other search engines. Just click on the link with the name of the search engine, and a new window will open its search results.

### **5. Search techniques in «Yahoo» system**

Yahoo offers a new and faster ways to find specific information on the Internet or in Yahoo. Now you have access to a whole arsenal of tools in one simple search session.

Several ways to be found quickly. On the results page you will see Yahoo Search links to other types of search results on the right.

- News: Yahoo Search among the last events and messages.
- Pictures: Pictures, illustrations, and icons from around the web.

Doing search "Internet" section, you can leave the same terms in the search box. Click on one of the links or pictures News, and you'll see a new page results related to your search, but already contains resources from other sections.

For example, after searching the Internet sites about cars, you can click on the link Pictures to find the photograph of automobiles. Then click on the news to see the latest news reports on cars.

You can initiate a search for any of these species, as well as others from the home page Russian Yahoo Search at [ru.search.yahoo.com](http://ru.search.yahoo.com).

Results. The results page on the Internet is divided into several parts, so you can easily find what you need.

Pages that most successfully meeting the search criteria are placed in the top of the results page.

The results of the Internet - it links to relevant sites that have been found by means of search technology Yahoo, sometimes combined with the results from our catalog and other resources search Yahoo

Advanced Search. Advanced search on the Internet will help you find sites that match a specific criteria, including such as various variants of the words entry and the date of the last update pages. Selectable search advanced search options apply only to the current search. Search the Web, in the news and image search each have their

advanced search page that offers you a unique set of capabilities to refine the search session.

### **3. The purpose of activity of students in class:**

The student should know:

1. What is the Internet.
2. What is a Browser.
3. The major search engines.

The student should be able to:

6. Work with your computer.
7. Work in the browser.
8. Finding the necessary information.

### **4. Learning content:**

1. The main types of search engines.
  - 1.1. Search directories.
  - 1.2. Rating system.
  - 1.3. Search indexes.
2. Four types of search.
3. search techniques in the «Google» system.
4. Search techniques in «Yandex» system.
5. Search techniques in «Yahoo» system.

### **5. The list of questions to test the level of knowledge:**

1. What is the search index?
2. Why do you need the ability to search for information on the Internet?
3. What is the difference between search engines?

### **6. The list of questions to check the final level of knowledge:**

1. Describe the information retrieval process.
2. Describe the main types of search.
3. Describe the search «Google» system.
4. Describe the «Yandex» search engine.
5. «Yahoo» Describe the search engine.

### **7. Using a search engine to find information on cardiovascular disease.**

### **8. Independent work of students:**

Learn the basic principles of information retrieval on the Internet.

### **9. Hronokarta training session:**

1. Organizing the time - 5 minutes.
2. Monitoring of knowledge - 30 min.

3. Analysis of the theme - 20 min.
4. Practical work - 30 minutes.
5. Wrap-up sessions - 10 min.

10. A list of textbooks for the class:

1. Gelman V.Ya., Shulga OA Buzanov DV Internet in medicine, 2005 MIA g.
2. Medical Internet Resources: A Reference Guide. ... - M .: Dess com 2000.
3. Internet to a doctor. Sinitsyn VE, EA Timonina

## **Subject 8: "Tools of the Internet to search for professional information on individual sections of medical knowledge. Library Information Systems "**

### **1. Scientific and methodological support of the theme:**

In the context of the information society is extremely important tool for sustainable economic and social development is to provide the public (including remote) access to socially significant information, especially scientific, educational and cultural nature. It must be admitted that the degree of accessibility of information resources of Russia with great value and an equally huge amounts, is still below any criticism. This realization led to the need to rethink the role, tasks and working methods of traditional storage centers and information dissemination. There was obvious need for effective co-operation of all institutions involved in the creation and dissemination of information and knowledge - research institutions, universities, information centers, libraries, archives, museums and so on..

So far, the main form of storage and dissemination of information were the prints, and the main means of access to information was the library. New information technologies have given new opportunities to meet the challenges of creating information storage resources, their organization, means and methods of access to users. In summary, these approaches became known as the "Digital Libraries" (DL).

### **2. Brief theory:**

1. Digital libraries in the information society. Functions of Digital Library.

Creating digital libraries and related information infrastructure is actively underway around the world. It is hard to imagine at the moment All this has led to the emergence of new, to some extent, a synthetic direction - electronic library, which brings together experts in the field of information technology, librarians, information professionals, employees of museums and archives, publishers and many others.

The main functions of digital libraries are as follows:

1. "Delivery libraries" directly to the user. Delivers library on the user's desktop.

2. Enhanced capabilities for searching and processing information. Automated search more effective than a manual.

3. Expansion of access to information opportunities. Placement of digital content on the network makes them accessible to everyone.

4. Fast updated information. Libraries support the online version of pointers, encyclopedias, directories, and so forth.

5. Information is available anytime and anywhere. Digital libraries do not have the start time and completion time of the day.

6. Access to the various types of information. The presentation of information: text, graphics, sound, animation and others.

The main tasks of the electronic library is the integration of information resources and efficient navigation in them.

Under the integration of information resources meant their union for the purpose of use (with a convenient and unified user interface - preferably one) a variety of information while preserving its properties, features performances and user manipulation capabilities with it. In particular, digital libraries need to ensure that work with heterogeneous databases or database systems, providing the user the efficiency of information searches, regardless of the specific characteristics of information systems that are accessed.

Efficient navigation in digital libraries understood as the user's ability to find the necessary information to fully and accurately with the least expenditure of effort in all the available information space. This approach is well-known information retrieval used in information systems and databases, are special cases of navigation aids.

There is an opportunity to restore lost or damaged books. For some users the electronic form offers the only opportunity to obtain the requested document;

-Provides the ability to produce work with electronic documents, which goes beyond a simple reading of the text or view the picture (including edit, combine, add, rearrange electronic documents, create new ones, and so on based on them);

- Use of multimedia publications, providing text, audio and video, allows you to better absorb the material, that is to receive information in a complex, multiple senses at the same time... The basic unit of information storage in digital library is an electronic document.

With the digital library is one more thing - "a collection of electronic documents" or "collection of information resources." The systematic nature of the collection of information resources is a crucial feature of its distinguishing collection of other sets of information resources. Adequate systematization of information resources not only facilitates user access to them, but also enables targeted and efficient way to explore with them the subject area of the collection.

In general, as was evident from the above definitions, Electronic Library - a heterogeneous system, that is combining all kinds of data. On the other hand, the binding properties of the electronic library is structured, systematization of content, which makes it necessary to share digital library resources into groups by combining them in electronic documents on any grounds. Such groups are inherently meet the definition of Information Resources Collection.

Thus, it can be argued that the electronic library, in general, is a hierarchical system, and may consist of a collection of electronic documents that specify the logical structure of the library.

In terms of the level of abstraction, information resources digital library are divided into the data (information) and metadata (meta-information). Resources are

the first species of interest to users of information about the subject area of the e-library. In turn, the metadata of the electronic library is characterized by the properties of the electronic library as a whole and its affiliated entities resources as a real-world use controls and / or user for the correct interpretation of information resources.

In practice, it has developed a great variety of electronic library systems. Their functionality vary over a fairly wide range. Along with degenerate cases (Web-sites available on the Web environment, traditional database systems and text retrieval system, simple system of electronic library catalogs, etc.) Set up and operate a system of advanced electronic libraries, providing a fundamentally new opportunities for their members.

In order to evaluate the characteristics of scientific (and educational) DL the following evaluation criteria will be considered:

- application area;
- functionality;
- the nature and content of information resources;
- the methods and technology.

## **2. Definition of electronic library**

At the moment, there are quite a number of definitions of the term "digital library", and it can be argued that this concept has already been formed. But, unfortunately, there is not one that could be considered basic and comprehensive. Having analyzed the most famous definitions can state the following:

- Digital Library - is an information system;
- Digital Library - is an information system designed to create, search and effective access to information;
- Digital Library - is an information system designed for use with remote or local electronic resources using global data network;
- Digital Library - is an information system that combines the resources of structuring a single ideology.

Digital Library - Information Service, in which all information resources contained in machine-readable form, and all the functions of acquisition, storage, preservation, dispensing and access provided through the use of digital technologies. F. Guy (National Library of Scotland)

Digital Library - controlled collection of information in conjunction with the relevant services, the information is stored in digital formats and accessible on the network. IN AND. Arms

Electronic Library - a collection of electronic resources and associated technical capabilities for creating, finding and using information.

In this sense they are an extension and expansion of the storage and retrieval of information, dealing with digital data of any type (text, images, sounds, static or dynamic images) and existing in distributed networks.

Contents of digital libraries includes data, metadata describing the various aspects of the data (for example, type of representation, the creator, owner, the right of reproduction), as well as metadata, consisting of ties or relationships to other metadata, whether are they internal or external with respect to the electronic library.

Digital library - a collection of electronic resources, organized on the principle of the library, ie, on the basis of known rules and technologies of traditional librarianship, including acquisition, processing, classification, subject indexing and storage and other processes and technologies, including the creation of a directory and reference and search tools in the electronic form).

Digital Library - is an information system that ensures the safety and effective use of a diverse collection of electronic documents placed in the system and accessible via telecommunication networks

Digital library is designed to store various kinds of information, especially text, and is realized in the form of complex distributed information systems with a unified interface, as well as the ability to access the Internet. Electronic libraries as a class of information systems are characterized by:

- Global access to the system in a Web environment;
- metadata support for the system and the users;
- the inclusion of heterogeneous information resources;
- distribution of information resources;
- presence materialized and virtual collections;
- Integration of information resources at various levels;
- use user interface with increased;
- the level of semantics and others.

Digital Library provides new opportunities to work with large volumes of information. To those include serial, parallel or selective viewing multiple documents;

multifaceted search throughout the entire volume of information;

copying the necessary documents or fragments thereof, both in paper and other media;

create your own documents, etc.

### **3. Scientific Electronic Library**

The main objectives of the creation of digital libraries are to provide scientific research, providing scientists the possibility of effective access to the necessary information resources, as well as:

- Provide the results of fundamental research broad research community;
- the creation of new technology research, effective tools to carry them out;
- Preventing the loss of valuable scientific collections for future generations of scientists;

• providing opportunities for scientific cooperation, not only in the regional, departmental, national, and international scale.

Serious impact on the establishment and on the specifics of the application of scientific EB has the fact, the scientific community has always sought to broad cooperation, it realized the need for the exchange of information, despite the diversity of research subjects, a variety of research techniques. The democratic character of the scientific community is one of the main reasons for the successful development of scientific digital libraries and, as a consequence, to create a scientific digital libraries need to take into account the multilingual environment of the scientific community, the heterogeneity of the information used to provide the possibility of operating data at different levels of abstraction.

At the moment, scientific DL covered almost all areas of knowledge. On the scale there is a full range of systems:

- EB specific journal or magazine group;
- DL separate research team;
- DL scientific institution, region, department;
- National / International DL.

By category of Information Resources Collection scientific EB can be both universal and specific areas of expertise or scientific field. Separately, you can select scientific DLs that are based on the personal archives of prominent scientists.

But in almost all cases, the basis of scientific information resources of digital libraries are scientific publications in various forms (articles, reports, monographs, dissertations, abstracts ...). In addition, research DL can also contain:

- bibliographic information;
- The results of various experiments, observation, measurement, simulation of reality;
- models of the processes, phenomena, phenomena, presented in various forms;
- news, event information (calendar of conferences, etc.)

Like in any other digital libraries, information resources of scientific DLs are a set of metadata + electronic document, ie scientific EB also contains:

- metadata describing information resources;
- catalogs of collections and descriptions of their elements, qualifiers and other means of systematization.

The main feature of the information resources of scientific DL is their heterogeneity in different aspects - a variety of presentation media (text, numeric data, static image, video, audio, multimedia ...).

Another feature of the information resources of scientific EB is the possibility of representing the subject area that are sufficient to carry out

research directly, that is, the use of scientific digital libraries, not only for the information support, but also as a research site.

Another specific feature of information resources of scientific DLs having essential and defining specific requirements for the functional characteristics of EB, is the factor of aging information resources as a result of various experiments, as well as the information contained in the articles, monographs and other publications.

All the above mentioned properties and characteristics of information resources, collection and proper scientific EB determine the fact that EB can be created in a variety of versions and architecture - from concentrated to distributed from materialized to virtual, and technology - some Web-sites, database systems data, text, a system based on the integration technologies.

#### **The main functions of research EB are:**

1. Keeping and updating collections of information resources.
2. Provision of user access to collections.
3. Formation of collections (digitization, recording experiments and observations directly in the process of carrying out, etc.).
4. Integration of publishing technologies and technologies of formation of collections.
5. Providing various embedded applications or overbuilt services - transforming DLs in the research polygon (Virtual Observatory, a virtual chemical or biological laboratory, etc.).

Features scientific EB is manifested not in the set of functions, and the specifics of their implementation, taking into account the properties of scientific information resources and collections.

#### **4. Educational Electronic Libraries**

Among the thematic digital library is not the last place is occupied by educational digital libraries. The main objectives are the creation of educational digital libraries providing of training, the provision of training opportunities effective access to the necessary educational information resources, as well as:

- improving the educational process, the organization of independent work of students, the organization of work and внеаудиторных т. Etc .;
- the creation of new educational techniques, effective tools for their use;
- providing the possibility of using the experience and results of educational and methodical work of the largest educational institutions;
- Saving for the future generations of the original lecture and methodical material best teachers and scientists of leading universities;
- Providing opportunities for cooperation not only in the regional, departmental, national, and international scale.

Thus, the fundamental difference between educational EB is the subject area - the educational process, and common goals - to provide access to and preservation of information - no different from the others.

following the application of educational digital libraries can be distinguished:

- use the usual way - educational EB performs traditional function of preserving and providing access to information;
- the only difference from other educational digital libraries, in this case, will be the subject area EB, causes the content specifics - electronic educational resources (ESM);
- Use for the organization of the educational process - in distance education, during the classroom, for the organization of independent work of students.

Like in any other digital libraries, information resources of educational digital libraries are a set of metadata + electronic document. Metadata describing the ESM should consider the features of the domain DL, t. E. Include elements specific to the description of educational resources.

Any ESM educational EB can be "tied" to a particular course of study (disciplines) that should be reflected in the metadata. The course can also be cataloged and provided with a detailed description.

Each ESM can determine their level of access:.. Free access without registration, free access to mandatory registration, paid access to the different form of payment, etc. In fact the electronic document - ESM - no restrictions, it can be of any type - text audio or video, software package, and so on. d.

Functions educational EB essentially depend on the application. If it is used in the traditional way, then its basic functionality identical to that of other types of EB. This is the formation and storage of collections of information resources, providing user access, metadata support, support for different user information, and so on. E., T. E. Those features that were considered in the previous sections.

New educational DL associated with it in the educational process. First and foremost, it is to ensure the ability to work with complex, specific to the educational EB electronic documents; provision of teachers to prepare and conduct classes; Integration with other educational information systems.

Providing this functionality is achieved by expanding the set of elements of metadata and search capabilities of EB. In profile, the metadata elements to be included for the analysis of painting a large volume of documents and complex structure, ie. E. Cataloging chapters, sections and other parts of the document. Thus, when using a conventional attribute search, you can get a specific section of the document corresponding to the search query, as opposed to the traditional approach, when, after receiving the necessary document had to or view it in its entirety or to organize an additional search within the document to get the desired information.

Enhanced search capabilities DL in this case involves the organization of full-text search and navigation within the ESM.

ELS "consultant physician» (<http://www.rosmedlib.ru>)

"Physician consultant" - is an electronic medical information and educational system, or library resources which are available on the Internet. The materials in the "medical consultant", developed by leading Russian experts on the basis of current scientific knowledge (evidence-based medicine). The information has been prepared in keeping with the scientific-practical medical society (global, European and Russian) in the relevant specialty. All materials have passed the mandatory independent review. The system includes medical news, textbooks, monographs, national guidelines, and much more; designed both for students and for teachers and health practitioners.

To log in, you must register on the site. Access to the system is only possible with the operating computers connected to the local network of the university.

**ELS 'student adviser. Electronic library of the medical school** »(<http://www.studmedlib.ru>)

**ELS 'student adviser. Electronic library of the medical school** - the university offers the most comprehensive sets of required literature in accordance with the curriculum and the requirements of state standards. The total number of publications - 2060; textbooks and posobiy- 622; It shows three publishers: "GEOTAR-Media", "Medicine", "SpetsLit"; videos on the practical skills and medical manipulations; atlases, workshops, handbooks, collections of assignments, practical guides; magazines, primarily included in the WAC list - more than 30 titles. Users can copy text, create your own notes and bookmarks.

**ELS 'student consultant medical college** »([www.medcollegelib.ru](http://www.medcollegelib.ru))

**ELS 'student medical college consultant** - e-library College of Medicine - an innovative tool for teachers and students of secondary vocational education. Total number of publications - over 469, spanning at least 85% of the subjects studied in medical colleges; textbooks and manuals with vultures - not less than 75% of the total amount included in the DEC; It shows three publishers: "GEOTAR-Media", "Medicine", "SpetsLit"; videos on the practical skills and medical manipulations; atlases, workshops, handbooks, collections of assignments, practical guides; magazines, primarily included in the WAC list - more than 30 titles.

Users can copy text, create your own notes and bookmarks.

**Electronic Library System "Lan" publishing house** ([e.lanbook.com](http://e.lanbook.com))

**Electronic Library publishing system "Lan"** - a resource that includes both electronic versions of books of publishing house "Lan" and other leading publishers of textbooks, as well as electronic versions of periodicals on natural, technical and humanities. The purpose of the resource - providing access to higher education institutions for scientific, educational literature and scientific periodicals on the maximum number of core areas, so the range of electronic-library system is constantly expanding.

The ELSs are books on the following topics: medicine (318 ind.), Chemistry (535 ind.), Psychology and Pedagogy (1213 ind.). It provided a permanent open access to all the free content publishing FBS "Lan".

Federal electronic medical library (FEML) (femb.ru)

Federal electronic medical library (FEML) is part of the unified state information system in the health sector as a reference system.

Just FEMB published in the open access document 23993.

Placing Documents in FEMB carried out in accordance with copyright and related rights of the Russian Federation legislation.

FEML created based on the funds of the Central Scientific Library of Medicine (TSNML) of the First Moscow State Medical University. Sechenov.

Federal electronic medical library (FEML) should provide fundamental modernization of information support of medicine and public health, as a result of which the most important information in digital form will be available in all educational, scientific and medical institutions through the Internet to meet the copyright requirements. Access to FEML free, user registration is required. The system provides the ability to explore the contents of the full texts of documents in read-only mode.

Central Scientific Library of Medicine (TsNMb) MMA. Sechenov), the base of "Russian Medicine" data - contains information about the primary sources received by TsNMb since 1988 within the divisions:

- Article - include articles from local magazines and collections;
- dissertation - domestic include abstracts and dissertations;
- Book - include domestic, and foreign books translated.

This database includes only bibliographic descriptions of primary sources available in TsNMb, and almost does not contain abstracts and text of the documents themselves. Subscribers can order the paper and electronic copies of articles and abstracts. TsNMb does not manufacture complete copies of books and dissertations, as well as electronic copies of the text of primary sources.

Thesaurus in Medicine MeSH

Thesaurus MeSH developing US National Medical Library for indexing and retrieval of documents in the life sciences (Medical Subject Headings, 1992). In 2009, a thesaurus contains more than 25 thousand handles. Descriptors are provided with interpretations and a list of synonyms or similar within the meaning of the terms (entry terms).

The relationship between the descriptors can be hierarchical - such relationships are presented in a hierarchical tree - and associative. Location in the tree is marked by special tags Stock No tree, and each handle can include a few trees, that is, he mapped several such rooms.

Non-descriptor in the hierarchical tree can be changed with the development of the thesaurus, each handle has a unique identification number, which remains the same throughout the lifetime of the handle.

At the top level of the hierarchy of the thesaurus is 16 descriptors: anatomy, disease organisms, chemicals and drugs, techniques and equipment, psychiatry and psychopathology, ., Person, geography and others.

The thesaurus is also a standard set of qualifiers (allowable qualifiers), which can be added to the descriptor to narrow subjects: BS - blood supply, PP - physiopathology, the MI - microbiology, etc. These qualifiers are especially important in a lot of case documents that mention a lot of concepts in different aspects - then through the qualifiers, you can more accurately determine what concept from what point of view is considered.

The purpose of activity of students in class:

**The student should know:**

1. Basic definitions and terms.
2. The difference between the union catalogs and medical libraries.
3. How can I search for medical resources.
4. The difference between scientific and educational EB EB.

**The student should be able to:**

1. Use union catalogs.
2. Use medical libraries.
3. Using scientific DL
4. Use educational DL.
5. Use of medical reference books and directories of drugs.

**4. Learning content:**

1. Digital libraries in the information society. Functions of Digital Library.
2. Definition of electronic library
3. Scientific Electronic Library
4. Educational Electronic Libraries
5. Medical Library Systems

The next challenge is the integration of educational digital libraries with other information systems, a prerequisite of which is interoperability, ie. E. Providing opportunities to work together. Ensuring integration is achieved:

- the use of well-known metadata schemes or correct description of their own profile;
- the use of Semantic Web technologies - XML, RDF, ontologies, and metadata for the formation of ESM;
- the possibility of access to EB for common protocols, providing information retrieval, - Z39.50, SRU / SRW, etc .;
- the use of web services.

**5. Medical Library Systems**

**5. The list of questions to test the level of knowledge:**

1. What is a digital library?
2. Why do you need the creation of digital libraries?
3. What is the difference between the different library systems?

**6. The list of questions to check the final level of knowledge:**

1. List the basic functions of digital libraries.
2. List the main objectives of the electronic library.
3. The criteria for evaluation of scientific digital libraries.
4. The main objectives of the creation of digital libraries research.
5. The main functions of research DL.
6. The main purpose of creation of educational digital libraries.
7. Functions of educational digital libraries.
8. Describe a medical library system.

**7. Using the Medical Library Systems, to find relevant information:**

- a. cardiovascular diseases.
- b. of anemia in children: causes, symptoms, treatment.
- c. Toxoplasmosis of the disease, as well as information about hereditary diseases,
- d. about the drug Aspirin and print the document.

Keep the information found in MS WORD file.

**8. Independent work of students:**

Learn the basic principles of information retrieval on the Internet.

**9. Hronokarta training session:**

6. Organizing the time - 5 minutes.
7. Monitoring of knowledge - 30 min.
8. Analysis of the theme - 20 min.
9. Practical work - 30 minutes.
10. Wrap-up sessions - 10 min.

**10. A list of textbooks for the class:**

1. Gelman V.Ya., Shulga OA Buzanov DV Internet in medicine, 2005 MIA g.
2. Medical Internet Resources: A Reference Guide. ... - M.: Dess com 2000.
3. Internet to a doctor. Sinitsyn VE, EA Timonina

## **Subject 9: "The algorithm simulation of physiological processes. Management Information Systems health care setting (AIS LPU) "**

### **1. Scientific and methodological support of the theme:**

Today is a topical issue of new formulations of problems of mathematical modeling in biomedical practice. For the most part a number of areas related to the modeling of complex medical and biological systems have not received development.

The theoretical issues of the mathematical modeling of the medical diagnosis and the use of simulation for solving urgent practical problems as well as problems in the development of medical information diagnostic support systems dedicated to the work, primarily on questions of a theoretical nature, stringent production tasks, the application of mathematical analysis to develop a means of setting diagnosis.

The problems, the development of tools to support medical and diagnostic activities include: weak formalization of knowledge and high dimensional feature space, not allowing a doctor (especially a young specialist) immediately to cover a full range of diagnostic pathology markers. The peculiarity of the diagnosis in early childhood is also a weak informativeness of each of the features, taken separately.

Quoted in the literature of preclinical diagnosis algorithms based on regression models of physiological state based on the idea that the whole range of transitions from one state to another can be described by a linear function. In fact, the complex physiological and pathological processes of adaptation to the environment can hardly have a linear nature. This is due to the fact that at different stages of the adaptation of the interaction of biomechanical processes, compensation and adaptation mechanisms actually develops differently. Spaces, which are deployed in various departments of the compensation processes of the musculoskeletal system, it is extremely heterogeneous. Therefore, to accurately describe them, use a specific mathematical techniques, in particular, non-linear regression or polynomial equation of varying degree. According to the descriptions of the various means of mathematical modeling used in medical applications, one of the most appropriate methods aimed at solving problems of medical diagnosis is the discriminant analysis.

Typical medical information system designed to support the work processes of therapeutic and prophylactic institutions (MPI)

One of the important features that should have an information system is its ability to automate large and very large health care institutions, which represent the complex systems with multiple repeating structural units. For such complex health care facilities as a relevant task to obtain data on the work of each of the structural components of the institution, which itself can act as an independent institution, and the problem of obtaining data on the work of the whole complex (the institution as a whole)

### **2. Brief theory:**

#### **1. Modeling physiological processes.**

Algorithm - a set of instructions that describe procedures artist to achieve the result of solving the problem in a finite time.

Modelirovanie- study of objects of knowledge on their models; Construction and investigation of models of real objects, processes or phenomena in order to obtain an explanation of these phenomena, as well as to predict the phenomena of interest to researchers.

Physiology (from grech.φύσις- grech.λόγος- nature and knowledge) - the science of the spirit of the living and life in normal and pathological, that is, the laws governing the functioning and regulation of biological systems of various organization levels, the extent of the norm of life processes (normal physiology) and painful deviations from it (pathophysiology).

In medicine, physiology, along with anatomy and histology is a basic theoretical foundation, through which the doctor brings together disparate facts and knowledge about the patient in a single whole, assesses his condition, the level of capacity. And according to the degree of functional disorders, that is, by the nature and magnitude of abnormalities important physiological functions - seeks to eliminate these deviations and to return the body to normal, taking into account the individual, ethnic, gender, age characteristics of the organism, as well as environmental and social conditions of the environment.

The process from the Latin processus- «for», "move", "promotion"

Simulation (situational simulation) - a method to build models that describe the processes as they would have passed in reality. Such a model can "play" in time for a test, and given their set. In this case the results will be determined by the random nature of the process. These data can be obtained fairly stable statistics.

A quantitative description of the observed phenomena has long been the norm medical research. For the most part, however, it is limited to some statistical analysis (now more often - a multi-dimensional).

Examples of the construction of dynamic models, such as the spread of viral infection, is quite rare. In our opinion, this hinders the widespread (but false) belief that "high-grade" can only be analytical models that provide a forecast, but also other (just) an opinion on the excessive complexity of the procedure for constructing and solving a system of differential equations.

Before forecast, you need to understand, explain. Therefore, firstly, it is necessary to discard only look at the model as prediction means and see it in the way of studying the characteristics of biological systems, including those that are hidden from direct observation. Second, to explain the case you want to use other effective, the funds available but the majority of researchers, namely, simulation.

To create simulation models are much lighter than the analysis because they are computer programs that can be built on the basis of the simplest (linear) algebraic equations. Moreover, the system of algebraic equations does

not have to decide, as the model parameters are selected with the help of special computer algorithms (optimization procedures). From this perspective, simulations look like numerical, arithmetic, model. Simulation models allow to completely "solve specific problems arithmetical methods".

### Example 2. Solutions modeling tasks.

We calculate the number of vipers that bite ecologist for the fifth time. Methods of labeling require a plurality of catching these animals, which are sometimes bite. With the acquisition of experience increased and caution, so the distance between bites (and the time and numbers of individuals) is increasing. Accumulated statistics provides a glimpse into the future and know in advance with what the next number will have to be especially careful to apply? To do this, we construct a simple model according to two indicators and try to make a prediction.

Turn on the computer and start MS Excel program.

First, we introduce the data in the Excel worksheet.

|   | A      | B       | C | D |
|---|--------|---------|---|---|
| 1 |        |         |   |   |
| 2 |        |         |   |   |
| 3 | Укус № | Ч особи |   |   |
| 4 | 1      | 14      |   |   |
| 5 | 2      | 99      |   |   |
| 6 | 3      | 1128    |   |   |
| 7 | 4      | 1724    |   |   |
| 8 |        |         |   |   |
| 9 |        |         |   |   |

**Pic.** Number of individuals viper, giving birth ecologist

The next stage - the mathematical description of the model. If you build a graph, it is seen that the desired relationship is likely to curved, and can be described, for example, the exponential function:

$$Y = a * X^b$$

Applying our notation, we obtain the estimated model:

$$N = a * Y^b$$

where

N' - the estimated number of individuals;

Y - bite number in order.

Conditional approximate values of the model parameters (coefficients a and b) must be set as soon as we introduce them in worksheet cells, C1 = 1, C2 = 1.

Now you can create a model in an Excel worksheet - enter the model formula. spreadsheet program rules require that the model values for each sample object (or one time step model) are calculated explicitly. We introduce into cells C3: C9 model formula, from C4:

|   | A      | B       | C |
|---|--------|---------|---|
| 1 |        | a=      | 1 |
| 2 |        | b=      | 1 |
| 3 | Укус № | N особи |   |
| 4 | 1      | 14      |   |
| 5 | 2      | 99      |   |
| 6 | 3      | 1128    |   |
| 7 | 4      | 1724    |   |
| 8 | 5      |         |   |

**Pic** Enter the primary values of the parameters

$C4 = \$C\$1 * A4^{\$C\$2}$ , where

$\$ C \$ 1$  - the absolute address to the setting of a cell,

$\$ C \$ 2$  - the absolute address with the value of the parameter b cells

A4 - relative address with the value of the US value of the cell

\* ^ - arithmetic operations, multiplication and exponentiation corresponding design model.

After pressing the Enter key cell will contain the calculated (obviously inaccurate) numbers viper value at current levels, the parameters a and b.

|   | A      | B       | C             | D | E |
|---|--------|---------|---------------|---|---|
| 1 |        | a=      | 1             |   |   |
| 2 |        | b=      | 1             |   |   |
| 3 | Укус № | N особи | N'            |   |   |
| 4 | 1      | 14      | =C\$1*A4^C\$2 |   |   |
| 5 | 2      | 99      |               |   |   |

**Pic.** Entering the first model of the formula.

Now we need to calculate the remaining value of the model, using the "auto-complete" procedure. To do this, select cell C4, direct the mouse cursor to the bottom right corner of her: he of the white cross turns into a black cross.

|   | A      | B       | C  |
|---|--------|---------|----|
| 1 |        | a=      | 1  |
| 2 |        | b=      | 1  |
| 3 | Укус № | N особи | N' |
| 4 | 1      | 14      | 1  |
| 5 | 2      | 99      |    |

**Pic.** Start of operation autocomplete cursor

By clicking the left mouse button, drag the cursor to the lower corner of the cell C7, let go. All the cells were filled with stereotyped formulas that calculate model values

|   | A      | B       | C  |
|---|--------|---------|----|
| 1 |        | a=      | 1  |
| 2 |        | b=      | 1  |
| 3 | Укус № | N особи | N' |
| 4 | 1      | 14      | 1  |
| 5 | 2      | 99      | 2  |
| 6 | 3      | 1128    | 3  |
| 7 | 4      | 1724    | 4  |

**Pic.** Completion operations autocomplete

By double-clicking the left mouse button (better yet, press the function key «F2») formula in any cell becomes editable. Thus it is possible to verify that in each of the cells contains a formula having the correct relative and absolute links to the cell with the values (a and b) and the leading variable (Y).

|   | A      | B       | C             | D |
|---|--------|---------|---------------|---|
| 1 |        | a=      | 1             |   |
| 2 |        | b=      | 1             |   |
| 3 | Укус № | N особи | N'            |   |
| 4 | 1      | 14      | 1             |   |
| 5 | 2      | 99      | 2             |   |
| 6 | 3      | 1128    | =C\$1*A6^C\$2 |   |
| 7 | 4      | 1724    | 4             |   |

**Pic.** The contents of cells - a model of the formula

The formula calculates the value of each cell numbers biting individuals for "their" bite rooms (from column A).

Thus, the model value (N') are counted, but they are obviously bad consistent with real values (N). For example, a secondary bite made the 99th caught a viper, and the model has given N' = 2. It is clear that the values of the parameters we have taken ill characterize the relationship between the studied traits. It is necessary to somehow improve them. To do this, we calculate the first difference cumulative model of reality. This role can perform the squared difference between each pair of values of the model - the reality:

$$\phi = (\text{Мод.} - \text{Реал.})^2 = (N'_i - N_i)^2.$$

On an Excel worksheet, this formula will look like this, for example, for line 4:

$$D4 = (C4 - B4)^2 = (1 - 14)^2 = -13^2 = 169.$$

Using the procedure of "autofill", it is easy to calculate the same values for all pairs of variables N and N '(for verification is to click in the D5 and press «F2»).

We denote the resulting graph, for example, through "f". In cell D8, type the formula calculation of the sum of the squares of the differences between the real and the model variables:

или  $D8 = \text{СУММ}(D4:D7) = 4233603$ .

|   | A      | B       | C  | D               | E |
|---|--------|---------|----|-----------------|---|
| 1 |        | a=      | 1  |                 |   |
| 2 |        | b=      | 1  |                 |   |
| 3 | Укус № | N особи | N' | φ               |   |
| 4 | 1      | 14      | 1  | 169             |   |
| 5 | 2      | 99      | 2  | $= (C5 - B5)^2$ |   |
| 6 | 3      | 1128    | 3  | 1265625         |   |
| 7 | 4      | 1724    | 4  | 2958400         |   |

**Pic.** calculation differences

4233603 Value calculated in cell D8, characterizes the difference between the calculated generalized model characteristic values from the source data. Such a large quantity is determined, apparently, by the fact that randomly assigned to the coefficients for the model equations poorly match the specifics of real relationships.

| D8 |        | =       |    | =СУММ(D4:D7) |   |
|----|--------|---------|----|--------------|---|
|    | A      | B       | C  | D            | E |
| 1  |        | a=      | 1  |              |   |
| 2  |        | b=      | 1  |              |   |
| 3  | Укус № | N особи | N' | φ            |   |
| 4  | 1      | 14      | 1  | 169          |   |
| 5  | 2      | 99      | 2  | 9409         |   |
| 6  | 3      | 1128    | 3  | 1265625      |   |
| 7  | 4      | 1724    | 4  | 2958400      |   |
| 8  |        |         | φ= | 4233603      |   |

**Pic.** Calculation of the generalized difference functions (F)

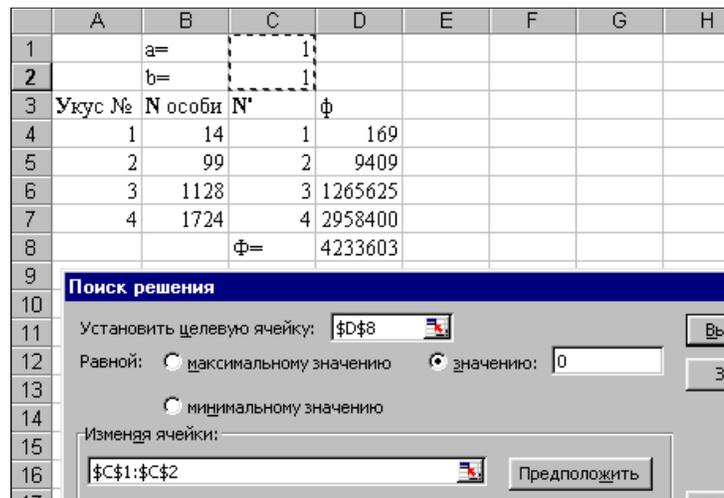
We can assume that for certain values of the coefficients of the model is more accurate to describe the reality and function of differences (value in cell D8) will decrease. This argument allows you to start searching for the best values of the model parameters by changing them and tracking function decline differences F.

For example, it would be possible to repeatedly enter the cells C1 and C2 are different settings that reduce F. For example, when a = 100 level difference function becomes slightly lower than the previous (2,456,157 vs. 4,233,603).

|    | A      | B       | C   | D       |
|----|--------|---------|-----|---------|
| 1  |        | a=      | 100 |         |
| 2  |        | b=      | 1   |         |
| 3  | Укус № | Н особи | N'  | φ       |
| 4  | 1      | 14      | 100 | 7396    |
| 5  | 2      | 99      | 200 | 10201   |
| 6  | 3      | 1128    | 300 | 685584  |
| 7  | 4      | 1724    | 400 | 1752976 |
| 8  | 5      |         | 500 |         |
| 9  |        |         | φ=  | 2456157 |
| 10 |        |         |     |         |

**Pic.** Manual adjustment of parameter values

Fortunately, the manual adjustment is not necessary because there has built-in program (macro) in an environment of Excel, search for the best procedure parameters optimization process. We call it "Solver" command "Tools" from the menu.



**Pic.** Setting Macro window "Solver"

If you can not find in the menu command Service search solutions, it is likely that this procedure is simply not connected, or is not installed. To connect the macro Search solutions need to call the Add-ins window on the Tools menu, where the tick title search solutions. After that, the corresponding command will appear on the Tools menu. If a title search solutions in the Add-ons window, there is no need to use the installation disc, MSOffice, select Add / Remove / Microsoft Excel / Add-ins, tick the box and search for a solution after the installation procedure connect.

Macro window that appears on the team search for a solution, you need to fill in properly (for example, using the mouse):

- Set target cell: \$ D \$ 8
- equal importance: 0
- By changing cell: \$ C \$ 1: \$ C \$ 2 (containing the parameter values).

After clicking the button a window will appear summary reports Run, warning that the search can not find a solution. This is natural, because the task of the module was to reduce the difference to zero function, and a macro could only reduce it to the level of  $P = 117\ 686$  (D8 cell).

With "point of view" macro (. See macro settings ...) solution found unsatisfactory, ie the values obtained are inaccurate coefficients. But from the point of view of ecology, such a decision may be quite acceptable: the values in the columns NiN 'have become quite close, well, the statistical significance of differences can (and should) be studied by statistical methods. Therefore, there is every reason to maintain the solution found and view the resulting equation:

This is the desired model. It is, of course, is very primitive and very well could be calculated in another way - by means of a regression analysis of the data analysis unit menu service.

Nevertheless, the result is of fundamental importance for the understanding of the modeling being. Now the user that performed the proposed example, has mastered the process of constructing the simulation model.

|    | A  | B       | C       | D       | E |
|----|--|---------|---------|---------|---|
| 1  |  | a=      | 63.2425 |         |   |
| 2  |  | b=      | 2.41289 |         |   |
| 3  | Укус №   | N особи | N'      | φ       |   |
| 4  | 1  | 14      | 63.2425 | 2424.82 |   |
| 5  | 2  | 99      | 336.792 | 56545.1 |   |
| 6  | 3  | 1128    | 895.883 | 53878.4 |   |
| 7  | 4  | 1724    | 1793.56 | 4838.07 |   |
| 8  |  |         | Ф=      | 117686  |   |
| 9  | Результаты поиска решения  |         |         |         |   |
| 10 | Поиск не может найти подходящего решения.  |         |         |         |   |
| 11 |  |         |         |         |   |
| 12 |  |         |         |         |   |
| 13 |  |         |         |         |   |
| 14 | <input checked="" type="radio"/> Сохранить найденное решение   |         |         |         |   |
| 15 | <input type="radio"/> Восстановить исходные значения   |         |         |         |   |
| 16 |  |         |         |         |   |
| 17 | <input type="button" value="OK"/> <input type="button" value="Отмена"/> <input type="button" value="Сохранить сче"/> |         |         |         |   |
| 18 |  |         |         |         |   |

**Pic.** Window macro execution "Solver"

Considered modeling method has the same features as regression analysis, when it comes to the simple relationship of variables, however, it becomes indispensable when medic have to study dynamic processes.

In addition, the flexible means of the Excel spreadsheet contain the possibility to finish building a simulation system and create a framework for assessing the statistical characteristics of parameters Introductory thesis of the

book is formulated as follows: Excel environment allows you to create models of any processes and to assess the values of their parameters. The subsequent exposition devoted to his illustrations.

As for the forecast, then give yourself determine the number of fatal snake, prompting the search direction. We need to add a line 8, enter the  $A8 = 5$  and ...

### **3. Appointment of the structure and the main characteristics of the IIA**

Typical medical information system designed to support the work of MPI processes.

Medical information system allows you to keep complete records provided to the patient medical services, automatically generates the necessary medical documentation (primary examination, diaries, minutes of additional studies, statements, standard forms dlyamed. Institutions), a detailed report on the work of the hospital and staff on established statistical and random forms .

#### **4.1. Core modules inherent in the majority of the IIA:**

1. electronic medical records. Depending on the profile of the medical institution (clinic or hospital), ambulatory card or medical history of the patient in an electronic form can be used. Export EHR to an external format.

2. Statistics. Automation of medical statistics and other forms of reporting. Online access to the reports of different types: administrative, financial, medical statistics, financial accounting. The ability to create reports of any complexity.

3. Schedule. Support schedule reception physicians, diagnostic rooms, places of group classes.

4. Laboratory. Laboratory unit for the organization of the business process and laboratory work areas. Supports laboratory profiles with the ability to input or automatic import of research results from the analyzers. Fence biomaterial. Quality control.

5. Accounting services. Accounting for medical services and settlements with various counterparties of medical institutions - insurance companies, businesses and patients.

6. Cashier. Integration with fiscal registrar to implement the cashier's workplace. The integration with the accounting system, the ability to export documents and postings in the accounting of the enterprise program.

7. Pharmacy. Support warehouses of medicines and supplies. It is personalized expense account in the provision of medical services.

8. bed capacity. For hospitals and hospitals in the IIA provides planning and accounting module ward and hospital beds. Various schemes of reservation chambers.

9. Plans for treatment. The treatment plan - treatment standards support mechanism in unity and interaction with other modules of the IIA and convenient tool that facilitates the work of a doctor.

10. Standards of treatment. The use of state standards of treatment with a common mechanism of work with treatment plans and templates directory.

11. Replication of the IIA makes it possible to exchange electronic health records between different institutions, synchronize directories and the consolidation of financial information.

12. Image processing. Preparation and storage of medical images in modern conditions allow, as a rule, specialized equipment and systems software. The IIA may provide for mechanisms for the organization of a structured image storage, retrieval, viewing and editing images.

13. The interface module. Provides connection of medical equipment and the organization of import data from external sources using the original information-sharing technologies.

14. HL7 standard. Using HL7 international standard MIS provides additional integration with medical devices and external applications.

15. System kernel. Security and confidentiality of data is one of the key requirements of a modern MIS. It provides access to the database and implementing the security data. It includes statistics module.

#### **4.2. MIS functions.**

MIS should provide the following functions:

- Reception and admission schedule
- Accounting for services rendered
- Electronic medical history / electronic medical record
- Calculations with patients, insurance companies and contractors
- Medical and economic standards
- Statistics and Analysis
- Automation of hospital
- Network management subsidiaries
- Maintain a database of patients, doctors and nursing staff
- (The account of the work of first aid and home care services)

In its operation the system performs the following tasks:

- Search and patient registration.
- Make an appointment.
- Keeping electronic medical records.
- Enter the results of laboratory and special studies.
- Formation and printing medical documents.
- Limit access to the operator's application.
- Logging into account the work of operators at each workstation (AWS).
- Registration of changes in the database and maintaining fiscal database.
- Maintain pharmacy accounting (for the hospital).
- Keeping food accounting (for the hospital).

Work carried out in the IIA in multiplayer mode with differentiation of access rights. Access control is provided by the identification of the subjects.

When you log on and extradition requests to access user authentication is performed IIA. MIS has the necessary data for identification, authentication, and prevents unauthorized access to resources.

### **3.The purpose of activity of students in class:**

#### **The student should know:**

1. Basic concepts and definitions of the simulation of physiological processes.
2. The principle of the dynamic model.
3. Appointment of AIS hospitals.
4. The core modules of information management systems health care setting.
5. What features should provide AIS hospitals.
6. What problems solves the AIS hospitals.

#### **The student should be able to:**

1. Predict the proposed situation.
2. To create a simulation model.
3. Work with health facilities "hospital" system.
4. Start and register the AIS LPU "Hospital".
5. Keep records of hospital admissions in hospitals "The hospital."
6. Maintain a record and searching for patient information.
7. Work with hospital sheets.
8. Generate reports in the system.

### **4. Learning content:**

1. Modeling physiological processes.
  - 1.2. Example Solutions modeling tasks.
2. Purpose, structure and main characteristics of the IIA.
  - 2.1. Core modules inherent in the majority of the IIA.
  - 2.2. MIS functions.

#### **3. Example of information medical institution management system "HOSPITAL".**

- 3.1. Launch the AIS "The hospital."
- 3.2. Register at AIS "HOSPITAL" system.
- 3.3. Using the toolbar.
- 3.4. Setting the AIS "The hospital."
- 3.5. Editing directories.

#### **4. Consideration of hospitalizations.**

- 4.1. Register a new patient.
- 4.2. Enter data to search for information in the database and the BDSG.
5. Viewing / Editing information on cases of hospitalization.
  - 5.1. General principles.

- 5.2. Removal value.
- 5.3. Selecting information on the cases of hospitalization.
- 5.4. The list of patients.
- 6. Information about the patient (in person).
- 6.1. Tabs "diagnosis", "Advanced".
- 6.2. Tabs "Sick leave", "History", "Window Card" tab "History".
- 7. Formation of a standard medical report forms of statistical reporting.

### **5. The list of questions to test the level of knowledge:**

1. What is an algorithm?
2. What is a simulation?
3. Formulate what physiological process
4. What is a simulation model?
5. The types of medical information system which is designed to
6. List the main modules inherent in standard AIS LPU
7. What features should provide a medical information system?
8. What problems are solved AIS LPU?

### **6. The list of questions to check the final level of knowledge:**

1. Briefly describe the process of process modeling using MS Exel.
2. How does the check-in AIS "Hospital" title.
3. How is the new patient registration in the AIS "The hospital."
4. How do I access to the window view / edit the information on cases of hospitalization.
5. What is the purpose mode "Patient Information."

### **7. Assignment 1. With the help of a computer model the clinical process according to an example.**

30-year-old woman, brought to the clinic with complaints of SMP sweating, tremors and drowsiness, mood swings, tearfulness, general weakness, pain migratory nature throughout the body. In patients with diabetes mellitus type 1 (DM1), identified 15 years ago, with heavy currents are constantly changing therapy due to recurrent hyper- and hypoglycemia. On admission, blood glucose level was 1.2 mmol / l. According to the patient, within a week it had noted the low level of glucose in the blood, although insulin is not administered at this time.

The patient revealed diabetic macro- and microangiopathy (neuropathy, retinopathy). Concomitant diseases: Hashimoto's thyroiditis (hypothyroidism in phase) on replacement therapy with L-thyroxine; and osteoporosis, about what it takes calcium and vitamin D. A family history of diabetes, coronary heart

disease, the older sister - severe CHD with repeated surgical interventions (died at the age of 23).

The patient first received in-patient treatment and examination of 5 years ago, and during this period has always been a cause of hospitalization poor control of diabetes. 2 years ago after a severe transient hypoglycemia in the hospital were made all hormonal tests (without disease), insulin dose was reduced, and the patient was transferred to insulin analogs. Despite changes therapy, diabetes remains poorly controlled - from severe hypoglycemia to hyperglycemia for more than 30 mmol / l. mmol / l.

On examination on admission: general state of moderate severity, mood suppressed. The reduction of subcutaneous fat, lipodystrophy zones under the hyperpigmented skin. The body mass index of 16.7 kg / m<sup>2</sup> (height 166 cm, weight 46 kg). Rhythmic heartbeat with a heart rate of 110 beats / min, the noise does not listen. BP 90/60 mm Hg. Pulse on peripheral arteries weak filling. In the lungs vesicular breathing, no wheezing. Respiratory rate 17 per minute. Abdomen soft, painless. Urine output is adequate.

During his stay in the hospital, there were episodes of hypoglycemia with blood glucose levels of 1-2 mmol / L with a loss of consciousness, which required almost continuous glucose infusion (insulin is not administered), during these attacks are analyzed levels of C-peptide, insulin, glucose blood:

| Episodes | Blood glucose (mmol / L) | Insulin (µE / l) | C-peptide (ng / ml) |
|----------|--------------------------|------------------|---------------------|
| 1        | 1.2                      | 20               | -                   |
| 2        | 2.1                      | 302              | 0.014               |
| 3        | 2.8                      | 63               | 0.26                |

In the clinical analysis of blood: Hb 123 g / L Erythrocytes 4,0h10<sup>12</sup> / l, leukocytes 9,9h10<sup>9</sup> / L, platelets 325h10<sup>9</sup> / L ESR 44 mm / h.

In biochemical analysis a blood protein: 69 g / l, cholesterol 4.21 mmol / l, creatinine 73 umol / L, ALT 31 units / liter AST 35 units / L, HbA1c 8,8%. Blood Electrolytes: K + 4.5 mmol / l, Na + 140 mmol / l, Cl- 107 mmol / l

Urinalysis: sp. 1025 weight, pH 6, glucose Neg., ketones Neg., 0 erythrocytes, leukocytes 5-6 in p / sp.

Glycemic profile:

| Day | Blood glucose (mmol / L) |              |                     |                |
|-----|--------------------------|--------------|---------------------|----------------|
|     | Before breakfast         | Before lunch | 2 hours after lunch | Before bedtime |
| 1   | 4,5                      | 1,2          | 2,6                 | 3,3            |
| 2   | 1,0                      | -            | 2,0                 | 4,9            |
| 3   | -                        | -            | -                   | 14,4           |
| 4   | 24,5                     | 2,8          | -                   | 1,9            |

|   |      |     |      |      |
|---|------|-----|------|------|
| 5 | 1,6  | 1,9 | 3,1  | 5,0  |
| 6 | 18   | 6,8 | 8,4  | 6,1  |
| 7 | -    | 3,9 | 4,6  | 4,1  |
| 8 | 11,1 | 4,0 | 16,0 | 12,0 |

### **8. Independent work of students:**

According to the textbook, BA Korbinskogo "Medical Informatics" Glavu10 study "Automated information system of medical institutions"

### **9. Hronokarta training session:**

1. Organizing the time - 5 minutes.
2. Monitoring of knowledge - 30 min.
3. Analysis of the theme - 20 min.
4. Practical work - 30 minutes.
5. Wrap-up sessions - 10 min.

### **10. A list of textbooks for the class:**

1. Korbinsky BA / TW. Zarubin Medical Informatics. -. 2 nd ed. - M .: Publishing Center "Academy", 2012. -192 p.
2. Esaulenko IE, Semenov SN Basics of practical informatics in medicine; Voronezh 2005