

МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ
БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ
КАФЕДРА МЕДИЦИНСКОЙ И БИОЛОГИЧЕСКОЙ ФИЗИКИ

М. А. ШЕЛАМОВА

**ОРГАНИЗАЦИЯ И ОБРАБОТКА
МЕДИЦИНСКИХ БАЗ ДАННЫХ СРЕДСТВАМИ
ПРОГРАММЫ EXCEL**

**ORGANIZATION AND PROCESSING
OF MEDICAL DATABASES IN EXCEL**

Учебно-методическое пособие



Минск БГМУ 2018

УДК 577.3:004(075.8)-054.6
ББК 32.97я73
Ш42

Рекомендовано Научно-методическим советом университета в качестве учебно-методического пособия 21.02.2018 г., протокол № 6

Рецензенты: канд. физ.-мат. наук, доц. каф. информатики и методики преподавания информатики Белорусского государственного педагогического университета им. М. Танка А. И. Шербаф; д-р тех. наук, зав. каф. компьютерных технологий и систем Белорусского государственного университета А. М. Недзьведь

Шеламова, М. А.

Ш42 Организация и обработка медицинских баз данных средствами программы Excel = Organization and Processing of Medical Databases in Excel : учебно-методическое пособие / М. А. Шеламова. – Минск : БГМУ, 2018. – 48 с.

ISBN 978-982-567-992-0.

Рассматриваются основные понятия баз данных и методов управления ими. Многочисленные профессионально-ориентированные примеры демонстрируют технологию создания и использования баз данных средствами электронных таблиц Excel.

Предназначено для иностранных студентов, обучающихся на английском языке.

УДК 577.3:004(075.8)-054.6
ББК 32.97я73

ISBN 978-982-567-992-0

© Шеламова М. А., 2018
© УО «Белорусский государственный
медицинский университет», 2018

Chapter 1. BASIC DATABASE CONCEPTS

DATABASE AND DATABASE MANAGEMENT SYSTEMS

A **database** is an organized structure designed to store information. It means that databases store not only data, but also information. The concepts of data and information are interrelated, but they are not identical. The structure of a modern database can contain not only data itself, but also the methods by which this data should be processed and organized.

Despite the fact that Office has a special application designed for work with databases (Microsoft Access), Excel also provides functions that allow users to create and edit databases, generate database reports and visualize information. Visualization means selection of the displayed data in accordance with a given criterion, its ordering, design and subsequent transfer to output devices (display, printer) or transfer via communication channels.

Thus, Excel can be used for sorting or storing a small amount of data.

STRUCTURE OF A SIMPLE DATABASE

It should be noted that even if a database contains no data (a blank database), it is still a complete database, because it still contains information – the database structure. The database structure defines the methods of entering and storing of data. The simplest non-computer version of a database is a business diary, which has a separate page assigned to each calendar day. Even if there is no a line written in the diary, it is still a diary, because it has a structure that clearly distinguishes it from an ordinary notebook.

Databases can contain different objects, but the main ones are tables. A simple database must contain at least one table. The structure of a two-dimensional table is composed of columns and rows. Their analogues in the structure of a simple database are fields and records. If there are no records in the table yet, then its structure is formed only by a set of fields.

In Excel, a simple database is called a **table**, its rows are called **records**, and the columns are called **fields**. The first row of a table must contain column headers that are used as **field names** (fig. 1).

	A	B	C	D	E	F	G
1	Patients with ischemic cardiomyopathy						
2	Surname	Name	Gender	Age	Height	Weight	Status
3	Abadi	Omar	m	45	1,78	114	discharged
4	Fedotova	Irina	f	60	1,57	50	continue treatment
5	Lewis	Peter	m	34	1,7	78	discharged
6	Singh	Arosh	m	54	1,73	113	discharged
7	Volkova	Anna	f	56	1,64	66	discharged
8	Nader	Ali	m	43	1,8	93	discharged
9	Wong	Li Jun	m	75	1,7	70	continue treatment
10	Kumar	Sia	f	60	1,58	58	discharged
11	Salib	Zara	f	56	1,67	69	continue treatment
12	Petrov	Anton	m	63	1,75	76	continue treatment
13							

Fig. 1. Example of records and fields in a database:

1 — records (rows); 2 — fields (columns)

TABLE (DATABASE) FIELD PROPERTIES

Table (database) fields do not just form its structure, but they also define the group properties of the data written into the cells that belong to each of the fields. Changing the composition or properties of the fields of the basic table, we change the database structure, and thereby we get a new database. Let's specify the main properties of the list fields:

- *field name* is the property that defines how to address the data of this field during automatic operations with the database;
- *field type* is the type of data that can be contained in this field;
- *field format* is the way of formatting of the data contained in the field cells.

EXCEL TABLE COMMANDS

To work with a table (list), the **Data** tab commands are used (fig. 2).

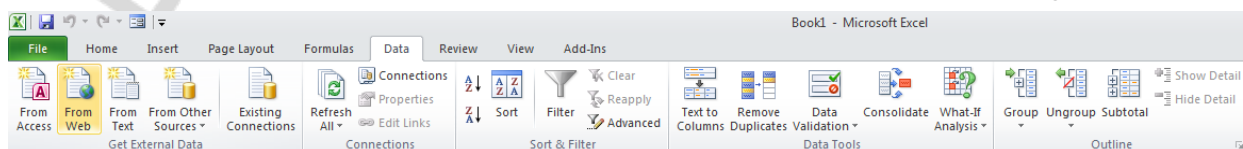


Fig. 2. Data tab and its commands

Tables can be sorted in ascending, descending or user-defined order. The information within the table can also be filtered to display only the data that corresponds to a specified criterion.

Excel has built-in data validation tools to work with tables. For example, the user can specify that a particular column of the table can contain numbers or dates only.

Table cells can be formatted (font type, colour and size or colour fill) in the same way as the cells of a list.

When working with tables, the user should use the **Table tools** tab (fig. 3), which appears after the cursor is set into any cell within the table.

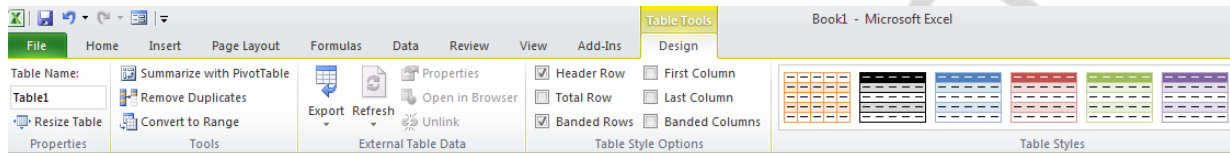


Fig. 3. Table tools tab and its commands

TABLES OF EXCEL PACKAGE

Excel tables (lists) provide tools that simplify management and analysis of groups of *interrelated* data on an Excel sheet. If you declare a range of cells to be a table, you can manage its data and analyze it regardless of data that was not included in the table. For example, you can filter the columns, add total rows, and create reports in the summary table using only the table data.

One sheet can contain several tables, which let users divide the data flexibly into separate well-managed sets (fig. 4).

The tables are differentiated by frames, which also allows users to distinguish the data of the table from the rest of the sheet data.

When creating a table, the process of recognizing and modifying of its content can be simplified using the table tools and visual elements designed to improve these tools (fig. 5). They are as follows:

	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							

Fig. 4. An example of two different lists on one sheet

1. By default, each column of the table can be modified with the **AutoFilter**. The buttons of the **AutoFilter** are situated in the title bar, which allows users to filter and sort the data quickly.

2. The **table indicator** (a frame around the table) clearly marks out the cell interval that makes up the table.

3. Users can add a **Total row** in a table (a special row, which contains a statistical function to process numeric data). If you click on any cell in this row, a drop-down list of generalized functions appears.

4. The size of a table can be changed by dragging of the **resize handler** located in the lower corner of the table frame.

	A	B	C	D	E	F	G
1	Column1 ▾	Column2 ▾	Column3 ▾	Column4 ▾	Column5 ▾	Column6 ▾	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12	Total					0	
13							

Fig. 5. Visual elements of a list:

1 — AutoFilter; 2 — Table indicator; 3 — Total row; 4 — resize handler

A table that is correctly organized should begin with the column headers. Each column must contain one and the same type of information.

The data can be managed without organization of a table. However, creation of a table has many advantages and offers remarkable possibilities to calculate totals and process information.

There are *two ways* to create a table. You can insert a table using the default table style, or convert the existing data into a table using the required style.

CREATION OF A TABLE WITH A DEFAULT STYLE

To create a table with a default style, follow these steps:

1. Open a new workbook or a new worksheet.
2. Create headers for each field of the list, set their alignment and format them as required.
3. Format the cells under the headers according to the data that should be stored there (numeric formats), change the alignment, if necessary.
4. Enter the data (records) under the headers.
5. Select the range of cells that you want to include in the table. The cells can be either *empty* or *contain data*.
6. On the **Insert** tab, in the **Tables** group, click the **Table** command (fig. 6), or press CTRL+L or CTRL+T.

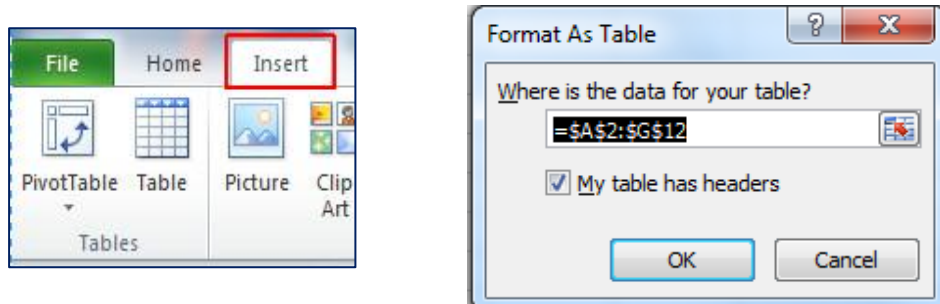


Fig. 6. Creation of a table

7. In the **Format As Table** window, set the check box **My table has headers** if the selected range contains the data that you want to use as the table header. If the check box **My table has headers** is clear, the table headers will display the default names only: **Column 1**, **Column 2**, etc.

To change the default name, select the header and replace it with the required one.

After the table is created, you can use the **Table tools** and the **Design** tab. The tools of the **Design** tab are used to adjust and modify the table. To make the **Design** tab visible, select any cell of the table.

The table automatically extends its boundaries if you enter any data in the row following the table and in the column to the right of the table. To extend the boundaries of the table drag the resize handler (fig. 5) down or to the right.

ADDING A TABLE WITH A SELECTED STYLE

To create a table with a selected style, follow these steps:

1. Select a range of cells with data (including the headers) that you want to convert quickly into a table.
2. On the **Home** tab, in the **Styles** group, click **Format as Table** (fig. 7).
3. In the **Light**, **Medium** or **Dark** section, click the desired table style.
4. In the **Create Table** dialog box (see fig. 6), set the check box **My table has headers** if the selected range contains the data that you want to use for table headers. If the check box **My table has headers** is clear, the table headers will have default names **Column 1**, **Column 2**, etc.

Note. When you select the command **Format as Table**, the table is inserted automatically.

5. When the table is created, the **Table Tools** become available and the **Design** tab appears. Using the tools of the **Design** tab, you can configure and modify the table.

If you set the **Total Row** check box in the **Table Style Options** group on the **Table Tools** tab, the total row will be added at the end of the table (list) (fig. 8).

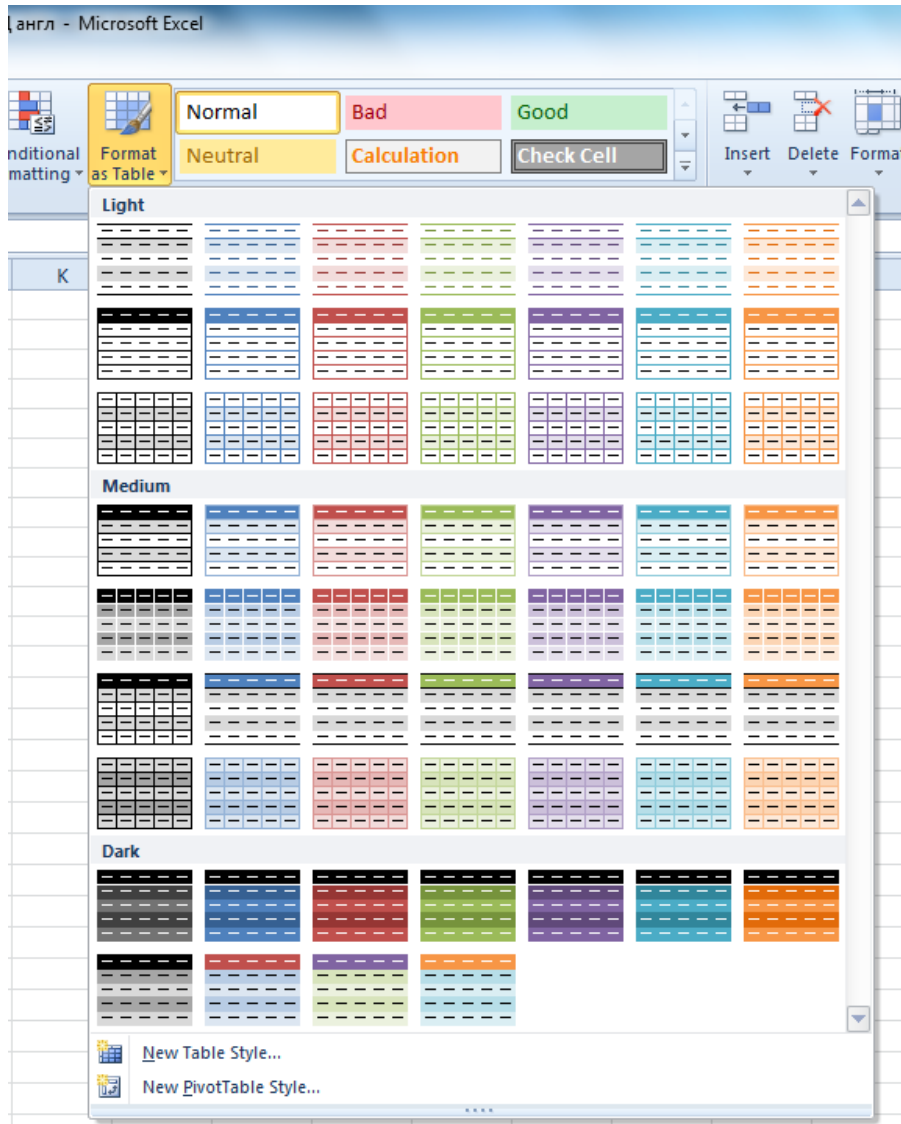


Fig. 7. Creation of a table with a selected style

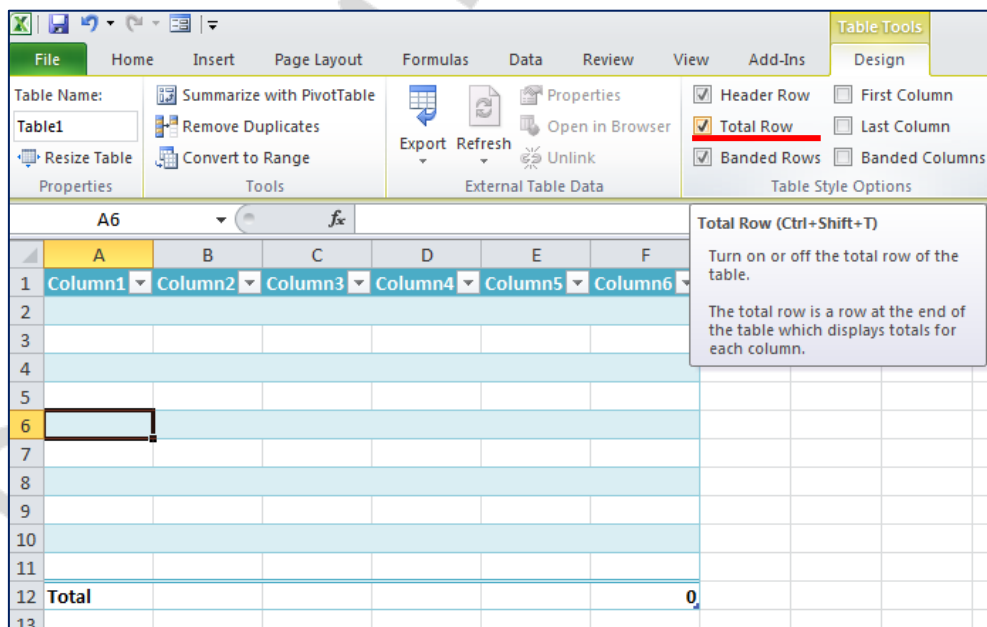


Fig. 8. Adding the Totals row to a table

RECONVERSION OF A LIST INTO A RANGE OF CELLS

If it is required, the table (list) can be converted back into a regular cells range. The data will remain on the Excel spreadsheet. To perform this procedure, do the following:

1. Select any cell in the table.
2. On the additional tab **Table Tools**, on the **Design** tab, find the **Tools** group, and select the command **Convert to range**.
3. When a message with a request to convert the table in a regular range appears, click **Yes**.

The data will no longer have special functions of the table. It will become a regular Excel data. No loss of information will occur after such a transformation.

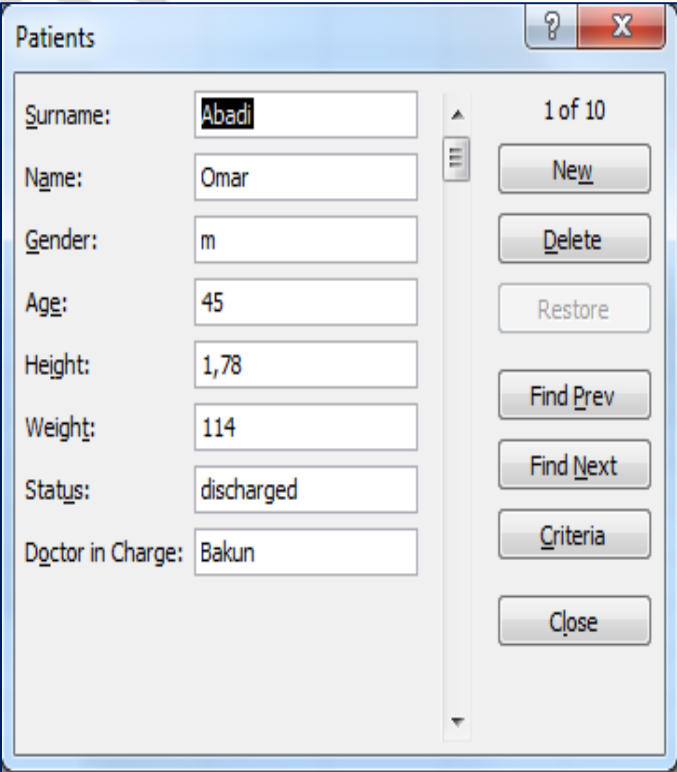
USE OF THE FORM

MS Excel provides a powerful, convenient and simple tool designed to facilitate the entry of information into a table which is the **Data Entry Form**. The **Data Entry Form** is a dialog box (fig. 9), which alternately displays the complete records. In the **Data Entry Form** they can be viewed, added, modified or deleted from the table. Also you can conduct search of the records that correspond to a specified criteria.

If the database is empty (contains only headers of the fields), the data form displays all the column headers with an empty field next to each of them. These fields are intended for entering the data into the column.

Excel generates a built-in data form for a table using the **Form** command.

The data form is used if a simple column enumeration is enough and no more complex or customizable features are required. The data form can facilitate data entry, for example, when there is a wide list with the number of columns exceeding the number of columns that can be displayed on the screen at the same time.



The screenshot shows a dialog box titled "Patients" with a close button (X) and a help button (?). The form contains the following fields and values:

Surname:	Abadi
Name:	Omar
Gender:	m
Age:	45
Height:	1,78
Weight:	114
Status:	discharged
Doctor in Charge:	Bakun

On the right side of the form, there are several buttons: "New", "Delete", "Restore", "Find Prev", "Find Next", "Criteria", and "Close". At the top right, it says "1 of 10".

Fig. 9. Data Entry Form

OPENING OF THE DATA ENTRY FORM

To open the **Data Entry Form**, follow these steps:

1. Place the Form activation icon on the **Quick Access** toolbar: in the **File** menu, click **Options** ⇒ **Quick Access Toolbar**. In the left field **Choose commands from...** set the mode **All Commands** and click **Form**. Then click the **Add** button (fig. 10).

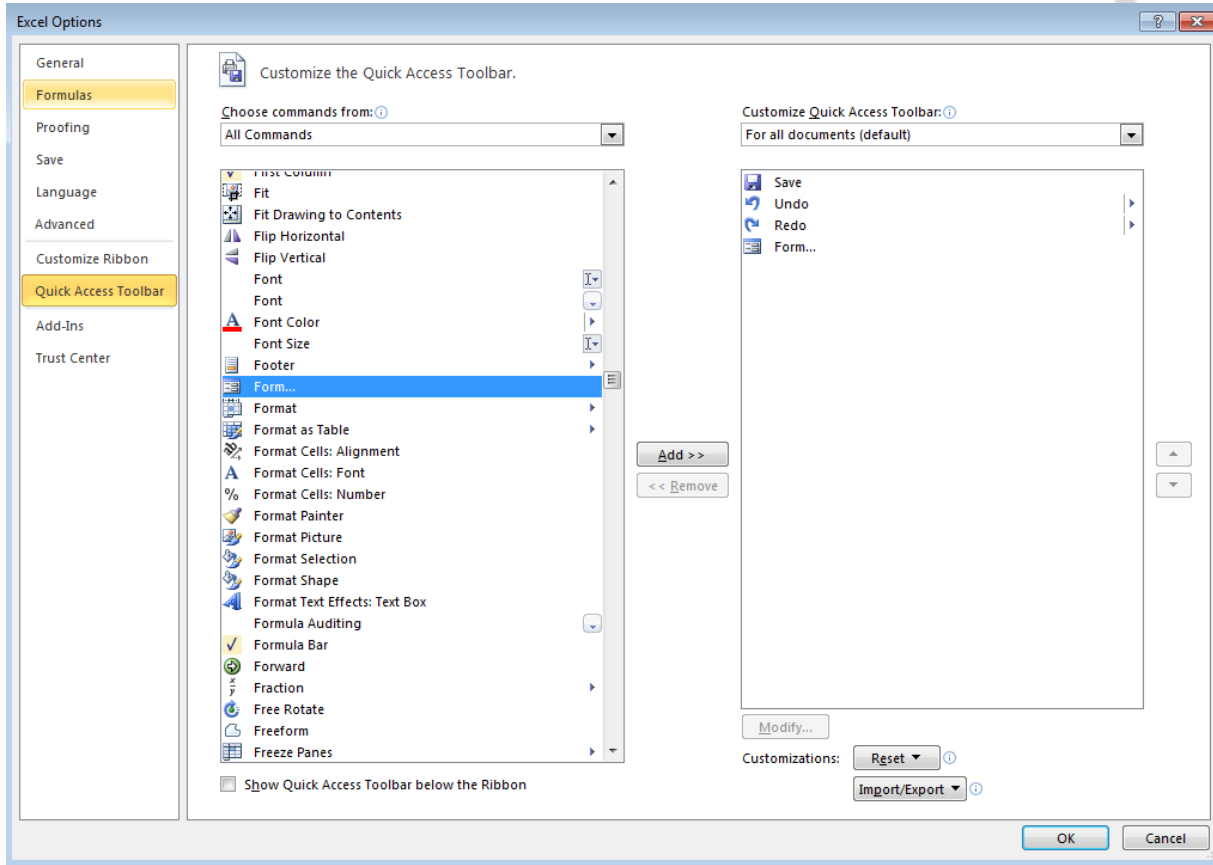


Fig. 10. Adding of the **Form** command to the quick access toolbar

2. In the right field of the **Customize the Quick Access Toolbar** the added command **Form** will appear. Click **OK**.
3. Select any cell of the list.
4. Click the **Forms** icon on the quick access toolbar. MS Excel will display the **Form** dialog box, shown in the Fig. 9.

Each time the **Form** window will display the content of only one current record.

ALGORITHM OF DATA ENTRY USING THE FORM

To enter any data using the form do the following:

1. Set the cursor into any cell of the list.
2. Select the command **Form**.
3. Click **Add**.

4. Fill the fields of a new record, using the **Tab** key to move to the following field. To return to the previous field use the key combination **Shift + Tab**.

5. Press **Enter** to add the record into the list.

6. After finishing entering the last record, click **Close** to add the entered record and close the form. Excel automatically adds the record after switching to another record or closing of the form.

MS Excel does not allow entering data into the fields that contain formulas and automatically copies the formulas for calculation fields.

When adding a record that contains a formula, the result of the formula will be calculated only after pressing the **Enter** key or clicking **Close**.

MS Excel adds the record at the end of the data list.

To cancel the addition of the record, click the **Undo** button before pressing **Enter** or clicking **Close**.

ALGORITHM OF THE DATA DISPLAY AND RECORDS EDITING USING THE FORM

By default the system displays only the first record, but the scroll bar and **Find Prev** and **Find Next** buttons allow the user to move on to the rest of the records and display the data.

To edit the records using the form, do the following:

1. Set the cursor into any cell of the list.

2. Select the **Form** command.

3. Find the record that should be edited.

4. Edit the data of this record.

5. Press **Enter** to update the current record and move on to the next one.

Before that all the changes can be canceled by clicking the **Restore** button.

6. After finishing editing, click **Close** to update the current record and close the form.

SEARCH OF THE RECORDS IN THE TABLE (LIST) USING THE FORM

To shift to one record, click the arrows of the scroll bar in the dialog box. To shift to 10 records, click the area between the arrows of the scroll bar.

You may use the **Find Next** button to shift to the next record of the list and the **Find Prev** button to shift to the previous record.

To specify search or comparison conditions (set of conditions for data search; the conditions may be represented by a required set of symbols, e. g. «Volkova» or an expression, such as «>300»), click **Criteria** and enter the criteria into the form. To search the records that match the criteria use the **Find Next** and **Find Prev** buttons.

ALGORITHM OF DELETING OF A RECORD USING THE FORM



To delete a record using the form, do the following:

1. Select any cell of the list.
2. Select the **Form** command.
3. Find the record that should be deleted.
4. Click **Delete**.


Deleting of a record using the form can not be canceled.

SORTING DATA IN A TABLE

After entering the data, you may need to arrange it. The process of arrangement of records in a database is called **sorting**. It allows the user to change the order of the records in a database, according to a specific task. The initial order of the records can be restored. The universal way to restore the initial order is the introduction of records' sequence numbers. In combination with Excel's data recovery capabilities, it will completely protect the database against losses from accidental operational failures.

To sort the records by one field, use the **Ascending Sort**  or **Descending Sort**  commands that are situated on the **Data** tab in the **Sort & Filter** group. You can also use the AutoFilter icons. It allows the user to arrange the rows according to the contents of specific columns.

It should be noted that the sorting result depends on the data type. To get the correct result, all cells of the column must contain the same data type, e. g. numbers or text. It is recommended to avoid the situations where the cells of one column contain both numbers and text.

When you select the **Sort** command  on the **Data** tab in the **Sort & Filter** group, the window **Sort** of the range appears (fig. 11).

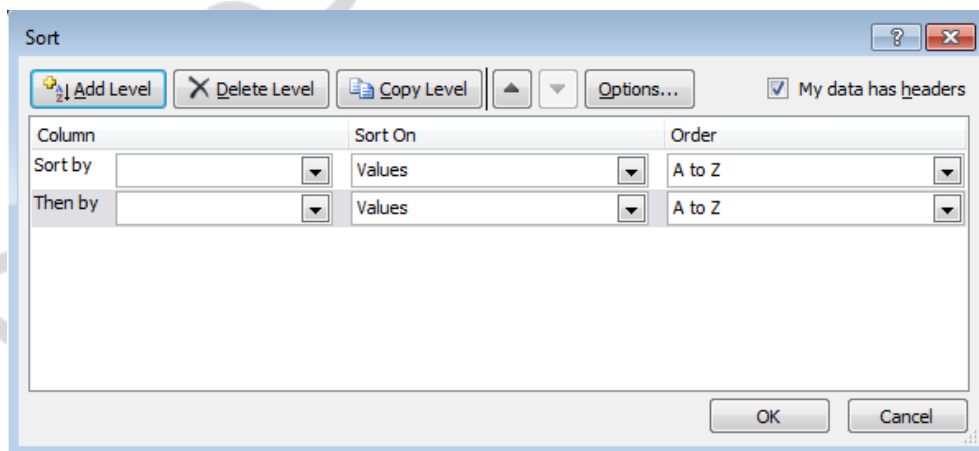


Fig. 11. Sort dialog box

This function allows the user to perform sorting by *several fields*. In this window, you can specify the sorting fields and determine its criteria. Using the drop-down list **Sort By** you can select the column for sorting. The order of sorting can be selected in the drop-down list.

When sorting in ascending order, text data is arranged in alphabetical order **from A to Z**, while numeric data is arranged in increasing order from the minimum value to the maximum one. The dates are arranged from the earliest date to the latest one.

When the records are sorted in descending order their arrangement is reversed.

There are two additional sections **Add Level** and **Copy Level** that enable to define the order of secondary sorting.

Sometimes it is required to select a range for sorting manually. If the selection includes the headers, set the check-box “My data has headers”, and clear this check box if it doesn’t (fig. 11).

You can use up to 64 levels of sorting, and sort the data by the color of cells or font.

The **Sort** dialog box contains the **Options** button, which enables to open the **Sort Options** dialog box (fig. 12). This dialog box allows to:

- make sorting sensitive to uppercase and lowercase letters;
- change the direction of sorting: by columns (sort top to bottom) or by rows (sort left to right).

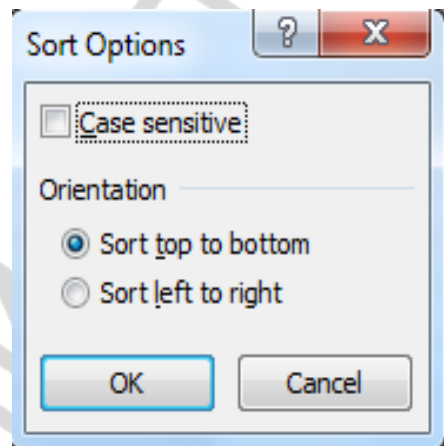


Fig. 12. Sort Options dialog box

SIMPLE SORTING ALGORITHM

To perform quick sorting of the table (list) data according to a certain column, do the following:

1. Set the cursor in the sorted column.
2. On the **Data** tab in the group **Sorting & filter** group click the

Ascending Sorting icon  or **Descending sorting** icon .

The sorting buttons are also available on the **Home** tab, in the **Editing** group.

To cancel the sorting, click **Undo** on the quick access toolbar.

RANGE SORTING ALGORITHM

After the data was organized in a table (list), you can use the **Sort** command on the **Data** tab to rearrange or analyse the data.

To sort the data range, do the following:

1. Set the cursor in any cell in the table.

2. On the **Data** tab, in the **Sort & Filter** group select the **Sort** command. Now all data is selected and the **Sort** dialog box appears (see fig. 11).

3. In the **Column** group, in the **Sort by** field, select the header of the column that should be used for sorting.

4. In the **Sort on** field, select the type of sorting:

- **Values** — sorting by values;
- **Cell Color** — sorting by the color of the cell;
- **Font Color** — sorting by the color of the font;
- **Cell icon** — sorting by the set of icons.

5. If you select sorting by **cell color**, **font color**, or **cell icon** in the **Order** group click the drop-down list and select the required **cell color**, **font color**, or **cell icon**.

6. In the **Order** group, select the sequence of sorting:

– to sort cells by their values, select the option: **A to Z** or **Z to A** (for symbolic data); **Smallest to Largest** or **Largest to Smallest** (for numeric data); **Oldest to Newest** or **Newest to Oldest** (for date values);

– to sort cells by user-defined lists (e. g. sorting by the names of the months of the year), select the **Custom List**. When the **List** window opens, select the required list and click **OK**;

– to sort cells by cell color, font color, or cell icon, select **On Top** or **On Bottom**.

7. To sort by the next column, click **Add Level**, and then repeat the steps 3–6.

8. To delete sorting by a certain column, select its record and click **Delete Level**. *The list must contain at least one column.*

9. Click **OK**.

The columns with a higher position in the list will be sorted earlier than the columns with a lower position.

To repeat sorting after changing the data on the **Data** tab, in the **Sort & Filter** group, click **Reapply** or press **Ctrl + Alt + L**.

Do not forget that the maximum number of columns for sorting is 64.

After application of sorting, the **AutoFilter** icon changes into the following way .

To restore the original list, select the command **Clear** on the **Data** tab, in the **Sort & Filter** group. It will remove sorting for the current data range.

DATA FILTERING

Filtering is a quick and easy way to find a subset of the required data in a table. A filtered table displays only the rows that match the selection criteria specified for a column. Unlike sorting, filtering doesn't change the order of records. It allows to hide temporarily the rows that don't match the criteria.

The rows selected during filtering can be edited, formatted and printed. Also they can also be used for creation of diagrams without changing the order of the rows or moving them.

There are two types of filters in MS Excel: **AutoFilter** and **Advanced Filter**.

When using the **AutoFilter**, the filtering is performed directly on the initial data. When using the **Advanced Filter**, you can place the results of filtering in a separate area.

In case of simple criteria, the **AutoFilter** is enough to display the required information. For complex criteria the **Advanced Filter** is used.

When using the **Find** dialog box for search in the filtered data, the search is performed only among the displayed data, while the hidden data is not involved.

FILTERING OF DATA USING THE AUTOFILTER

The **AutoFilter** allows creation of three types of filters: **by list of values**, **by format** or **by conditions**. All of them are mutually exclusive within the range of cells or the column of the table. For example, you can perform filtering by cell color or by a list of numbers, but you can not use both types of filters at the same time. Likewise you need to select only one option if you want to perform selection by icons or apply a custom filter.

As it was mentioned above, the **AutoFilter** is applied by default to each column of the table. The buttons of the **AutoFilter** are located in the title bar (fig. 13).

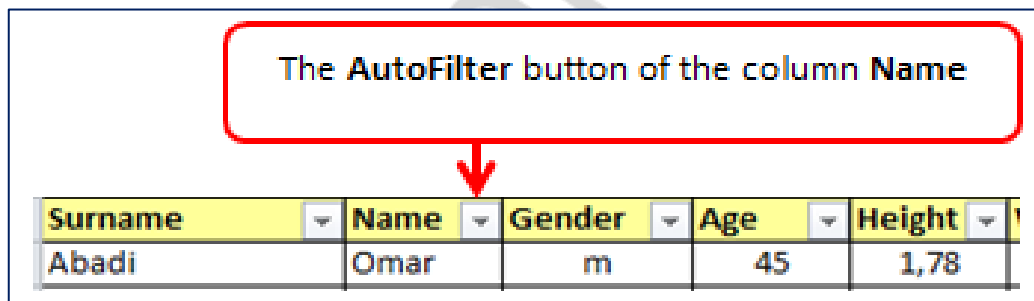
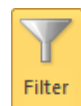


Fig. 13. The AutoFilter button

The presence of this button indicates that filtering is enabled, but not applied.

You can enable or disable the **AutoFilter** by clicking the **Filter** button



on the **Data** tab, in the **Sort & Filter** group.

After clicking the **AutoFilter** button, the full list of the field data is opened (fig. 14).

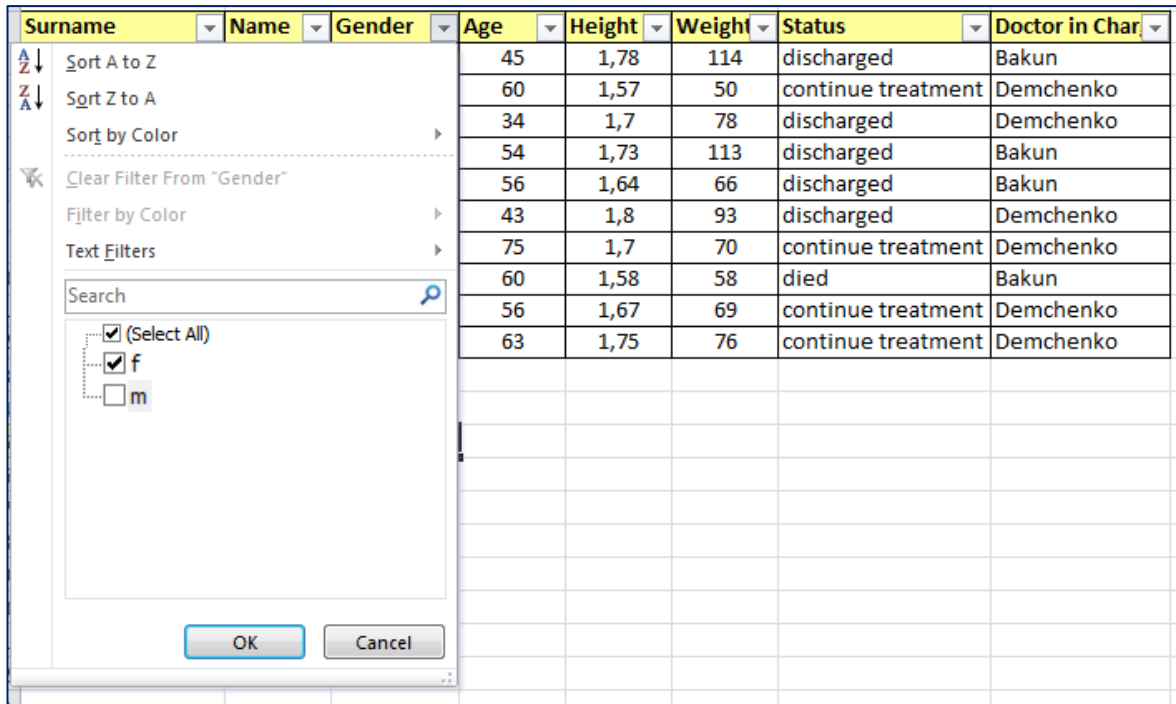



Fig. 14. The use of the AutoFilter

When you select a specific value, all rows that contain this value in the selected field are displayed. For example, you can view data only for a particular drug (fig. 15).

Surname	Name	Gender	Age	Height	Weight	Status
Fedotova	Irina	f	60	1,57	50	continue treatment
Volkova	Anna	f	56	1,64	66	discharged
Kumar	Sia	f	60	1,58	58	died
Salib	Zara	f	56	1,67	69	continue treatment

Fig. 15. The result of the use of the AutoFilter

If the **AutoFilter** icon has changed its appearance , it means that a filter has been applied to this field.

To restore the initial list set the check box **Select all** in the **AutoFilter** list or select the **Clear** command on the **Data** tab, in the **Sort & Filter** group. It will remove all filtering conditions and sorting for the current data range.

APPLICATION OF CUSTOM CRITERIA

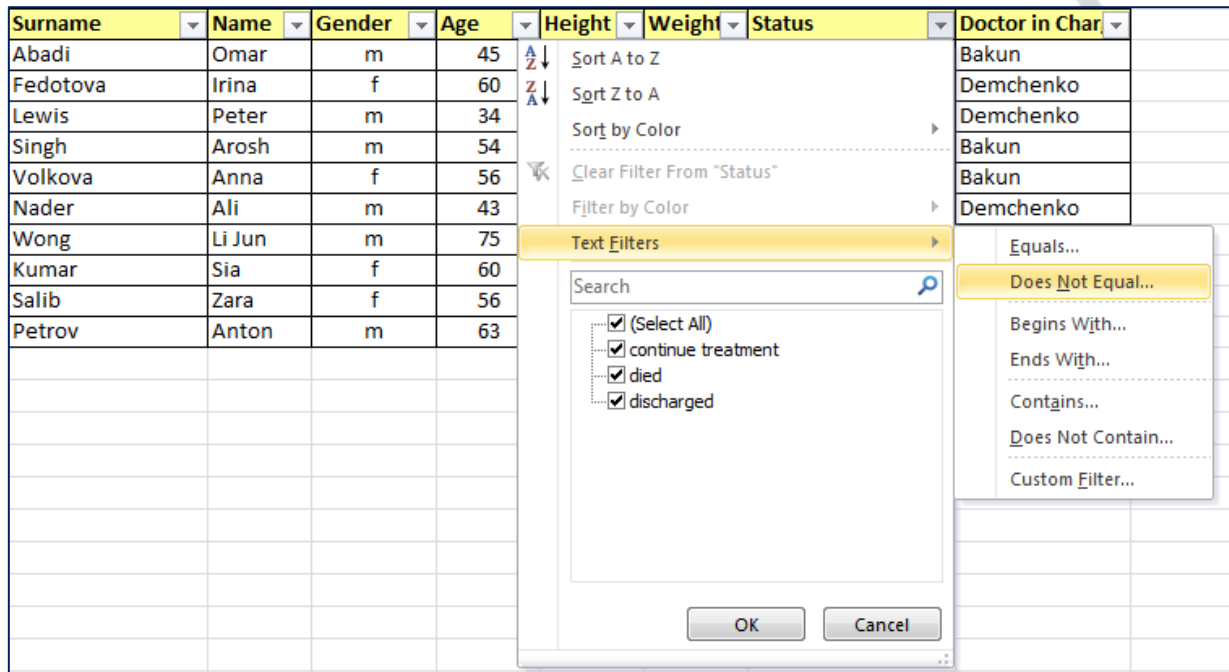
Another way of filtering data in a table (list) is the application of custom comparison criteria.

To perform filtering based on certain conditions follow these steps:

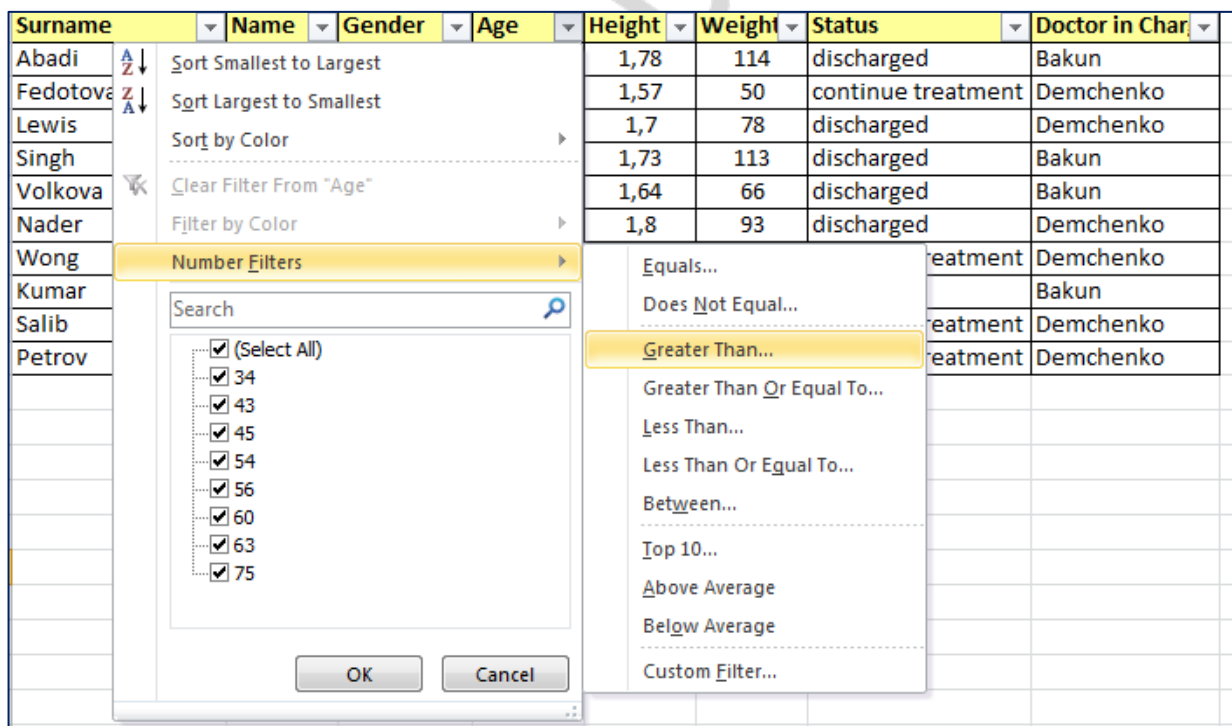
1. Select any cell in the table (list).
2. Click the **AutoFilter** button next to the header of the column that should be used for filtering (if the **AutoFilter** button is absent, click the **Filter** button on the **Data** tab, in the **Sort & filter** group).

3. Do one of the following operations:

- if the column contains text data, select the **Text Filters** command (fig. 16, a);
- if the column contains numbers, select the **Number Filters** command (fig. 16, b).



a



b

Fig. 16. Filtering commands of the **AutoFilter**:
a — Text Filters; b — Number Filters

To obtain better results, do not mix different types of data in one column (e. g. text and numbers or numbers and dates), because only one type of filtering commands is available for each column.

If the column contains different types of data, the **AutoFilter** will display the filter command for the type of data that occurs more often. For example, if the column contains four textual values and nine date values, the **Date Filters** command is displayed.

3. Select the appropriate filter criterion (**Equals...; Does Not Equal...; Begins With...; Ends With...; Contains...; Does Not Contain...**, etc.) or the **Custom Filter** command. MS Excel will display the **Custom AutoFilter** window (fig. 17).

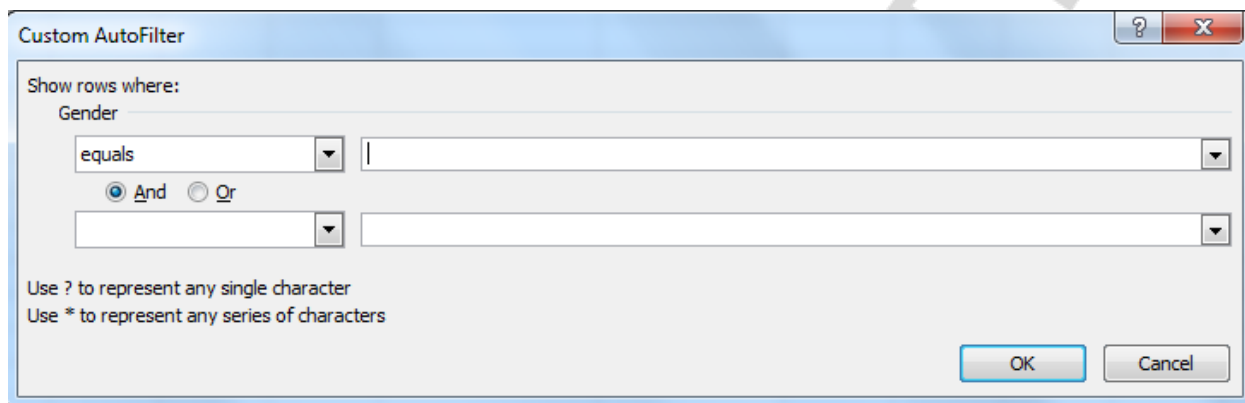


Fig. 17. Custom AutoFilter window

In this window, you can define one or two comparison criteria for one and the same column. Excel will compare the elements of the list with the values entered in the dialog box and display only the rows that met the given criterion. To combine or compare criteria for one and the same column, you can use the **AND/OR** operators.

In the **Custom AutoFilter** window find the field **Show rows where**. It displays the header of the column that contains the active cell (selected with the cursor), and two fields with drop-down lists. To enter one criterion, one line is used. The button at the right edge of the field opens the list of comparison operators that can be used for entering of a criterion (fig. 18).

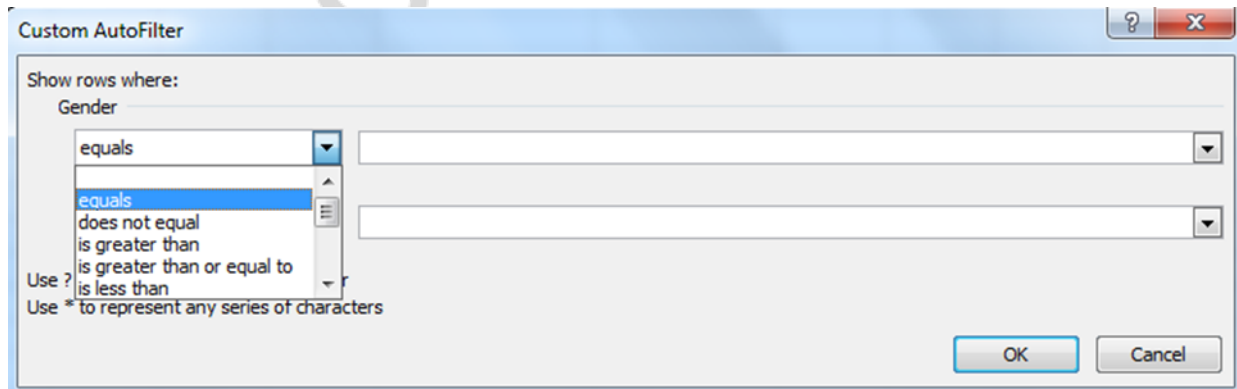


Fig. 18. The list of comparison operators

Do one of the following actions in the field to the right of the comparison operator field:

1. Enter the value that you want to use for comparison.
2. Click on the arrow, and select the value that you want to use for comparison.

The second set of drop-down lists is used to indicate another comparison operator and the value to be used with this operator.

If the switch key **AND** is selected, Excel will display only the rows that match each of the two criteria. If the switch key **OR** is selected, Excel will display the rows that match at least one criterion.

To expand the search capabilities, the wildcard symbols «?» and «*» can be used. To pick out the rows with cells containing a sequence of characters, certain positions of which can contain different characters, you need to take into account the following rules:

– «?» (the question mark) can replace a character (e. g. the notions «cat» and «cut» correspond to the condition «c?t»);

– «*» (the asterisk) replaces any number of characters (e. g. the notions «elephant» and «eye» correspond to the condition «e*», etc.).

To reapply the filter after changing the data, select the cell in the range or table, and click **Reapply** on the **Data** tab, in the **Sort & Filter** group.

All date filters are based on the Gregorian chronology.

The fiscal year and fiscal quarter always begin in January of the calendar year.

If you want to filter cells by the days of the week, change their format so that the days of the week are displayed.

CANCEL OF FILTRATION

To display all the data in the list, do the following:

1. Click the **AutoFilter** button next to the header of the filtering column.
2. Do one of the following operations:
 - in the drop-down list select the command **Clear Filter From** (the column name);
 - set the check box **Select All** in the **AutoFilter** list;
 - if you used more than one column for filtering, you can cancel the filtering by clicking the **Clear** button on the **Data** tab, in the **Sort & filter** group.

APPLICATION OF THE ADVANCED FILTER

The **Advanced Filter** command was designed to search database records using more complex criteria as compared to custom filters.

There are two types of criteria: **multiple** and **calculated**. Multiple criteria are used when you need to define more than two comparison criteria for a single

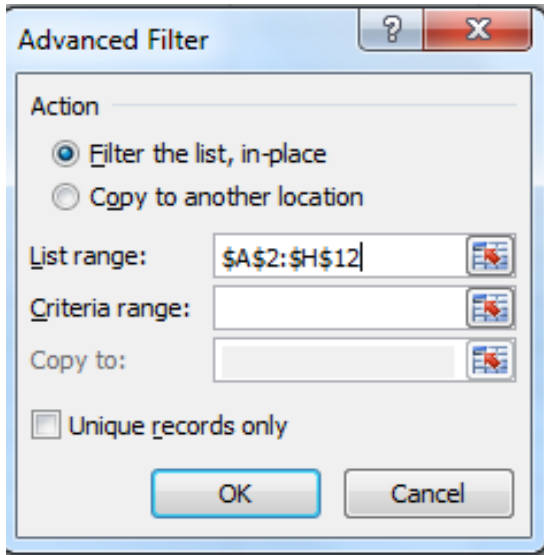


Fig. 19. Advanced Filter dialog box

column. Calculated criteria are applied when the comparison operations contain any calculation results.

To filter the data the criteria interval should be specified. Excel displays only the rows that match all recorded criteria in the range. The filter parameters should be specified in the **Advanced Filter** dialog box (fig. 19).

The **Action** section contains the switch keys **Filter the list, in-place** and **Copy to another location**. If you select the first switch key, Excel displays only the rows that match the specified criteria.

If you select **Copy to another location**, the filtered data is copied to another location on the same spreadsheet.

The **List range** field is the interval that contains the list to be filtered. Here you need to enter the link to the table.

In the **Criteria range** field you need to specify the cell range that contains the filtering criteria. The **Criteria range** must be created before using the advanced filter. This range should consist of at least two rows, the first of which contains the headers of the list fields that you want to use for filtering, while the others should contain user-defined conditions. The range of conditions can be located anywhere in the spreadsheet or even on a separate spreadsheet.

In the **Copy to** field you can specify the interval of cells where you want to copy the rows that meet the criteria. This field is active only if the **Copy to another location** check box is set.

The **Unique records only** check box is used to display only non-repeating rows.

Creation of the Conditions Range.

To set up a Conditions Range, follow these steps:

1. Copy the headers of the columns with the data to be restricted in a blank row outside the table.
2. Set conditions of data selection under each of the headers:
 - conditions may be represented by data or data elements, contain comparison operators (more or less), or they can be formulas, e.g. a formula that filters all values that exceed the average value of the column;
 - conditions may contain wildcards «?» or «*»;
 - the conditions located in one row are considered as conditions combined by the operator **AND** (fig. 20, a);
 - the conditions located in different rows are considered as conditions combined by the operator **OR** (fig. 20, b).

Surname	Name	Gender	Age	Status
Abadi	Omar	m	45	discharged
Fedotova	Irina	f	60	continue treatment
Lewis	Peter	m	34	discharged
Singh	Arosh	m	54	discharged
Volkova	Anna	f	56	discharged
Nader	Ali	m	43	discharged
Wong	Li Jun	m	75	continue treatment
Kumar	Sia	f	60	died
Salib	Zara	f	56	continue treatment
Petrov	Anton	m	63	continue treatment

Gender	Age
m	>57

Criteria range

a

Surname	Name	Gender	Age	Status
Abadi	Omar	m	45	discharged
Fedotova	Irina	f	60	continue treatment
Lewis	Peter	m	34	discharged
Singh	Arosh	m	54	discharged
Volkova	Anna	f	56	discharged
Nader	Ali	m	43	discharged
Wong	Li Jun	m	75	continue treatment
Kumar	Sia	f	60	died

Gender	Age
m	>57

Criteria

b

Fig. 20. Conditions Range:
a — AND connective; *b* — OR connective

There must be at least one blank row (column) between the database table and the range of conditions.

Creation of the Advanced Filter.

To perform filtering using the **Advanced Filter**, follow these steps:

1. Select any cell inside the table (list).
2. On the **Data** tab, in the **Sort & Filter** group, click the **Advanced** button. The **Advanced Filter** dialog box will open (fig. 21).
3. In the **Advanced Filter** dialog box, in the **Action** section, do one of the following:
 - to display the results of filtering directly in the list and hide the rows that do not meet the selection criteria, set the check box **Filter the list, in-place**;
 - if the result of filtering should be placed elsewhere on the same spreadsheet, at the check box **Copy to another location**.

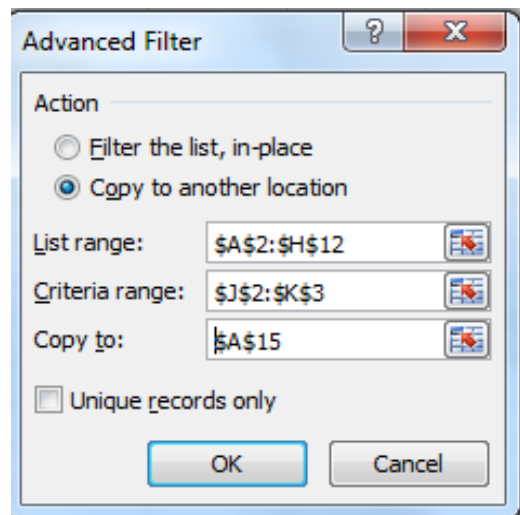


Fig. 21. Setting up the parameters of the **Advanced Filter**

4. In the **List range** field specify the range of cells to be filtered. The range must contain all cells in the list and the cells of the column headers.

5. In the field **Criteria range** specify the range of previously formulated conditions: it must contain all cells in the range of selection conditions and the cells of the column headers.

6. In the field **Copy to** specify the cell from which the **Result Range** will begin on the sheet. This field is active only if the **Copy to** check box is set. The result range can only be placed on the same spreadsheet with the original range.

7. Click **OK** to complete the filtration. Excel will display only those records that meet the specified criteria (fig. 22).

Surname	Name	Gender	Age	Status
Abadi	Omar	m	45	discharged
Fedotova	Irina	f	60	continue treatment
Lewis	Peter	m	34	discharged
Singh	Arosh	m	54	discharged
Volkova	Anna	f	56	discharged
Nader	Ali	m	43	discharged
Wong	Li Jun	m	75	continue treatment
Kumar	Sia	f	60	died
Salib	Zara	f	56	continue treatment
Petrov	Anton	m	63	continue treatment
Total				

Surname	Name	Gender	Age	Status
Wong	Li Jun	m	75	continue treatment
Petrov	Anton	m	63	continue treatment

Fig. 22. The result of application of the Advanced Filter

HIDING AND DISPLAYING OF THE INFORMATION IN A TABLE

If the table (list) contains cells with unnecessary information that impedes data analysis, you may hide certain columns or rows. You may also use this function if you want to print a table and exclude unnecessary rows or columns. Hiding of the elements of the table does not lead to their removal, they just are not displayed on the screen. This process is reversible, as all the elements of the table can be displayed on the screen at any time.

The rows and columns can be hidden in two ways: by adding the «hidden» attribute or by grouping.

USE OF THE HIDDEN ATTRIBUTE

To hide the elements of a table, do the following:

1. Select the column, row or group of columns and rows.
2. On the **Home** tab, in the **Cell** group, click **Format**. In the **Visibility** section of the **Format** command drop-down list, click **Hide & Unhide** (fig. 23).

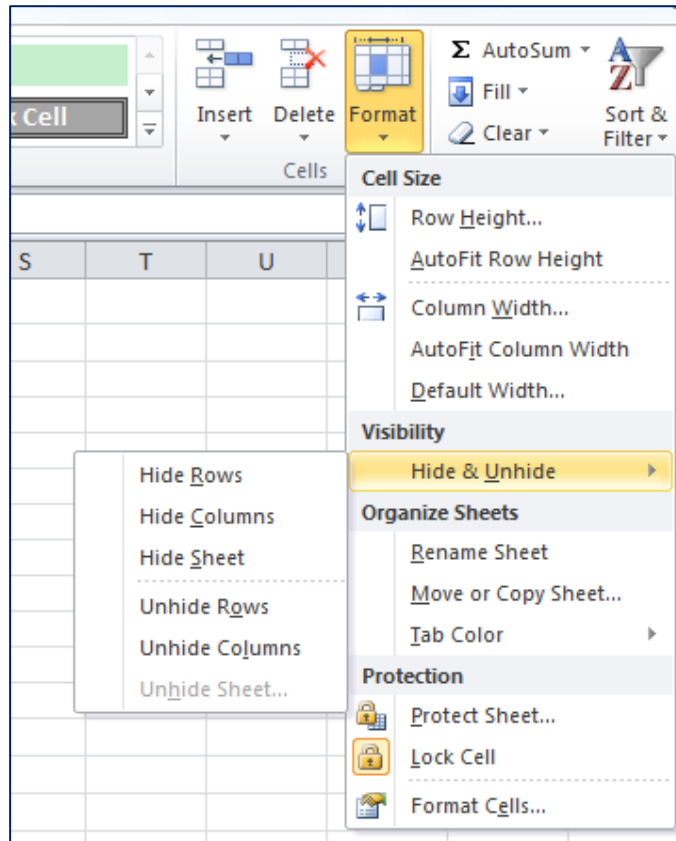


Fig. 23. The drop-down list of the **Format** command

To display hidden elements, do the following:

1. Select the area of hidden columns or rows.
2. On the **Home** tab, in the **Cell** group, click **Format**. In the **Visibility** section of the **Format** command drop-down list, click **Hide & Unhide**.

GROUPING OF ROWS AND COLUMNS

Sometimes you have to work with huge tables, consisting of hundreds of rows and/or columns with data which can be logically combined into groups. For this purpose MS Excel has the data grouping tool, which allows the user to create a multilevel structure. The structure can be composed of rows, columns or both rows and columns at the same time.

The data on a spreadsheet can be structured **automatically** or **manually**.

Manual data structuring doesn't presuppose any special requirements for data structure.

If you need to group levels **manually**, display all the data on the screen to avoid errors. Then do the following:

1. Select all the rows (columns) that should be combined into a group.
2. Groups of detailed data should be separated either by blank rows (columns) or by the result rows (columns).

Do not include the result row or a blank row used to separate data groups into selected area.

3. On the **Data** tab, in the **Outline** group, click the **Group** button.

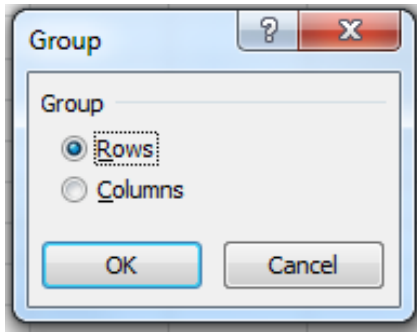


Fig. 24. Group dialog box

If you've selected not whole rows (columns), but a range of cells, the **Group** dialog box will appear (fig. 24). In this window you should specify the elements that you want to group — **rows** or **columns**.

Next to the group the structure signs will appear.

4. Continue selecting and grouping the internal rows (columns) until all the necessary levels of the structure will be created.

Automatic data structuring presupposes that the data should contain total rows (or columns) located next to the detailed data. These total rows (or columns) must include final formulas with references to the cells located within the data range.

HIDING AND DISPLAYING OF STRUCTURED DATA

Displaying of the outline symbols on a spreadsheet. If there are no outline symbols (1 2, +, -, etc.) on the spreadsheet, do the following:

1. On the **File** tab click the **Options** command.
2. On the **Advanced** section, in the group **Display options for this worksheet** select the sheet that contains structured data.
3. Set the check box **Show outline symbols if an outline is applied** (fig. 25).

Displaying or hiding of the detailed data of a group. To manage individual groups, do one of the following actions:

1. To display the group details, click the button + that corresponds to that group.
2. To hide the group details, click the button - that corresponds to that group.

Displaying or hiding of the outline to a certain level.

To manage all groups of a certain level, do the following: among the outline symbols 1 2 3 click the button with the number of the required level. Details of the lower levels will be hidden. For example, if the outline consists of four levels, you can hide the fourth level by pressing the button 3, while the remaining three levels will be displayed.

Displaying or hiding of all structured data.

To display all details, press the lowest level button of the outline symbols 1 2 3. For example, if there are three levels in the outline, click the button 3.

To hide all details, click the button 1.

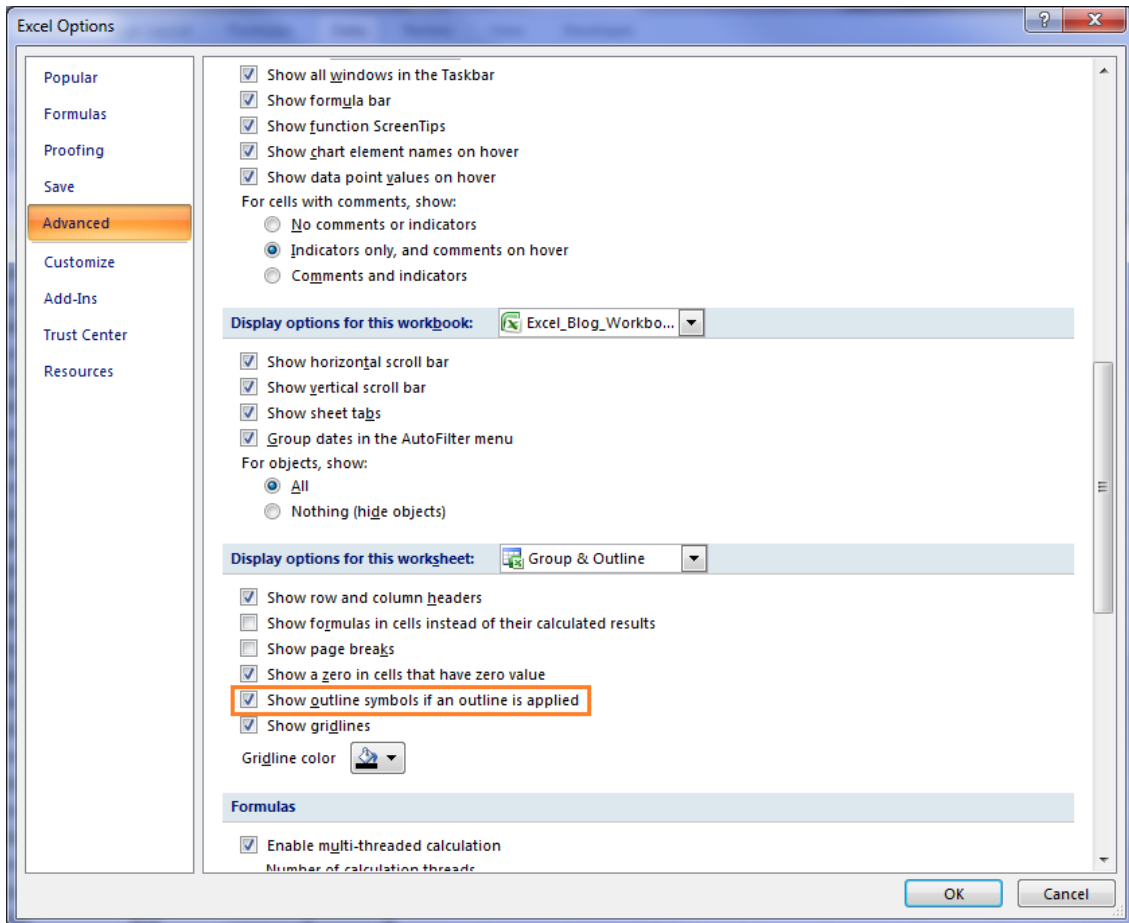


Fig. 25. Settings of the outline symbols displaying

DATA UNGROUPING

If necessary, you can cancel multilevel structuring of data. In addition, you can cancel the grouping of separate outline elements, as well as separate rows (columns).

Deletion of a multilevel structure.

To cancel a multi-level structure, follow these steps:

1. Select any cell within the multi-level structure.
2. On the **Data** tab, in the **Outline** group, click the arrow to the left of the

Ungroup button and select **Clear Outline**.

Ungrouping of separate elements of a multilevel structure.

To ungroup elements of a multi-level structure, follow these steps:

1. Select the elements of the multi-level structure that should be excluded from the group.

To select all the elements of the group, hold down the **Shift** key and click buttons **+** or **-** that correspond to that group.

2. On the **Data** tab, in the **Outline** group, click **Ungroup**.

If the detailed data is hidden during the ungrouping of the multi-level structure, the columns that contain this hidden data can be hidden as well. To display the data, drag the pointer through the numbers of visible columns (rows) next to

hidden columns (rows). On the **Home** tab, in the **Cells** group, click **Format**, select **Hide & Unhide**, and then click **Unhide Columns (Unhide Rows)**.

Ungrouping of rows (columns).

To ungroup rows (columns), follow these steps:

1. Select the rows (columns) that you want to ungroup.
2. On the **Data** tab, in the **Outline** group, click **Ungroup**.

SUMMARIZING

CREATION OF TOTALS

One of the ways to process and analyze a table (list) is summarizing.

On the Additional tab **Table Tools\Design**, set the **Total Row** check box (fig. 26).

Under the table (list), Excel will add a new row with the word *Total*, which shows total results for the selected column. This mode allows the user to display automatically the totals for each column of the table.

To calculate the grand total in any column, you should simply place the cursor in the total row of a particular column and select the required final formula from the list (fig. 26).

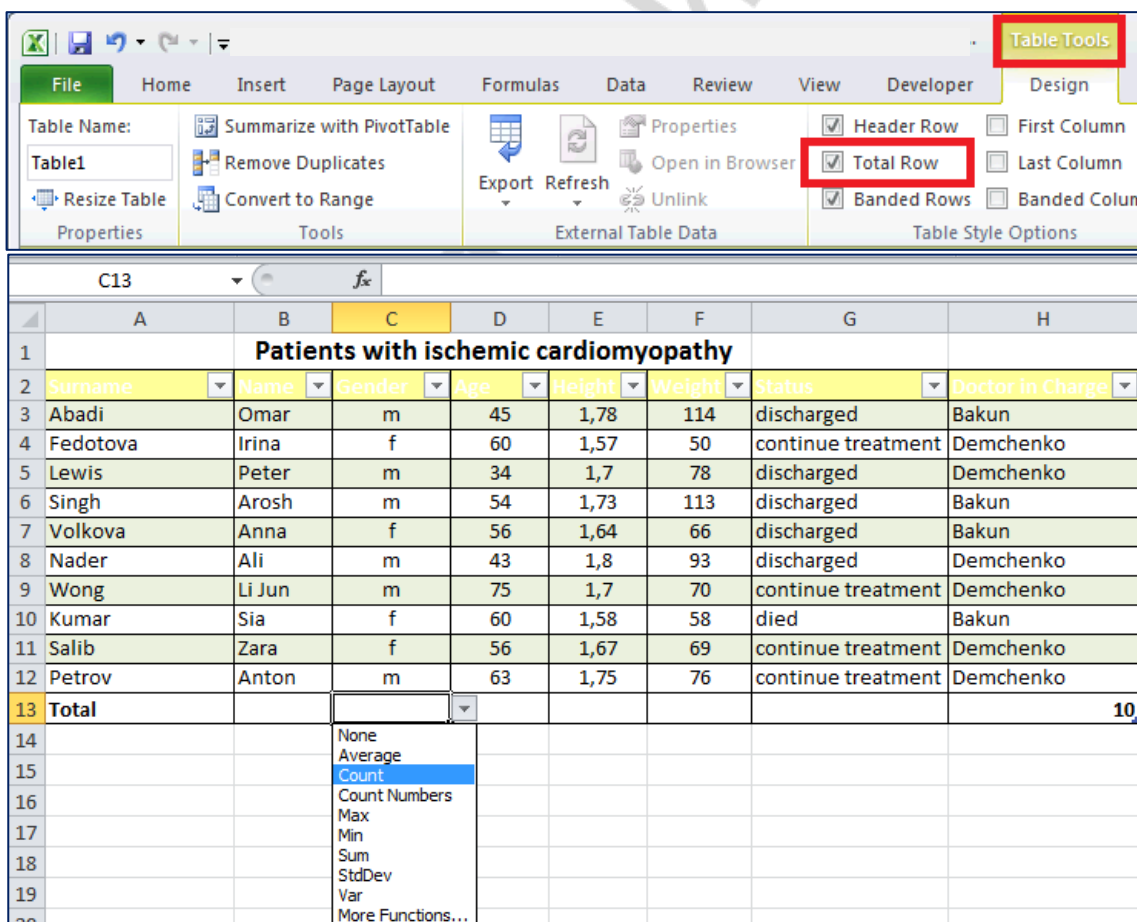


Fig. 26. Adding the **Total Row**

If the data is organized as a table (list), you can use the automatic summing up function using the **Subtotal** command. The operation of automatic summarizing of subtotals in MS Excel not only calculates totals and transfer them to the worksheet, but simultaneously creates on the worksheet an outline associated with the resulting totals.

Note. The **Subtotal** command is not available when working with the Microsoft Excel spreadsheet. To add subtotals to the table, you must first convert it to a normal data range. Note that it will lead to removal of all functional capabilities connected to the tables, except for formatting.

To calculate simple subtotals, follow these steps:

1. Perform sorting by the column that want to sum up, so that all the records of this column with the identical fields fall into one group. For this purpose:

- set the cursor in any cell of the column that you want to sum up;
- on the **Data** tab, in the **Sort & Filter** group, click the **Sort Largest to**

Smallest  or **Sort Smallest to Largest**  buttons.

2. On the **Data** tab, in the **Outline** group, click the **Subtotal** button. MS Excel will display the **Subtotal** dialog box (fig. 27).

3. In the field **At each change in**, select the column by which the data was sorted (see point 1).

4. In the field **Use function**, select the function to calculate the totals. The list of the main available functions is presented in the Table 2.


By default, MS Excel uses the **Sum** function for numeric values and the **Number** function for text values.



5. In the field **Add subtotal to**, set the check boxes next to the names of the columns to be calculated.

6. If necessary, set or clear the check boxes with different parameters. The list of parameters of the **Subtotal** dialog box is shown in the Table 3.

7. Click **OK**.

After summarizing the subtotals, the table is represented in the form of an outline, which allows the user to display or hide the rows of each subtotal result (fig. 28).

To display only subtotals and the grand total you may use the outline level icons  on the left side of the screen (next to the row numbers).

Buttons  and  allow the user to show and hide the rows with details for particular totals.

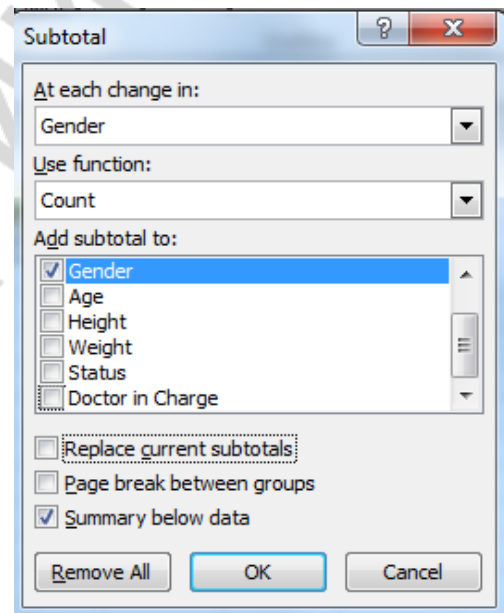


Fig. 27. **Subtotal** dialog box

	A	B	C	D	E	F	G
1	Surname	Name	Gender	Age	Height	Weight	Status
2	Fedotova	Irina	f	60	1,57	50	continue treatment
3	Volkova	Anna	f	56	1,64	66	discharged
4	Kumar	Sia	f	60	1,58	58	died
5	Salib	Zara	f	56	1,67	69	continue treatment
6		f Count	4				
7	Abadi	Omar	m	45	1,78	114	discharged
8	Lewis	Peter	m	34	1,7	78	discharged
9	Singh	Arosh	m	54	1,73	113	discharged
10	Nader	Ali	m	43	1,8	93	discharged
11	Wong	Li Jun	m	75	1,7	70	continue treatment
12	Petrov	Anton	m	63	1,75	76	continue treatment
13		m Count	6				
14		Grand Count	10				

Fig. 28. An example of a table with a **Subtotal** result

The subtotals can be reapplied to a table that has been already processed.

To increase flexibility, you can add details levels to an outline created in Excel. It allows the user to hide certain details, if necessary. For example, you can hide the information of one group in order to view the details of other groups and compare them to each other.

Table 2

Main functions available in the Use function field

Function	Description
Sum	The sum of values. This operation is used by default to summarize numeric fields
Count	Number of records and data rows. This operation is used by default to summarize non-numeric fields
Average	Average number
Max	Maximal number
Min	Minimal number
Product	Products of numbers
Count Numbers	Number of records and rows containing numbers

Table 3

Additional parameters of the Subtotal dialog box

Parameter	Description
Replace current subtotals	Recalculating of subtotals and replacement of current ones
Page break between groups	Inserting of automatic page breaks after each group of subtotals
Summary below data	Insertion of subtotal rows and grand totals below data
Remove All	Removal of subtotal

REMOVAL OF SUBTOTALS

To display the table (list) in its original form, you need to delete subtotals. For this purpose, do the following:

1. Select any cell in the range that contains subtotals.

2. On the **Data** tab, in the **Outline** group, click the **Subtotal** button.
3. In the **Subtotal** dialog box, click the **Remove All** button. MS Excel will delete all subtotals.

Chapter 2. PRACTICAL TASKS

CREATION OF A SIMPLE DATABASE

DATA INPUT

Use the given data to create a database of patients with ischemic cardiomyopathy and metabolic syndrome according to the sample in fig. 29.

	A	B	C	D	E	F	G	H
1	Patients with ischemic cardiomyopathy							
2	Surname	Name	Gender	Age	Height	Weight	Status	Doctor in Charge
3	Volkova	Anna	f	56	1,64	66	discharged	Bakun
4	Salib	Zara	f	56	1,67	69	continue treatment	Demchenko
5	Fedotova	Irina	f	60	1,57	50	continue treatment	Demchenko
6	Kumar	Sia	f	60	1,58	58	died	Bakun
7	Chan	Ning	f	70	1,71	72	discharged	Bakun
8	Lewis	Peter	m	34	1,7	78	discharged	Demchenko
9	Nader	Ali	m	43	1,8	93	discharged	Demchenko
10	Abadi	Omar	m	45	1,78	114	discharged	Bakun

Fig. 29

For this purpose do the following:

1. Run Excel.
2. Create a new workbook and save it under the name **ICMS Database**.
3. Rename **Sheet1** as **ICMS**.
4. Fill the table with data about the patients according to the fig. 34.

CREATION OF A TABLE BASED ON THE GIVEN DATA

To ensure that Excel interprets the input data as a table, do the following:

1. Select any cell with data and click **Table** on the **Insert** tab.
2. In the **Format as Table** dialog box (fig. 30) set the following parameters:
 - use the mouse to select the range of cells **A2:H10** and create a list on its

basis;

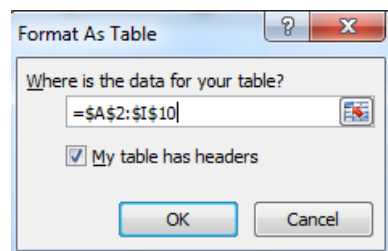


Fig. 30. Format as Table dialog box

- set a check box to confirm that the table contains column headers;
- Click **OK**.

The result of these actions is shown in the fig. 31.

Now the data is organized as a table, and the AutoFilter buttons are automatically added to the title bar of each column. A frame with a resize handle appears around the list. The frame shows the range of cells in the list.

	A	B	C	D	E	F	G	H
1	Patients with ischemic cardiomyopathy							
2	Surname	Name	Gender	Age	Height	Weight	Status	Doctor in Charge
3	Volkova	Anna	f	56	1,64	66	discharged	Bakun
4	Salib	Zara	f	56	1,67	69	continue treatment	Demchenko
5	Fedotova	Irina	f	60	1,57	50	continue treatment	Demchenko
6	Kumar	Sia	f	60	1,58	58	died	Bakun
7	Chan	Ning	f	70	1,71	72	discharged	Bakun
8	Lewis	Peter	m	34	1,7	78	discharged	Demchenko
9	Nader	Ali	m	43	1,8	93	discharged	Demchenko
10	Abadi	Omar	m	45	1,78	114	discharged	Bakun

Fig. 31. ICMS Database

After creation of a table, the **Table Tools** become available and the **Design** tab appears. The **Design** tab allows the user to configure and modify the table.

CONVERSION OF A TABLE INTO A REGULAR RANGE OF CELLS

To convert a table into a range of cells, do the following:

1. Select any cell in the table.
2. On the **Table tools\Design** tab, in the **Tools** group, select the command **Convert to Range**.

3. In the appeared dialog box confirm the conversion of the table into a regular range by pressing the button **Yes**.

The data no longer have any special functions specific for a table. Now it is a regular Excel data.

Exercise 1. Convert the data about the group of patients with ischemic cardiomyopathy and metabolic syndrome into a table.

EDITING AND UPDATING OF A DATABASE:

ENTERING FORMULAS. INSERTING RECORDS AND FIELDS

As it is known, the body mass index (BMI) is one of the informative indicators that can be used as a risk factor for pathology development. It is calculated as follows: **BMI = mass/height²**.

Insert another column (field) in the table to calculate the BMI, enter the formula to calculate it. For this purpose do the following:

1. Set the cursor in the column **G**, as new columns are inserted to the left of the active cell.

2. On the **Home** tab, in the **Cell** group, click **Insert** ⇒ **Insert Sheet Columns**.

3. Rename the inserted column **Column1** as **BMI**.

4. Enter the BMI formula in cell **G3**.

To enter the formula, use the **method of cursor indication**. In this case, during entering of the formula Excel will display not the names of the cells, but the names of the fields: = [**@ weight**]/[**@height**]^2. After pressing **Enter** the formula will be automatically copied to all elements of the table. In case of regular typing (=F3/E3^2), you will need to copy the formula from cell **G3** to cells **G4:G10**. It is more convenient to use the **AutoFill marker**.

– set the cursor in cell **G3**;

– point the cursor to the lower right corner of cell **G3** until the **AutoFill marker +** (plus) appears, then hold the left mouse button and simultaneously drag the selection downwards to cell **G10**.

5. Round the result in cells **G3:G10** to an integer value using the **Decrease Decimal** button on the **Home** tab, in the **Number** group.

The result of these actions is shown in fig. 32.

	A	B	C	D	E	F	G	H	I
1	Patients with ischemic cardiomyopathy								
2	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
3	Volkova	Anna	f	56	1,64	66	25	discharged	Bakun
4	Salib	Zara	f	56	1,67	69	25	continue treatment	Demchenko
5	Fedotova	Irina	f	60	1,57	50	20	continue treatment	Demchenko
6	Kumar	Sia	f	60	1,58	58	23	died	Bakun
7	Chan	Ning	f	70	1,71	72	25	discharged	Bakun
8	Lewis	Peter	m	34	1,7	78	27	discharged	Demchenko
9	Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
10	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun

Fig. 32 Addition of the calculated BMI

6. Enter additional information about the patients as shown in the fig. 33:

– set the cursor in cell **A11**, type «Singh», press **Tab** or ⇒ to move to the next cell;

– type «Arosh» in cell **B11**, press the **Tab** key or ⇒ to move to the next cell;

– fill all the cells in the same way.

Singh	Arosh	m	54	1,73	113	continue treatment	Bakun
Wood	Adam	m	58	1,85	110	continue treatment	Bakun

Fig. 33 Additional information in the database

After entering the growth and weight data of a patient, the **BMI** will be calculated automatically using the formula.

WORK WITH THE FORM: VIEWING AND EDITING OF THE DATABASE RECORDS USING THE FORM

Use the **Form** to review the contents of the database and edit it in the following way:

- change the record of the **Status** field of the patient Adam Wood to «**discharged**»;
- enter additional records (patients' data) as it is shown in the fig. 34.

Petrov	Anton	m	63	1,75	76	continue treatment	Demchenko
Wong	Li Jun	m	75	1,7	70	continue treatment	Demchenko

Fig. 34

For this purpose do the following:

1. Specify any cell in the table (in the range A2 : I12).
2. On the **Quick Access Toolbar**, click the **Form** command. If the **Form** command is not available on the **Quick Access Toolbar**, you must add it (see 1.6.1).
3. To view the content of the list using the form (fig. 35), click the **Find Prev** and **Find Next** buttons.
4. To edit the 9th record, do the following:
 - use the **Find Next** button to move to the 9th record of the patient Wood;
 - replace the text in the **Status** field to «**discharged**»;
 - press **Enter** to update the record.
5. To add new rows, do the following:
 - in the form window, click **Add**;
 - fill in the fields of the new 11th record of the patient Petrov;
 - press **Enter** to add a new record to the list;
 - enter the data of the patient Wong in the 12th record;
 - click the **Close** button to add a row which will be the last one in the list.

The screenshot shows a window titled "ICMS Database" with a standard Windows title bar (minimize, maximize, close). The window contains a form with the following fields and values:

- Surname: Chan
- Name: Ning
- Gender: f
- Age: 70
- Height: 1,71
- Weight: 72
- BMI: 25
- Status: discharged
- Doctor in Charge: Bakun

On the right side of the form, there is a vertical scroll bar and a list of buttons: "New", "Delete", "Restore", "Find Prev", "Find Next", "Criteria", and "Close". The text "1 of 12" is displayed above the "New" button.

Fig. 35

The result of these actions is shown in the fig. 36.

	A	B	C	D	E	F	G	H	I
1	Patients with ischemic cardiomyopathy								
2	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
3	Volkova	Anna	f	56	1,64	66	25	discharged	Bakun
4	Salib	Zara	f	56	1,67	69	25	continue treatment	Demchenko
5	Fedotova	Irina	f	60	1,57	50	20	continue treatment	Demchenko
6	Kumar	Sia	f	60	1,58	58	23	died	Bakun
7	Chan	Ning	f	70	1,71	72	25	discharged	Bakun
8	Lewis	Peter	m	34	1,7	78	27	discharged	Demchenko
9	Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
10	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
11	Singh	Arosh	m	54	1,73	113	38	continue treatment	Bakun
12	Wood	Adam	m	58	1,85	110	32	discharged	Bakun
13	Petrov	Anton	m	63	1,75	76	25	continue treatment	Demchenko
14	Wong	Li Jun	m	75	1,7	70	24	continue treatment	Demchenko

Fig. 36

DATABASE SORTING


SORTING OF A DATABASE BY ONE FIELD

Arrange the data.

Change the order of the records so that the patients' surnames are arranged alphabetically. Then, sort the BMI values in descending order.

For this purpose do the following:

1. Sort the data in the **Surname** column:

- click the AutoFilter arrow in the **Surname** field and select the icon  (Ascending Sort) in the appeared menu;
- analyze the results (the first record in the list must be Abadi, the last record must be Wood).

2. Copy the result of sorting in the range of cells starting from **A19**.

Exercise 2. Arrange the data in the **BMI** column in descending order (**Sort Z to A** command). Make sure that the first patient on the list is Singh, who has a BMI = 38, and the last one is Fedotova with BMI = 20. Copy the result of sorting in the range of cells starting from **A36**.

SORTING OF THE DATABASE BY MULTIPLE FIELDS

Sort the list in ascending and descending order.

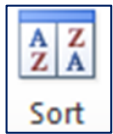
Change the order of the records so that women go first, followed by men. Both categories should be displayed in age decreasing order. To do this, you need to organize the data by the values of the fields **Gender** and **Age**.

As it was mentioned earlier, the table may be sorted by multiple fields, which makes sense when data can be divided into groups (e. g. men and women).

In this case, you can sort data by another field within these groups. The columns with a higher position in the list will be sorted earlier than the columns with a lower position.

To sort the contents of several columns simultaneously, follow these steps:

1. On the **Data** tab, in the **Sort & Filter** group, select the **Sort** command



2. In the **Sort** dialog box (fig. 37), specify the fields for sorting:

– in the first level area of **Sort by**, in the **Column** section select the field name **Gender**, in the **Sort on** section select **Values**, in the **Order** section select **A to Z** (ascending order);

– click the **Add Level** button;

– in the second level area **Then by**, in the **Age** field, in the **Sort on** and **Order** sections, select **Values** and **Z to A** (descending order), respectively.

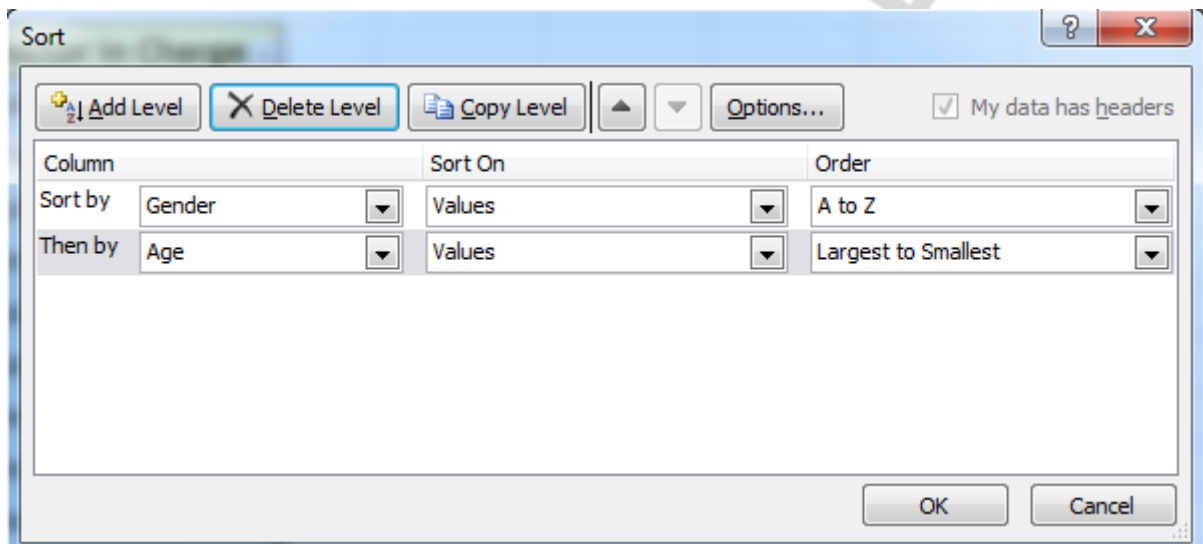


Fig. 37

The result is shown in the fig. 38.

Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
Chan	Ning	f	70	1,71	72	25	discharged	Bakun
Kumar	Sia	f	60	1,58	58	23	died	Bakun
Fedotova	Irina	f	60	1,57	50	20	continue treatment	Demchenko
Salib	Zara	f	56	1,67	69	25	continue treatment	Demchenko
Volkova	Anna	f	56	1,64	66	25	discharged	Bakun
Wong	Li Jun	m	75	1,7	70	24	continue treatment	Demchenko
Petrov	Anton	m	63	1,75	76	25	continue treatment	Demchenko
Wood	Adam	m	58	1,85	110	32	discharged	Bakun
Singh	Arosh	m	54	1,73	113	38	continue treatment	Bakun
Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
Lewis	Peter	m	34	1,7	78	27	discharged	Demchenko

Fig. 38

As a result of sorting by two fields **Gender** and **Age**, the data in the table is divided into two groups: women and men. The records within the groups are arranged in age decreasing order.

Copy the result of sorting in the range of cells starting from **A53**.

Exercise 3. Change the order of the records so that women go first, followed by men. Both categories should be displayed in alphabetical order of surnames. Make sure that the first patient of the list is the patient Chan, while the last one is Wood. Copy the result of sorting in the range of cells starting from cell **A70**.

APPLICATION OF THE AUTOFILTER:

DATA FILTERING

Display on the screen the information about the patients treated by Dr. Bakun. Then display the list of female patients of Dr. Demchenko.

Data filtering is as easy as sorting. Just click the AutoFilter arrow and select the required option. Excel will automatically display the selected data only.

To filter the data, do the following:

1. To view the data of Dr. Bakun's patients, click the AutoFilter arrow of the **Doctor in Charge** field and select the option Bakun. The result of your actions is shown in the fig. 39.

Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
Chan	Ning	f	70	1,71	72	25	discharged	Bakun
Kumar	Sia	f	60	1,58	58	23	died	Bakun
Volkova	Anna	f	56	1,64	66	25	discharged	Bakun
Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
Singh	Arosh	m	54	1,73	113	38	continue treatment	Bakun
Wood	Adam	m	58	1,85	110	32	discharged	Bakun

Fig. 39

Regardless of the column that contains the selected data, Excel displays only the filtered rows in all the columns of the list.

Copy the result of filtering into the range of cells starting from cell **K19**.

2. To return the list to the initial state, click the AutoFilter arrow of the **Doctor in Charge** field again and click **Select all**.

3. To *filter the contents of several columns simultaneously*, do the following:

–click the AutoFilter arrow of the **Gender** field and select option **f** (the list of female patients will be displayed);

–in the list that is already filtered, click the AutoFilter arrow of the **Doctor in Charge** field and select **Demchenko**.

The list will shorten to six rows, as it is shown in the fig. 40.

Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
Fedotova	Irina	f	60	1,57	50	20	continue treatment	Demchenko
Salib	Zara	f	56	1,67	69	25	continue treatment	Demchenko
Lewis	Peter	m	34	1,7	78	27	discharged	Demchenko
Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
Petrov	Anton	m	63	1,75	76	25	continue treatment	Demchenko
Wong	Li Jun	m	75	1,7	70	24	continue treatment	Demchenko

Fig. 40

- Copy the result of filtering into the range of cells starting from cell **K28**.
- To return the list to the initial state, click the AutoFilter arrows of the **Gender** and **Doctor in Charge** fields again, then click **Select all** in both cases, or on the **Data** tab, in the **Sort & Filter** group, click **Clear**.

Exercise 4. Display on the screen the information about male patients treated by Dr. Demchenko. Copy the result of filtering into the range of cells starting from cell **K37**.

APPLICATION OF USER CRITERIA

APPLICATION OF THE CUSTOM FILTER WITH ONE CRITERION

Create a custom filter to display the list of men of retirement age (65 years and older).

For this purpose do the following:

- Click the AutoFilter arrow of the **Gender** field and select **m** (Excel will display the list of male patients).
- Click the AutoFilter arrow of the **Age** field and select the **Number Filters** option ⇒ **Greater Than Or Equal To**.
- In the **Custom AutoFilter** dialog box that appears (fig. 41), specify the selection criteria:
 - in the text field to the right, type **65**;
 - click **OK**.

Fig. 41

The list will shorten to one record, as it is shown in the fig. 42.

Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
Wong	Li Jun	m	75	1,7	70	24	continue treatment	Demchenko

Fig. 42

4. Copy the result of filtering into the range of cells starting from cell **K44**.

5. To return the list to the its initial view, click the AutoFilter arrows of the **Gender** and **Age** fields again, then click **Select all** in both cases, or on the **Data** tab, in the **Sort & Filter** group, click **Clear**.

Exercise 5. Create a custom filter to display the list of women whose height is more than 1.64 m. Copy the result of filtering into the range of cells starting from cell **K48**.

APPLICATION OF THE CUSTOM FILTER WITH TWO CRITERIA

It is well known that if the BMI value is equal to 26–29, it is considered as overweight, and if it is equal to 30 or more, it is considered as obesity. Create a custom filter to display the list of patients with overweight ($26 \leq \text{BMI} < 30$).

For this purpose do the following:

1. Click the AutoFilter arrow of the BMI field and select the **Number Filters** \Rightarrow **Custom Filter**.

2. In the Custom AutoFilter dialog box, specify the selection criteria:

- in the **BMI** field select **is greater than or equal to**;
- in the text field to the right, enter the value «**26**»;
- select the **AND** operator (the **AND** operator presupposes presence of all the listed conditions in the selected records, while the **OR** operator presupposes presence of at least one condition);
- in the second drop-down list, select one more criterion – **is less than**;
- in the text field to the right, enter the value «**30**» (fig. 43);
- click **OK**.

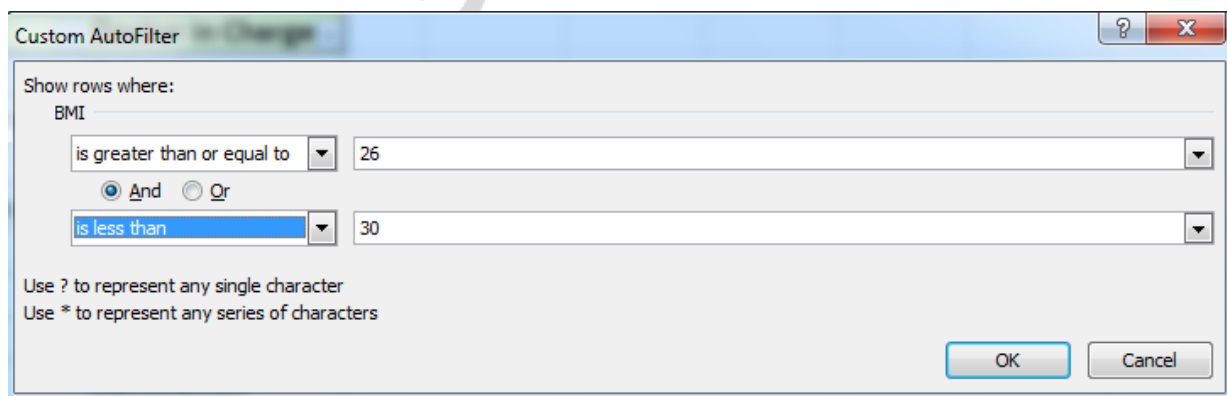


Fig. 43

The result of filtering is shown in the fig. 44.

Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
Lewis	Peter	m	34	1,7	78	27	discharged	Demchenko
Nader	Ali	m	43	1,8	93	29	discharged	Demchenko

Fig. 44

3. Copy the result of filtering into the range of cells starting from cell **K53**.
4. To return the list to its initial view, click the **BMI** AutoFilter arrow and click **Select all** or on the **Data** tab in the **Sort & Filter** group, click **Clear**.

Exercise 6. Create a custom filter to display the list of patients aged 50 to 60, copy the result of filtering into the range of cells starting from cell **K58**.

APPLICATION OF THE ADVANCED FILTER

Copy the initial database to **Sheet 2**, using the **Special Insert**. Rename the sheet as **Advanced Filter**.

ADVANCED FILTER WITH SEVERAL CONDITIONS FOR ONE COLUMN

Find the database records about the in-patients who do not continue treatment.

If there are two or more selection conditions for **one** column, enter these conditions directly under each other in separate rows.

For example, this range of selection conditions displays rows that contain the values «discharged» **or** «died» in the **Status** column.

Status
discharged
died

To filter the data, do the following:

1. Create selection criteria:
 - place the cursor in cell **A18**, as there must be at least one empty row between the values of the conditions and the range of conditions;
 - type the name of the column «**Status**» in cell **A18**, as the range of conditions should include column headers;
 - enter the selection criteria: type «discharged» in cell **A19**, and «died» in cell **A20**.
2. On the **Data** tab, in the **Sort & Filter** group, click **Advanced**.
3. In the **Advanced Filter** dialog box (fig. 45), specify filter parameters. For this purpose do the following:
 - to copy the filtered rows to another area of the worksheet, set the check box **Copy to another location** in the **Action** field, press the **Tab** key;
 - in the **List range** field, select with the mouse the table with the data or type absolute references to the range of cells **\$A\$2:\$I\$14**, press the **Tab** key;

- in the **Criteria range** field, select the interval that contains the selection criteria **A18:A20**, or type absolute references to the range of cells **\$A\$18:\$A\$20**, press the **Tab** key;
- in the **Copy to** field, select the upper left cell of the insertion area **A22**;
- Click **OK**.

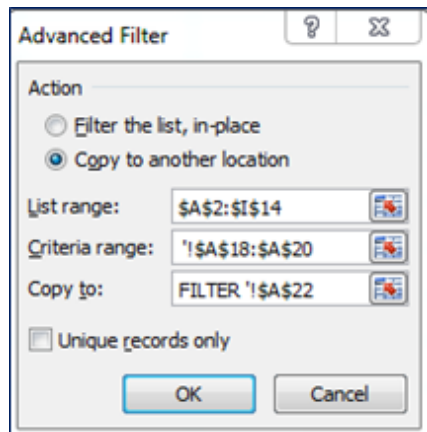


Fig. 45

The result of these actions is shown in the fig. 46.

	A	B	C	D	E	F	G	H	I
18	Status								
19	discharged								
20	died								
21									
22	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
23	Chan	Ning	f	70	1,71	72	25	discharged	Bakun
24	Kumar	Sia	f	60	1,58	58	23	died	Bakun
25	Volkova	Anna	f	56	1,64	66	25	discharged	Bakun
26	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
27	Lewis	Peter	m	34	1,7	78	27	discharged	Demchenko
28	Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
29	Wood	Adam	m	58	1,85	110	32	discharged	Bakun

Fig. 46

ADVANCED FILTER WITH A SINGLE CONDITION FOR MULTIPLE COLUMNS

Find the records of doctor Bakun's male patients, whose weigh is more than 110 kg.

In order to find the data corresponding to one and the same selection condition in several columns, enter all selection parameters in one row of the range of selection conditions.

For example, this range of selection conditions will display all the rows that contain the values «m» in the column Gender, «Bakun» in the column Doctor in charge and «>110» in the column Weight (i. e. all the criteria are combined by the connective AND, and the presence of all selection conditions in the output records is obligatory).

Gender	Weight	Doctor in Charge
m	>110	Bakun

To filter the data, do the following:

1. Create selection criteria:

– enter the name of the column «**Gender**» in cell **K2**, the name of the column «**Weight**» in cell **L2**, and the name of the column «**Doctor in charge**» in cell **M2**;

– enter the selection criteria: the value «**m**» into cell **K3**, «>**110**» in cell **L3**, «**Bakun**» in cell **M3**.

2. On the **Data** tab, in the **Sort & Filter** group, click **Advanced**.

3. In the **Advanced Filter** dialog box, specify filter parameters:

– in the **Action** field, click the **Copy to another location**, press the **Tab** key;

– in the **List range** field, select the table with the data (or type the range of cells **\$A\$2:\$I\$16**), press the **Tab** key;

– in the **Criteria range** field, select the interval containing the criteria (or type the range of cells **\$K\$2:\$M\$3**), press the **Tab** key;

– in the **Copy to** field, click indicate the address **K5** (fig. 47);

– Click **OK**.

The result of these actions is shown in the fig. 48.

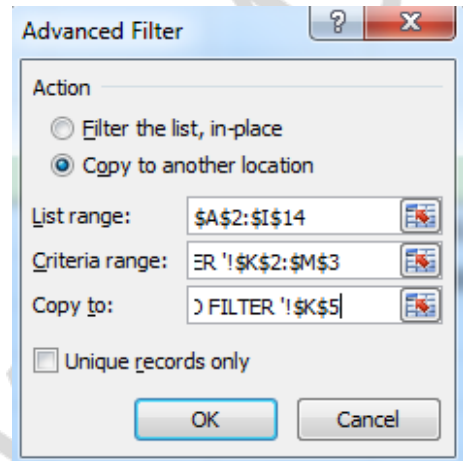


Fig. 47

	K	L	M	N	O	P	Q	R	S
1									
2	Gender	Weight	Doctor in Charge						
3	m	>110	Bakun						
4									
5	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
6	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
7	Singh	Arosh	m	54	1,73	113	38	continue treatment	Bakun

Fig. 48

ADVANCED FILTER WITH DIFFERENT CONDITIONS FOR DIFFERENT COLUMNS

Find the records of Dr. Bakun's female patients, all patients whose weigh is more than 110 kg, and all patients treated by Dr. Bakun.

In order to find data that corresponds to one condition in one column or satisfies another condition in another column, enter the selection conditions in different rows of the range of selection conditions.

For example, this range of selection conditions displays all the rows that contain the value «f» in the column **Gender**, the value «Dr. Bakun» in the column **Doctor in charge** or the value «>110» in the column **Weight**.

Gen der	Weig ht	Doctor in charge
f		
	>110	
		Bakun

To filter the data, do the following:

1. Create selection criteria:

–enter the name of the column «**Gender**» in cell **K11**, the name of the column «**Weight**» in cell **L11** and the name of the column «**Doctor in charge**» in cell **M11**;

–enter the selection criteria: the value «**f**» in cell **K12**, the value «**>110**» in cell **L13** and the value «**Dr. Bakun**» in cell **M14**.

1. On the **Data** tab, in the **Sort and Filter** group, click **Advanced**.

2. In the **Advanced Filter** dialog box, specify filter parameters:

–in the **Action** field, set the check box **Copy to another location**, press the **Tab** key;

–in the **List range** field, select the table with the data (or type the range of cells **\$A\$2:\$I\$16**), press **Tab**;

–in the **Criteria range** field, select the interval that contains the criteria (or type **\$K\$11:\$M\$14**), press **Tab**;

–in the **Copy to** field, indicate the address **K16**;

–click **OK**;

The result of these actions is shown in the fig. 49

	K	L	M	N	O	P	Q	R	S
10									
11	Gender	Weight	Doctor in Charge						
12	f								
13		>110							
14			Bakun						
15									
16	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
17	Chan	Ning	f	70	1,71	72	25	discharged	Bakun
18	Fedotova	Irina	f	60	1,57	50	20	continue treatment	Demchenko
19	Kumar	Sia	f	60	1,58	58	23	died	Bakun
20	Salib	Zara	f	56	1,67	69	25	continue treatment	Demchenko
21	Volkova	Anna	f	56	1,64	66	25	discharged	Bakun
22	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
23	Singh	Arosh	m	54	1,73	113	38	continue treatment	Bakun
24	Wood	Adam	m	58	1,85	110	32	discharged	Bakun

Fig. 49

Exercise 7. Find the records of female patients whose weigh is more than 90 kg, and male patients whose weight is more than 110 kg. Insert the created filter into cell **K30**, and place the result in cell **K34**.

ADVANCED FILTER WITH A CONDITION THAT REQUIRES ANY CALCULATION

Create a filter that will display the list of patients whose BMI exceeds the calculated average.

The selection condition can be represented by the value resulted from a formula calculation. If you enter a selection condition using a formula, *leave the condition without a title, or use a header that is not the header of the column in the list*. For example, this range of selection conditions displays the rows that

contain in the column **G** a value that exceeds the average value of the cells in the range **G3:G14**.

The formula for creation of the selection condition must contain a relative reference (format «**G3**») to the column header (e. g.: **BMI**) or to the corresponding field in the first record. All other references must be absolute (format «**\$G\$3**»), and the formula must have the result **TRUE** or **FALSE**. In the example above, «**G3**» is a reference to column **G** of the third row of the list.

To filter the data, do the following:

1. Create selection criteria:

=G3>AVERAGE(\$G\$3:\$G\$14)

–enter the selection condition: leave cell

A34 blank, enter the formula: **=G3>AVERAGE(\$G\$3:\$G\$16)** in cell **A35**. Use the mouse to specify the range **G3:G14** and the **F4** function key to make the references **G3** and **G14** absolute.

2. On the **Data** tab, in the **Sort & Filter** group, click **Advanced**.

3. In the **Advanced Filter** dialog box, specify the filter parameters:

–set the check box **Copy to another location**, press the **Tab** key;

–in the **List range** field, select the table with the data using the mouse (or type the range of cells **\$A\$2:\$I\$16**), press the **Tab** key;

–in the **Criteria range** field, select the range of cells containing the criterion **A34:A35**, press the **Tab** key;

–in the **Copy to** field, click the address **A37**;

–Click **OK**.

The result of selection is shown in the fig. 50.

	A	B	C	D	E	F	G	H	I
33									
34	ЛОЖЬ								
35									
36	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
37	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
38	Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
39	Singh	Arosh	m	54	1,73	113	38	continue trea	Bakun
40	Wood	Adam	m	58	1,85	110	32	discharged	Bakun

Fig. 50

The BMI average is 34. Filtered entries in the **BMI** field contain values greater than 27.

HIDING AND DISPLAYING DETAILS IN THE LIST

HIDING AND DISPLAYING ROWS AND COLUMNS

Analyze the male and female patients' BMI values based on the results of filtration performed in the task in Section 2.7.4 (fig. 51).

For this purpose, copy the result of the filtration task in Section 2.7.4 (range of cells **A36:I40**) on the **Sheet 3**. Rename this sheet as **BMI Filter**.

It is more convenient to hide unnecessary information in columns **D**, **E** and **F**. To hide the columns, do the following:

1. Select the group of columns **D**, **E** and **F**.

2. On the **Home** tab, in the **Cell** group, click **Format**. In the **Visibility** section, select **Hide & Unhide** ⇒ **Hide Columns** (fig. 23).

The result is shown in the fig. 51.

	A	B	C	G	H	I
1	Surname	Name	Gender	BMI	Status	Doctor in Charge
2	Abadi	Omar	m	36	discharged	Bakun
3	Nader	Ali	m	29	discharged	Demchenko
4	Singh	Arosh	m	38	continue treatment	Bakun
5	Wood	Adam	m	32	discharged	Bakun

Fig. 51

To display the hidden columns again, do the following:

1. Select the area of the hidden columns (columns **C** and **G**).

2. On the **Home** tab, in the **Cell** group, click **Format**.

In the **Visibility** section, click **Hide & Unhide** ⇒ **Unhide Columns**.

The list will return to its original view.

GROUPING OF ROWS AND COLUMNS

Combine the records of female patients and hide them, to display only the male patients' records.

To create a group, do the following:

1. Select the rows **2** and **3** (the rows that you want to hide).

2. On the **Data** tab, in the **Outline** group, click **Group**.


The layout of the list has changed, and its structure has become visible (fig. 52).


	A	B	C	D	E	F	G	H	I
1	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
2	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
3	Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
4	Singh	Arosh	m	54	1,73	113	38	continue treatment	Bakun
5	Wood	Adam	m	58	1,85	110	32	discharged	Bakun

Fig. 52

When you click the structure button **1**, all the grouped rows with the female patients' records will become hidden.

When you click the structure button **2**, the entire list will be displayed.

Clicking on the **Hide Details** button  you will hide the female patients' records.

Clicking on the **Unhide Details** button  you will display the details about female patients.

To ungroup the records, do the following:

1. Select the range of rows **2:3** again.
2. On the **Data** tab, in the **Outline** group, click **Ungroup**.

SUMMARIZING

CREATION OF TOTALS

Calculate the total number of sorted rows on the **BMI Filter** sheet.

Do the following:

1. Convert the data range **A1:I5** into a table. For this purpose do the following:

- click in any data cell, then on the **Insert** tab, click **Table**;
- in the **Create Table** window that appears, set the following parameters: select the range of cells **A1:I5** to create a list on its basis and set the check box that confirms that the table contains headers;
- Click **OK**.

The data is organized in the form of a table again: the title bars of each column have the AutoFilter arrows, a frame selects the range of table cells, the lower right corner of the range has the *table resizing marker*.

2. To calculate the totals, on the additional tab **Table tools/Design** in the **Table Style Options** group, set the **Total Row** check box.

3. Excel will add the row «Total», which will automatically summarize the values in the last column of the list (fig. 53).

In our example, the last column contains the data that can not be summarized (the doctors' surnames), so Excel will display the value that corresponds to the number of column elements.

	A	B	C	D	E	F	G	H	I
1	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
2	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
3	Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
4	Singh	Arosh	m	54	1,73	113	38	continue treatment	Bakun
5	Wood	Adam	m	58	1,85	110	32	discharged	Bakun
6	Total								4

Fig. 53

This mode allows the user to display automatically the totals for each column of the table.

To calculate the totals in any column, place the cursor in the Total row of the selected column and select the required variant of the final formula from the drop-down list.

4. To disable the Total row, on the additional tab **Table tools/Design**, clear the **Total Row** check box.

5. **Restore** the Total Row.

CALCULATION OF SUBTOTALS

CALCULATION OF SUBTOTALS BY ONE FIELD

Perform calculations based on other columns. For example, calculate the number of male and female patients in the initial database.



For this purpose do the following:

1. Move to the **Sheet4** and rename it as **Totals**.

2. Move to the **ICMS Database** sheet and copy the original database (range **A1:I14**) using the **Paste Special**, to the **Totals** sheet.

3. Since we are going to calculate subtotals by the **Gender** field, the data in this column must be sorted (e.g., in ascending order) before summarizing. For this purpose, select any cell in the column **C (Gender)**.

4. Sort the records of the column in alphabetic order. Click the **Sort A to Z**

button  to open the **AutoFilter** drop-down list, or click the button  on the **Data** tab in the **Sort & Filter** group.

5. To make the **Totals** command active, convert the list into a data range: in the additional tab **Table tools/Design**, in the **Tools** group click **Convert to range**.

6. On the **Data** tab, in the **Outline** group, click **Subtotal**.

7. In the **Subtotal** dialog box (fig. 54), do the following:

–in the field **At each change in**, select the column **Gender** to calculate the totals;

–in the field **Use function**, select the function **Sum** to calculate the totals;

–in the field **Add subtotal to**, select the column **Gender**, that contains the values you want to sum up;

–set the check boxes **Replace current totals** and **Summary below data**;

–Click **OK**.

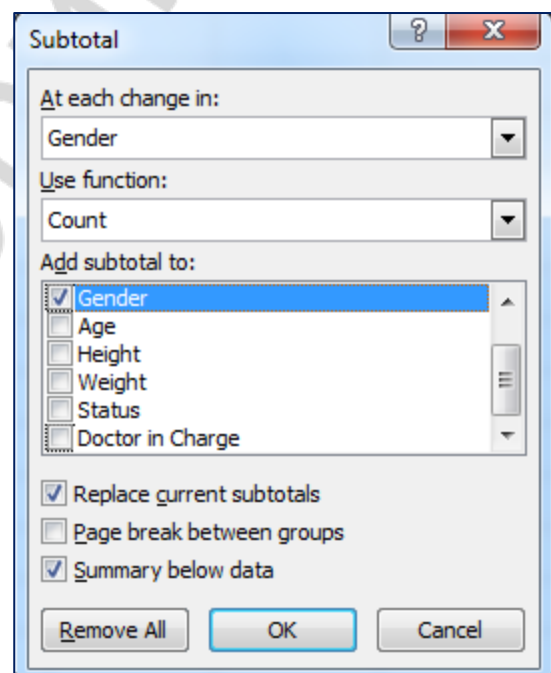


Fig. 54

The result of summarising is shown in the fig. 55.

	A	B	C	D	E	F	G	H	I
1	Patients with ischemic cardiomyopathy								
2	Surname	Name	Gender	Age	Height	Weight	BMI	Status	Doctor in Charge
3	Chan	Ning	f	70	1,71	72	25	discharged	Bakun
4	Fedotova	Irina	f	60	1,57	50	20	continue treatment	Demchenko
5	Kumar	Sia	f	60	1,58	58	23	died	Bakun
6	Salib	Zara	f	56	1,67	69	25	continue treatment	Demchenko
7	Volkova	Anna	f	56	1,64	66	25	discharged	Bakun
8	f Count		5						
9	Abadi	Omar	m	45	1,78	114	36	discharged	Bakun
10	Lewis	Peter	m	34	1,7	78	27	discharged	Demchenko
11	Nader	Ali	m	43	1,8	93	29	discharged	Demchenko
12	Petrov	Anton	m	63	1,75	76	25	continue treatment	Demchenko
13	Singh	Arosh	m	54	1,73	113	38	continue treatment	Bakun
14	Wong	Li Jun	m	75	1,7	70	24	continue treatment	Demchenko
15	Wood	Adam	m	58	1,85	110	32	discharged	Bakun
16	m Count		7						
17	Grand Count		12						

Fig. 55

After adding totals, the layout of the list has changed, and its structure has become visible.

When you click the structure button **1**, all rows of the list will become hidden, except for the Total Row.

When you click the structure button **2**, only the subtotal calculations of the patients of each gender will be displayed.

Clicking on the **Unhide Details** top button **+** you will display the details about female patients.

Clicking on the **Hide Details** button **-** you will hide the details and show only totals again.

8. Cancel the calculation of subtotals. For this purpose, on the **Data** tab in the **Outline** group, click **Subtotal**, and in the **Subtotal** dialog box, click **Remove All**.

CONTENTS

Chapter 1. Basic database concepts	3
Database and database management systems	3
Structure of a simple database	3
Table (database) field properties.....	4
Excel table commands.....	4
Tables of excel package	5
Use of the form.....	9
Sorting data in a table.....	12
Data filtering	14
Hiding and displaying of the information in a table	22
Summarizing	26
Chapter 2. Practical tasks	29
Creation of a simple database	29
Editing and updating of a database:	30
Work with the form: viewing and editing of the database records using the form	32
Database sorting	33
Application of the autofilter:	35
Application of user criteria	36
Application of the advanced filter.....	38
Hiding and displaying details in the list.....	42
Summarizing	44

Учебное издание

Шеламова Марина Алексеевна

**ОРГАНИЗАЦИЯ И ОБРАБОТКА МЕДИЦИНСКИХ
БАЗ ДАННЫХ СРЕДСТВАМИ ПРОГРАММЫ EXCEL**

**ORGANIZATION AND PROCESSING
OF MEDICAL DATABASES IN EXCEL**

Учебно-методическое пособие

На английском языке

Ответственный за выпуск М. В. Гольцев

Переводчик Ю. И. Шеламова

Компьютерная верстка А. В. Янушкевич

Подписано в печать 26.03.18. Формат 60×84/16. Бумага писчая «Снегурочка».

Ризография. Гарнитура «Times».

Усл. печ. л. 2,79. Уч.-изд. л. 2,44. Тираж 150 экз. Заказ 217.

Издатель и полиграфическое исполнение: учреждение образования

«Белорусский государственный медицинский университет».

Свидетельство о государственной регистрации издателя, изготовителя,

распространителя печатных изданий № 1/187 от 18.02.2014.

Ул. Ленинградская, 6, 220006, Минск.