

## Practical class № 8-9

### Subject: «Database management System Microsoft Access. Creating a database from multiple tables.

**Purpose:** To introduce the main database objects from the ability to build a database from multiple tables, creating a connection between them.

**Database** - a collection of data (tables) is stored together and connected to each other, or is it a special electronic storage related data.

Database management system Microsoft Access is one of the most popular applications in the family desktop database. All versions of Access have in their arsenal of tools greatly simplified data entry and processing, retrieval of data and information in the form of tables, graphs and reports.

Microsoft Access is made up of individual components, which used for storing and presenting information. These components are the **tables, forms, reports, queries, macros, modules**. Each object Microsoft Access have at least **two ways to create**: with the **constructor** or using the **Wizard**. In Design created or modified the structure of the object, in Wizard uses ready-made versions of objects that allows the user to choose.

**Data** is any information that you need to save to be able to refer to it periodically. Most databases have a **table structure**. As we know, in a tabular data structure address is determined by the intersection of **rows and columns**. The database **columns** are called **fields and the rows - recordings**. Fields form the structure of the database, and write up information that it contains.

*Field* - are the main elements of the database structure. They possess properties. From the properties of the fields depends on what types of data can be made in the field, and what does not, and what you can do with the data contained in the field. For example, the data contained in the price, can be summed to determine the final result. To summarize the data contained in the phone number, it is meaningless, even if the phone numbers written in figures. It is obvious that these fields have different properties and are of different types.

Different types of fields have different purposes and different properties.

1. The main property of the *text box* - the size.
2. *The numeric field* to enter numeric data. It also has a size, but are different numeric fields, for example for input integers and real numbers for input. In the latter case, in addition to field size also sets the size of a decimal part of the number.
3. The fields for entering dates or times are of type *Date / Time*.
4. To enter the logical data having only two values .. Yes or no, 1 or 0, True or False, etc.), is a special type - *Boolean field*. The length of this field is always equal to 1 byte, because this is more than enough to express a Boolean value.
5. A special type of field - *Money*. From the title it is clear what data it is stored. Monies can be stored in a numeric field, but in currency format is easier to work with them. In this case, the computer shows the number, along with the currencies distinguishes rubles and kopecks, pounds and pence, dollars and cents, in general, refers to them more elegant.
6. In the current database, you can store not only letters and numbers, but also pictures, music clips, and videos. The field for these objects is called a field *object OLE*.
7. In the text field has the drawback that it is limited in size (256 characters). If you want to insert in the long text, for this is the *MEMO* type field. It can store up to 65,535 characters. MEMO field feature is that the actual data is not stored in the field and elsewhere, and only a pointer is stored in the field on which the text is.
8. A very interesting field *meter*. At first glance, this is a common number field, but it has the ability to automatically increase. If there is such a field basis, the number is automatically entered when entering a new entry is made one greater than the value in the same field of the previous record. This field is useful for numbering records.

If the information is stored in a simple structure, to work with, it could do without a special database management system. In practice, we have to deal with more complex structures, which are formed from many related tables. Databases having associated tables, also referred to as a relational database.

The division bases on related tables are not only convenient, but sometimes necessary. For example, to increase the number of orders of the company manager, dealing with rental of CDs, I have decided to put in the common room the computer on which every client can view the list of available drives with illustrations of the games. If the database contains only one table, along with information about the disks casual visitor will have access to information about other clients of the firm. This manager is not only acquiring new customers, but will lose those who had.

In order to relationships between tables to work reliably and the records from one table could definitely find a record in another table, you must provide a *unique field* in the table. When you create a table structure one field (or a combination of fields) can be assigned to the key. With the key fields of computer runs too much. It checks their uniqueness and faster to sort on such fields. Key Field - an obvious candidate for making connections. Sometimes the key field is called the *primary key*.

The types of links:

**1: 1:** The ratio of "**one-to-one**" For example: (a student - № student's book)

**1: N:** ratio of "**one-to-many**". For example: One supplier... a)... can supply some products... b)... but each product can be only one provisioned. (A group of students)

**N: M:** ratio of "**many-to-many**" entries in Table A can have multiple entries in Table B, and records in Table B several entries in table A. For example: (students courses that they listen)

To create linked tables Requirements:

**Data integrity** is a system of rules that are used in an Access database for the relationships between records in related tables. Monitor the integrity of the data as possible if the following conditions are met:

- Linked to the same table field is a key field or a unique index.
- Related fields have the same data type. Exception: The field meter can be connected with a number field, if it is of type Long Integer.
- Both tables belong to the same Access database.

**Exercise 1.**Creation of databases Task data "Dean's office"

1. Create a new database "Dean's office" base. To create a new database:

- Load the Access, in the window that appears on the left side, click on **office** button, select the point where the **new database**;
- In the "New Database" in the *File name* field as the name of the **database**, specify the name of the Dean's office and select the **folder** (click folder) where your database is located, in its own folder.
- click on the button <New>.

2. **Create a database table.** To create a database table:

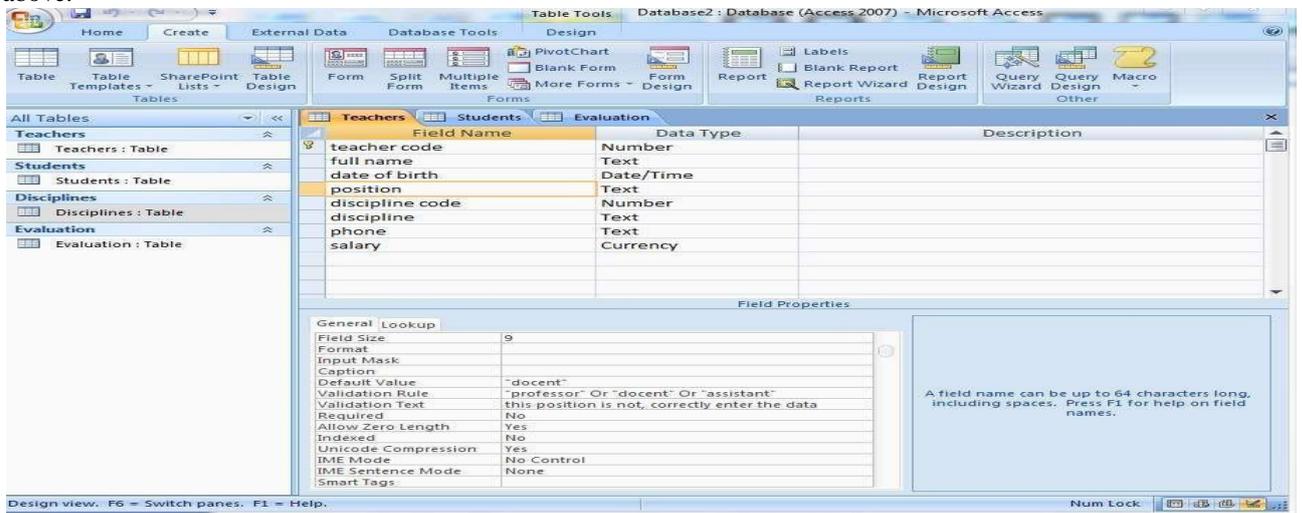
- On the toolbar menu **Creating** a focus controls to call all types of Access objects (tables, queries, forms, etc.). In the window, select the type of document to be created. You create a table, so select a tab, and then click **Table** to open the Mode tab of the table.
- In the **View menu / View** is a list of options for further work: *Table Mode and Designer*.
- Select **Designer** and then click. A window appears in which you want to set *Teachers* table name and click *OK*. All tables are created, and we are in the **mood of the Table Designer**.

3. **Define the field in the table under the table. 1.** To determine the fields of the table:

- Enter into a string column "*Field Name*" the name of the first field of the *teacher code*;
- In column "*Data type*" list, click the button and select the numeric data type and field size; *The whole of the General tab*
- *Golf teacher* automatically becomes a *key code*. To do this, you can also click on a key figure in the toolbar or context menu.
- **Enter the restrictions on data in the <code>**; These data must be repeated, since Teachers codes do not have repeats used, as well as their changes must be provided. On the General tab, click the parameter row indexed floor;

**Note.**Index - a tool Access, accelerating search and sort data in a table. The key field (the primary key field) index table automatically. It is not allowed to create indexes for the MEMO field types and Hyperlink, or OLE Object fields.

- Select the item in the list *Yes (matches are not allowed)*;
- To determine all other fields of the database table *Teachers* under with table.1 follow steps similar to those described above.



**Table 1**

Field name	Data Type	Field size
Teacher code	Number	Field Size: Integer
Full name	Text	40
Date of birth	Date/Time	<b>Format of field:</b> Short format of date
Position	Text	9
Discipline code	Number	Field Size: Integer
Discipline	Text	11
Phone	Text	9

Salary	Currency	<b>Format of field:</b> General Number <b>The number of decimal places:</b> 0
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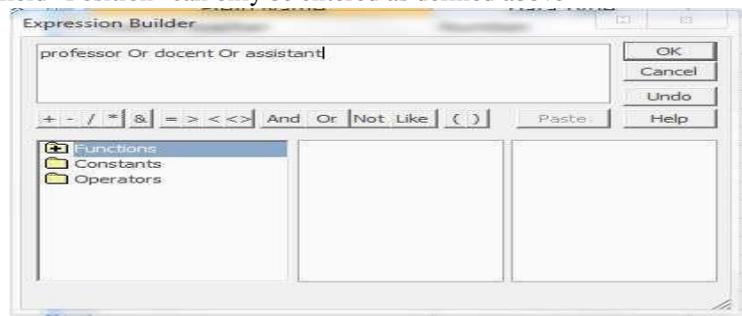
**Save the created table.** To do this, click on the sign "Close" .In the window that appears, click *Yes*.

**Exercise 2.** Edit the database.

1. Log in to the **design** mode for the projected table. If you are in the Database window, select in inset *All Access objects / Teachers table* and from the context menu, click on the button **Design**
2. Enter the restrictions on data entered in the "Position"; You must be entered only words of *Professor, Docent or Assistant*.

To set conditions to the value the input data:

- Click in the "Position" at the bottom of the *Generalgo* on **Validation Rule**;
- Click on the button  to determine the conditions on the value of using *expressionbuilder*;
- In the window that appears, write to the *professor*, then click on the button  (the button performs the function of OR), please contact *Docent*, again click on the same button, writes *Assistant* and click <OK>. So you enter a condition in which the field "Position" can only be entered as defined above



3. Enter the text of the error message that will appear on the screen when you enter incorrect information in the "Position".

In line *Validation text*, error message type the sentence "This position is not, correctly enter the data."

4. Set the default value for the field "Position" in the form of words *Docent*.

*Line Default Value*, type the word "Docent". Go out from Design Mode. Save the changes in the table.

**Exercise 3.** Work in the table mode.

1. Go to the Table mode:

On the toolbar, the command *Home / View*, select the mode of the table. On the question of the preservation of the table, click <Yes>.

2. Fill in the data table in accordance with the Table. 2 and check the system response to the input of incorrect information in the "Position".

Try it in the <title> of any entry to enter the word *Laboratoryassistant*. Look what happened. You should see a message: "This position is not correct, enter the data". Enter correct word

**Table 2**

Code	Full name	Date of birth	Position	Code of discipline	Discipline	Phone	Salary
1	AbayNargiza	23.10.1965	Docent		InformationScience	104468	120000
2	AmanovaAydan	25.07.1967	Professor		Economy	122140	289000
3	AsanAydar	05.12.1982	Docent		Mathematics	602365	180000
4	Osman Adil	12.02.199	Assistant		Mathematics	348569	107000
5	NurtasTalgat	16.02.197	Docent		Economy	667533	250000
6	NazarAygerim	30.05.1976	Docent		InformationScience	103698	103000
7	Abay Aisha	30.07.1981	Docent		Physics	1667533	107000

3. Change the width of each field in the table according to the data width:

- Click in any row of the field "code";
- The command *Home / Blog / Advanced*;
- To click <column width> window that appears. The width of the field changes, click the "best fit" button;
- Repeat this procedure with the other fields.

4. Make a *table* lookup teacher *Abav*:

- Set the cursor to the first line of the field "Name";
- The command *Home / Find / Find*
- Under the Sample line parameter, enter *Abav*;

- Click on <Find>. The cursor will move to the second record and allocate word *Abay*;
- Click on <Find Next>. The cursor will move to the seventh record and just as *Abavalso* selects a word;
- Click on <Close> to exit the search mode.

5. Make the replacement of data: Change wages assistant Osman from 107000 to 200000:

- Move the cursor to the first field line "Salary";
- The command *Home / Find / Replace*;
- In the window that appears, type in the sample line 107000
- Replace in line to enter 200000. Note the other options -

You have to search through all the records of the field;

- Click on <Replace all >. The data will be changed;

**6. Perform data sorting in the "Salary" field in ascending order.**

- Click on any record field of "salary";
- Click the button  on the control panel or the command *Home / Sort and Filter*. All data in the table will sorted in accordance with the increase in value in the "Salary".

7. Learn how to use the filter:

- a) Perform data filtering through the fields "Position" and "Discipline":

- Click on the entry field Associate Professor "title";
- Click on the button  or use the command *Home / Sort and Filter*, the filter on the selected. The table will only write about the teachers-docent;
- Click on the *Information Science* entry field "discipline";

- Click on the button  or use the command *Home / Sort and Filter*, the filter on the selected. The table will only write about the teachers - docent of computer science;

- To cancel the filtering, click the button  on the toolbar or

8. Save the table.

**Exercise 4.** Create three tables: *Students*, *Evaluation* and *Discipline*.

1. Create a table *Students*

Field name	Data type	Field size
Student code	Number	Field Size: Integer
Full name	Text	40
Group number	Text	10
Phone	Text	12
Scholarship	Yes/No	Yes/No

Set the "student code" as a key field. To do this, click on the field "student code" and the button  on the toolbar or click follow **Design / Tools / Primary Key**; Close the table by specifying the name of her *students*.

2. Create a table *Disciplines*:

Field name	Data type	Field size
Discipline code	Number	Field Size: Integer
Discipline name	Text	15

The set "*Code of discipline*" as a key field. This table will be filled in mode shapes.

3. Create a table structure of the *Evaluation*:

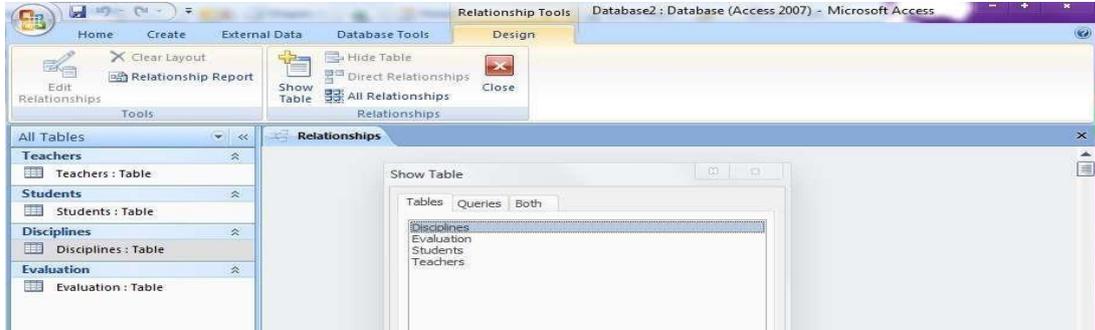
Field name	Data type	Field size
Student code	Number	Field Size: Integer
Discipline code	Number	Field Size: Integer

Evaluation	Number	Byte
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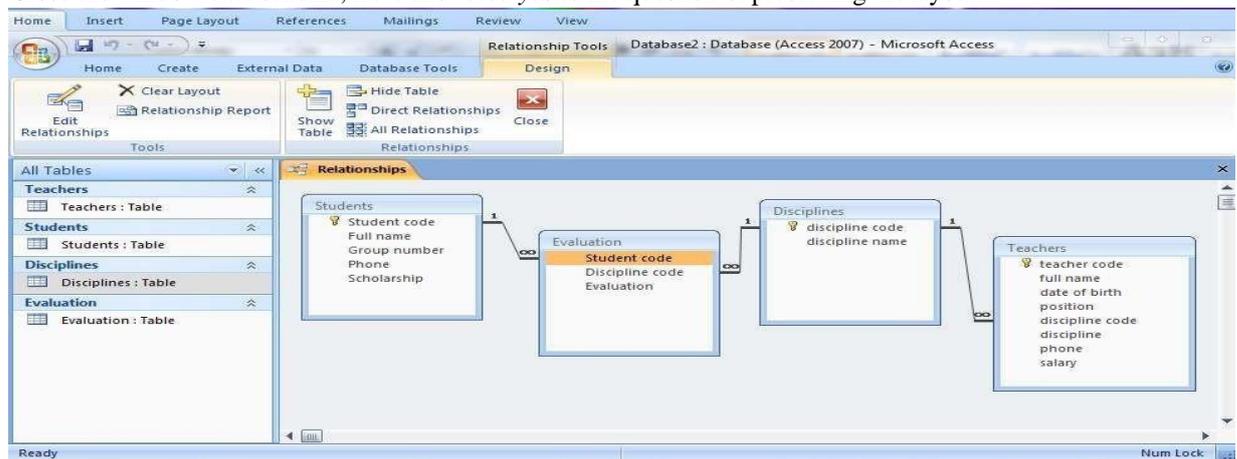
**Attention!!!**In this table define the key field is not necessary, since the data in all the fields may be repeated. This table is similar to the previous one, will be filled in Form view.

4. Develop a database schema, create relationships between tables: Teachers, Students, Evaluation, Discipline:

- Click on the toolbar  or use the command work with *databases /Design/Relationships/ Show table* A window will appear "Data Scheme";



- The name of one of the tables will be highlighted in the dialog box. Click <Add>;
  - Move the highlight to the next table name and click <Add>. Similarly, add the remaining two tables;
  - Close the window by clicking <Close>;
  - Create a connection between tables *Discipline and Evaluation*. To do this, move the mouse cursor to the "Code of Discipline" *Discipline* in the table, click the left mouse button and, without releasing it, drag the cursor to the "Code of discipline" table *Evaluation*, and then release the mouse button. The screen opens the window "Edit Relationships";
  - Check the box ("tick") in the property *Enforce Referential Integrity* by clicking on it. It cannot be done if both types of fields are set differently
  - Check the property of *Cascade Update Related Fields and Cascade delete related records*;
- Note.** Setting cascade update related fields and cascade delete related records will allow you to edit records only *Disciplines* table, and table *Evaluation* these actions are recorded automatic. For example, if you remove the *Disciplines* table is one thing, the *Evaluation* in the table Delete all lines connected with this subject.
- Click on the button <New>. Communication will be created;
  - Similarly create a connection between the field "code of discipline" in the table and *Discipline* field "code of discipline" in the table *Teachers*, as well as between the field "student code" in the table of *students* and the field "student code" in Table *Evaluation*. The result is shown in Fig. 4.;
  - Close the window data schema, have answered *yes* to the question of preserving the layout.



### Tasks for independent work:

1. Create a database... see table.

Independently think of these tables, fields, select the key fields, set links between tables.

Variant №	Task
1	"Music Album", consisting of three tables, "Composer", "Singer," "Songs".
2	"Clinic", consisting of three tables "doctor", "Patient", "Land".
3	"Schedule", consisting of three tables "class", "Teacher", "Objects".
4	"Computer Show", consisting of two "Commodity bundle" of tables, the "Buyer".