ITdesk.info -
project of computer e-education with open access -
handbook for digital literacy

Using databases -
Microsoft Access 2010

Handbook

Authors: Gorana Celebic, Mario Dujlo
Authors:
Gorana Celebic, Mario Dujlo

Proofreading:
Petra Matjašec

Expert review:
Surojit Chakraborty

Title:
*ITdesk.info – project of computer e-education with open access, handbook for digital literacy*

Subtitle:
Using databases - Microsoft Access 2010, handbook

Cover:
Silvija Bunic

Publisher:
Open Society for Idea Exchange (ODRAZI), Zagreb

Expert review of Croatian version:
Infokatedra, adult education centre, Zagreb

ISBN:
978-953-7908-16-4

Place and year of publication:
Zagreb, 2011

*Education and Teacher Training Agency* in Croatia has approved the use of this publication as official additional teaching resource in all the primary schools in Croatia

Class: 602-09/14-01/0418
Reg: 561-03-03/10-15-4
Zagreb, April 2015.

Copyright:
Feel free to copy, print and further distribute the whole or part of this publication, including for the purpose of organized education, whether in public or private educational organizations, but only for noncommercial purposes (that is, free of charge to end users for use of the publication) and with reference to the source (source: [www.ITdesk.info](http://www.ITdesk.info) - Project of Computer E-education with Open Access). Derivative works without prior approval of the copyright holder (NGO Open Society for Idea Exchange) are not permitted. For permission for derivative works please contact: info@ITdesk.info.
PREFACE

Today's society is shaped by sudden growth and development of the information technology (IT) resulting with its great dependency on the knowledge and competence of individuals from the IT area. Although this dependency is growing day by day, the human right to education and information is not extended to the IT area. Problems that are affecting society as a whole are emerging, creating gaps and distancing people from the main reason and motivation for advancement—opportunity. Being a computer illiterate person today means being a person who is unable to participate in modern society, and a person without opportunity; and despite the acknowledged necessity and benefits of inclusive computer literacy from institutions like the European Commission, UNESCO, OECD, there are still groups of people having difficulties accessing basic computer education viz. persons with disabilities, persons with learning difficulties, migrant workers, unemployed persons, persons that live in remote (rural) areas where IT education is not accessible.

This handbook, combined with other materials published on ITdesk.info, represent our effort and contribution to the realization and promotion of human rights to education and information considering the IT area. We hope that this education will help you in mastering basic computer skills and with that hope we wish you to learn as much as you can, and therefore become an active member of modern ICT society.

Sincerely yours,

ITdesk.info team

Expert review of Croatian version:

infokatedra
Centar za obrazovanje
CONTENT:

1 Database - basic concepts ........................................................................................................3
  1.1 Database organization ........................................................................................................3
     1.1.1 Primary key ................................................................................................................6
     1.1.2 Indexes .......................................................................................................................6
  1.2 Connecting tables - relationships .......................................................................................6
2 DATABASE APPLICATION - MICROSOFT ACCESS 2010 ......................................................10
  2.1 Elements of an application window ..................................................................................10
  2.2 Basic tasks: Open/close a database or an application .....................................................11
     2.2.1 Open/close a database .................................................................................................11
     2.2.2 Create a new database and save it to the local computer ...........................................12
     2.2.3 Setting the work environment - ribbons and toolbars ...............................................12
  2.3 Working with databases .....................................................................................................14
3 Tables .........................................................................................................................................17
  3.1 Records ................................................................................................................................17
  3.2 Database design ..................................................................................................................17
     3.2.1 Working with field settings .........................................................................................18
     3.2.2 Validation rule .............................................................................................................20
     3.2.3 Primary key ................................................................................................................20
     3.2.4 Field index ..................................................................................................................21
     3.2.5 Add fields to a table ....................................................................................................22
     3.2.6 Modify column width in a table ..................................................................................22
4 Information display ..................................................................................................................23
  4.1 Basic functions ...................................................................................................................23
     4.1.1 Find and replace functions ..........................................................................................23
     4.1.2 Working with filters ...................................................................................................24
  4.2 Queries ..................................................................................................................................25
     4.2.1 Create and name a query from one table .................................................................25
     4.2.2 Add conditions to a query .........................................................................................27
     4.2.3 Joker symbols and how they are used in a query .......................................................28
     4.2.4 Format a query ...........................................................................................................29
     4.2.5 Run a query ...............................................................................................................29
5 Objects ......................................................................................................................................30
  5.1 Forms ...................................................................................................................................30
     5.1.1 Using forms ................................................................................................................31
     5.1.2 Edit header and footer ...............................................................................................32
6 Reports ......................................................................................................................................33
  6.1 Reports and data export ......................................................................................................33
     6.1.1 Create and name a report based on a table or a query ...............................................33
     6.1.2 Adjust data fields position and titles in a report .......................................................34
     6.1.3 Review of certain fields in a report grouped according to criteria ..............................35
     6.1.4 Edit header and footer ...............................................................................................35
     6.1.5 Export a table or a query result ....................................................................................35
  6.2 Print .....................................................................................................................................377
     6.2.1 Print settings ...............................................................................................................388
     6.2.2 Print record by using a form .......................................................................................38
     6.2.3 Print a query ...............................................................................................................38
     6.2.4 Print a report ...............................................................................................................39
DATABASE - BASIC CONCEPTS

A database is a structured collection of interrelated data. In a relational database, data is stored in tables.

The difference between the terms “data” and “information”:

A piece of data is a fact that can be represented as audio, video, text or number(s). By itself, it may not be relevant, but if it is processed and put in a certain context, it takes on a meaning and becomes information. Information is the context - the meaning attached to the data.

For example, the sound of an alarm is data. If you listened to it out of context, it would be just an unpleasant and penetrating sound. After it was assigned the meaning "imminent danger", it became (well known) information.

Examples of large database use:

- plane ticket reservations
- government institutional databases
- bank accounts
- patient data

1.1 Database organization

A table is the most important database element. It is composed of rows and columns that contain information on a certain subject. For example, the table "Customers" contains the necessary information about customers.

A Record in a table is displayed as a row and contains information about a subject, e.g. relevant information about a customer.

Fields are individual record characteristics which are displayed as columns within a table. The type of data that can be entered in a field is specified as the data type (textual, logical, currency, numeric etc.), e.g. name, address, city, telephone, e-mail etc.

Cells are the rectangular spaces where the rows and columns intersect, and where the date is entered.

Besides the type, within the fields we can also determine:

- Field size
- Format – e.g. we can specify what currency indicator is added to the amount
- Default Value – if nothing is entered, the value that we enter here will be written in the field
- Validation Rule – checks whether the entered information is correct, i.e. checks whether the set criteria is met
Why should each table field contain only one data element, one type of information?

In Figure 1, Table records and fields, you can see an example of good table design, i.e. each field contains only one data element. Name is entered in one field, last name in another, street and number (address) in the third etc. A bad design example would be this:

In the previous example, there are two data elements in one field (first and last name in the Name field) and three data elements in another (street number, city and zip code). The data is inflexible, making it very difficult to sort and create queries and reports.

Better design example in comparison to the previous table would be this:

With every data element in a separate field, it is easier to sort and create queries and reports.

Connection between data types and field content

Field content is a particular data type within a table. It can be text, number, currency, date and time, yes / no, etc.
To add a field, click on the table header labeled **Click to Add**. Another way to add a field is via the **Design View**, in the **Data Type** column.

**Basic field properties**

Table fields have the appropriate properties, such as field size, formatting and default values. These properties can be changed in the **Field Properties** in **Design View**.

**Field Size** – for example, pre-set to 255 text characters.

**Format** – for example, there are several formats for date and time (General, Long, Short, etc.).

**Default Value** – for example, for Yes/No data type, default value is 0.
1.1.1 PRIMARY KEY

A Primary Key is a field, which clearly identifies each table record. A very important part of designing a database is to determine the primary key for each table. You should take into account that it is unique for each record. Figure 9 shows the primary key as an ID field which is assigned as the AutoNumber data type, which means that by entering each new record, the system itself generates a new unique ID (number).

Indexes are automatically assigned to primary keys, which significantly accelerates the search and data retrieval. Primary keys are often used to create relationships between tables.

![Fig. 9. ID field set as primary key](image)

1.1.2 INDEXES

Data locations are stored in indexes. Table indexes are used as term indexes in books - when searching for information, its location is looked up via an index. We use them to speed up the search and data retrieval. For tables with a small number of records, using indexes is not required, because speed improvement when searching or sorting is negligible. However, if we have a lot of data, by setting the appropriate indexes on certain fields, we can expect a significant search and sort acceleration.

1.2 Connecting tables - relationships

Often, a database consists of several tables. For example, an internet shop database could include, among other tables, Customers and Shipping tables. The mere fact that we can have multiple tables within a database suggests that the tables can be linked. The link between tables within a database is called a Relationship.

Relationships (connections) between tables are made through primary key fields and on the principle of field equality. We connect tables to be able to make queries, reports and forms with data located in multiple tables. In Figure 10 we have connected a Customer ID field which is the primary key of the Customers table with the Customer ID field from the Shipping table.
To create a relationship between two or more tables, we need to have fields that have the same data type in the relevant tables (*fields need not have the same name!). In Figure 10 there are Customer ID fields, which are identical in the Customers table and in the Shipping table.

![Fig. 10. Relationship (1xn) between Customers and Shipping tables](image)

**Relationship types:**

1:M (One to Many) – one field in the relationship is the primary key of its table. This is the most common relationship type.

1:1 (One to One) – both fields in the relationship are primary keys of their tables. This is the most uncommon relationship type.

M:M (Many to Many) – in this relationship, a third table is created in which the primary key consists of two fields that are foreign keys from the linked tables.

**Create a relationship between tables**

In order to create a relationship between tables, on the Database Tools tab, within the Relationships group, choose the Relationships tool.

To display the tables you want to connect, choose the Show Table tool on the Design tab in the Tools group.

The Show Table dialog box opens (Fig. 11.) in which you first select and then press the Add button to add the tables to be displayed within the Relationships pane.

![Fig. 11. Show Table dialog box](image)
A relationship can also be created via the drag and drop method (Fig. 12.) by following these steps:

1. Position the cursor over the first table primary key (ID field to Customers table)
2. Press and hold the left mouse button, pull the cursor over to the Customer ID field in the Shopping cart table and release the mouse button
3. Edit Relationships dialog box opens (Fig. 13.)
4. Press the Create button to create a relationship

**Fig. 12. Create relationship between Customers and Shopping cart tables via drag and drop method**

**Fig. 13. Edit Relationships dialog box**

**Why is it important to preserve the referential integrity between tables?**

The referential integrity ensures the integrity of all database records. By its application, validity of the relationship between the tables is confirmed and accidental modification or deletion of the related data is prevented.

In the Edit Relationships dialog box (Fig. 13), check the Enforce Referential Integrity option. After that, if you try to delete a record from the Customers table (which is connected to the Shopping cart table), a Microsoft Access application warns that the record cannot be deleted, because the other table includes the related records (Fig. 14).

**Fig. 14. Warning about related records**

**Delete a relationship between tables**

First, select the relationship, and then:

- press the right mouse button and from the pop-up menu choose the Delete command, or
- press the Delete key on the keyboard
Who creates, manages, fills out and maintains a database?

Database designers are experts who create professional databases.

Database administrators are responsible for database maintenance and functionality. Among their tasks is the determination of data access permissions for a particular category of users. Database administrators ensure database recovery in case of failure or major errors.

A Database user handles data entry, data maintenance and information retrieval.

A Database administrator has the highest level of database user rights (access and manipulation). He/she grants or withholds data access rights. The database administrator is responsible for functioning, backup and database recovery in case of failure.
2 DATABASE APPLICATION - MICROSOFT ACCESS 2010

2.1 ELEMENTS OF APPLICATION WINDOW

Buttons to manipulate the window, located on the right-hand side of the title bar; are used to maximize, minimize or close the window.

The Title bar contains information about a database and an application in which it is open.

Tabs:
- **File** - used to perform basic operations on the database (save or open an existing one, create a new one etc.)
- **Home** – contains tools for word processing, sorting, commands for copying, cutting and pasting
- **Create** – used to create database objects (tables, queries, forms and reports)
- **External Data** – contains tools used to manage data import
- **Database Tools** – contains tools used to compress and repair a database (Compact and Repair Database), to display relationships and object dependencies, Visual Basic Editor etc.

Extra contextual tabs appear when a database object is open. In Figure 15, notice the new tab Table Tools, with Fields and Table tabs that appeared after we opened a table.

Quick Access Toolbar is there for an easy access to the most often used tools. It can be displayed above or below the Ribbon.

The Ribbon contains tabs with logically grouped commands.
The **Navigation Pane** is located on the left side of the window and it lists all database objects:

- Tables
- Queries
- Forms
- Reports

**Fig. 18. Database objects pane**

Bars for horizontal and vertical navigation (sliders) are used to navigate to the desired location.

Above the status bar, there is a **record navigation bar**.

**Fig. 19. Record navigation bar**

**Status bar** displays information about the possible view of the object.

### 2.2 BASIC TASKS: OPEN/CLOSE DATABASE OR APPLICATION

**To run an application:**

- On the **Start** menu – click **All Programs** and from the **Microsoft Office** folder choose **Microsoft Access 2010**
- Using the **Search** function, enter the word “access” into the search box and from the search results list choose **Microsoft Access 2010**
- Double-click the program shortcut (usually found on the computer desktop)

**To close an application:**

- Click the **Close** button, located on the window’s **Title bar**
- Click on the **File** tab and choose the **Exit** command
- Use the keyboard shortcut: **Alt + F4**

### 2.2.1 OPEN/CLOSE A DATABASE

**To open an existing database:**

- Click on the **File** tab and choose the **Open** command
- Use the keyboard shortcut **Ctrl + O**
ITdesk.info – project of computer e-education with open access

- Double-click the left mouse button on the database icon
- Press the right mouse button on the database icon and choose the **Open** command

**To close a database:**

In order to close a database, choose the **Close** command from the **File** menu.

### 2.2.2 CREATE A NEW DATABASE AND SAVE IT TO THE LOCAL COMPUTER

**To create a new database:**

From the **File** menu, select the **New** command. If you want to create a new blank database, select the **Blank Database** template and confirm your selection by pressing the **Create** button.

**To save a database**

Save your database by clicking on the **Save** command on the **File** menu. To save, you can also use the keyboard shortcut **Ctrl + S** or the **Save** button, located on the **Quick Access Toolbar**.

Before saving the database, it is necessary to close (and save) all database objects. If this is not done, a dialog box will appear with a warning (**Fig. 20**).

**Fig. 20. Closing all open database objects before saving the database**

If objects are not saved, you can do it now.

**Fig. 21. Save table**

In case that the table is being saved for the first time, the **Save As** dialog box appears in which you can enter the table name.

**Fig. 22. Save As dialog box – first time saving table**

After closing and saving all objects, the database can be saved.

### 2.2.3 SETTING THE WORK ENVIRONMENT - RIBBONS AND TOOLBARS

In order to set the **Ribbon**, open **File** menu, click on the **Options** button and open the **Customize Ribbon** tab. If you don’t want any of the default tabs to show, simply remove the checkmark next to it. There is also a possibility to create your own tab that can be adjusted
to fully meet your needs. On the dialog box on the left side, select the desired tool and click the **Add** button to add it to the tab. If you want to remove a tool from the tab, select it and click the **Remove** button.

**Minimize the Ribbon:**

- On the **Ribbon**, press the right mouse button and from the pop-up menu, select the **Minimize the Ribbon** command
- Click on the arrow located on the upper-right corner of the ribbon
- Double-click on the tab's name

**Maximize the Ribbon:**

- On the **Ribbon**, press the right mouse button and from the pop-up menu, select **Minimize the Ribbon** (remove checkmark)
- Click on the arrow located on the upper-right corner of the ribbon
- Double-click the tab's name

![Fig. 23. Setting the Ribbon](image)

**Setting the Quick Access Toolbar:**

The **Quick Access Toolbar** is used for a quick access to the most often used tools. On the **File** menu click on **Options** and select the **Quick Access Toolbar** tab. Depending on needs, add the desired tools and remove the unnecessary ones.
The Quick Access Toolbar can be displayed above or below the Ribbon. Press the right mouse button over the Ribbon, and choose the Show Quick Access Toolbar Below the Ribbon or Show Quick Access Toolbar Above the Ribbon command from the pop-up menu.

Help function

The Help function can be accessed via the File menu. On the right side of the window, there is information on the used application version. Selecting the Microsoft Office Help tab, a window opens with a list of available help topics. In the Search text box, write the term you want to explore. The Help function can also be opened by clicking on the icon located below the manipulation buttons, or by pressing the F1 key on the keyboard.

2.3 WORKING WITH DATABASES

Open a table:
- Double-click the table within the Navigation Pane
- Position the cursor over it, press the right mouse button, and choose the Open command from the quick menu

Fig. 24. Setting Quick Access Toolbar

Fig. 25. Object pane that has listed one table
Save a table, query, form or report

In order to save an object, choose the Save command from the File menu.

![Fig. 26. File menu – Save command](image)

Close a table, query, form or report

An object is closed by pressing the Close button. You can also use the keyboard shortcuts Ctrl+W and Ctrl+F4.

Types of views for a table, query, form or report

The view of the table is changed via the View tool. To display the table at Design View, click the View icon on the Home tab.

Delete a table, query, form or report

Within the navigation pane, select the object (table, query, form, report) that you want to delete and:

- Right-click and choose the Delete command from the pop-up menu
- On the Home tab under the Records group, choose the Delete command

Navigate through records and fields in a table, query or form by:

- pressing buttons on the record navigation bar
- pressing the following keys: up, down, left, right, PageUp, PageDown, Tab, Home, End
- left-clicking over the field, or on the gray border at the left side of the record

Sorting records in a table, query or form in an ascending or descending order, numerically and alphabetically

- On the Home tab within the Sort & Filter group, choose a tool to sort in an ascending or descending order
If you selected a field in which the set data type is a default numeric value (AutoNumber, Number, Currency), click the right mouse button over it and choose **Sort Smallest to Largest** or **Sort Largest to Smallest** from the pop-up menu.

- If you selected a field in which the data type is set as text, press the right mouse button and choose **Sort A to Z** or **Sort Z to A** from the pop-up menu.

*Fig. 27. Quick menu – commands to sort numeric values*
3 TABLES

3.1 RECORDS

Add records to a table

To add records, click on the record marked with an asterisk and enter your data. In the example presented in Figure 28, the content cannot be entered in the Author ID field, because it was assigned as the AutoNumber data type i.e. the system will automatically generate the number.

![Fig. 28. Adding a new record](image)

Delete a record from a table

In order to delete a record, first select it and then press the Delete key.

Change data in a record

Select information or the part of the data that you want to modify, delete the entry with the Delete key and enter new data. You can select the entire record and write new data.

Delete data within a record

Select information or a part of it and press Delete in order to delete it.

3.2 DATABASE DESIGN

Create and name the table

A table is created via the Create tab, by choosing the Table tool within the Tables group.

By pressing the Close button, a dialog box appears asking whether you want to save the table. If you reply "yes", the Save As dialog box appears in which you can enter the table name.

![Fig. 29. Save As dialog box](image)
Design View - after you determine the field name, click to the right of it on the Data Type column, and from the drop-down menu, select the appropriate data type.

Often used data types:

- **Text** - accepts text and numeric characters
- **Number** - accepts only numeric characters
- **Date/Time** - date and time entry
- **Currency** - currency values entry
- **AutoNumber** - the system automatically generates an ordinal number for each record, entry is not permitted
- **Yes/No**

Datasheet View — on the Fields tab under the Table Tools tab, within the Formatting group, click on the Data Type drop-down menu to set the data type.

3.2.1 WORKING WITH FIELD SETTINGS

Modify field settings (via Design View)

**Field Size** - if a text is assigned as the field data type, here you set the field size (maximum size is 255 characters).
**Format** – if a number is assigned as the field data type, choose from a number of formatting options (general, currency, percent etc.) from the drop-down menu next to the Format label.

![Fig. 33. Choose number format](image)

**Date/time** – if date and time are assigned as the field data type, select among a number of formatting options from the drop-down menu next to the Format label.

![Fig. 34. Choose date/time format](image)

**Default Value**  – via this property, we determine the value that Microsoft Access automatically enters in a table if nothing is entered within a selected field (e.g. Figure 35, if nothing is entered within a selected field, 0 will be entered).

![Fig. 35. Default Value](image)
3.2.2 VALIDATION RULE

The Validation Rule is used to verify field input values. If you type in the expression “<50”, all numbers greater than or equal to 50 cannot be entered into this field and the application will give you a warning.

If you write validation rules for a field formatted as date, before and after each date you must put the # sign. For example, to ensure that data referring to dates between 01/01/1970 and 01/01/1975 cannot be entered, set the following rule: >#01/01/1970# and <#01/01/1975#.

![Fig. 36. Setting Validation Rule in Design View](image)

The hazards of changing data types and table field settings

For example, if you try to type a text in a field with data type set as number, the system will give the user an error notification, because only numeric values can be entered in the Number field. Changing data type and attributes should be handled carefully, because it may lead to data loss and affect data consistency.

3.2.3 PRIMARY KEY

The primary key is a field that uniquely identifies each record stored in a table.

![Fig. 37. ID field is primary key; data type: AutoNumber](image)
Defining a field as a primary key (via Design View)

Before defining the primary key, it is necessary to switch to Design View, select the field that will be defined as the primary key and:

- in the Tools group (under the Table Tools tab on the Tables tab), choose the Primary key icon, or
- right-click over the selected field and choose the Primary key command from the pop-up menu

Remove a primary key

- in the Tools group (under the Table Tools tab on the Tables tab), choose the icon, or
- right-click over the selected field and choose the Primary key command from the pop-up menu

3.2.4 FIELD INDEX

Indexes are automatically assigned to primary keys and double records are not allowed. The fields’ index property (Indexed) is defined in the General tab:

- No - the default option for all fields except the primary key to which the index is automatically assigned without duplicate entries
- Yes (Duplicates OK) - set the field index and allow duplicate records
- Yes (No Duplicates) - indexes the field and does not allow duplicate values

![Fig.38. General tab - Indexed property](image_url)
3.2.5 ADD FIELDS TO A TABLE

- Via Datasheet View - select a column before which you want to add a field and press the right mouse button. Choose the Insert Field command from the pop-up menu.
- Via Design View - under the Table Tools tab on the Design tab, select the Insert Rows button , or select a field, press the right mouse button and choose the Insert Rows command from the pop-up menu.

3.2.6 MODIFY COLUMN WIDTH IN A TABLE

On the Home tab, within the Records group, choose the More command then on the drop-down menu click on Field Width and enter the desired value.
4 INFORMATION DISPLAY

4.1 BASIC FUNCTIONS

4.1.1 FIND AND REPLACE FUNCTIONS

The Find and Replace functions are used when we want to find and replace a small amount of data. These functions are located on the Home tab, within the Find group. They can also be accessed via keyboard shortcuts: \texttt{Ctrl+F} - for the Find function and \texttt{Ctrl+H} for the Replace function.

Search records

When searching for some information within a table, first select the field you are searching in, and then in the Home tab, choose the Find icon.

In the Find What text box write the data to search for and click the Find next button.

![Fig. 39. Find and Replace dialog box – Find function](image)

The Replace function

In order to replace some data, after you have selected a field, click on the Replace icon on the Home tab.

In the Find What text box enter the data to search for, and in the Replace With text box enter the data you want to replace it with. Then click on the Find Next button and when Microsoft Access finds it, click on the Replace button.

![Fig. 40. Find and Replace dialog box – Replace function](image)
4.1.2 WORKING WITH FILTERS

A Filter is used to restrict data display to only certain records, while setting certain conditions. Data that do not meet this condition will not be displayed.

The Tool for filtering data is on the Home tab within the Sort & Filter group. Select the field that you want to filter e.g. Last Name, and choose the Filter function. In the open dialog box via the Text Filters command (data type in the field is text), choose the condition Equals and in the Custom Filter dialog box that opens up, enter the last name you want to filter (e.g. Cohen). The table will show the records for all the people with the surname Cohen.

![Fig. 41. Filtering data in the “Last Name” field](image1)

![Fig. 42. Custom Filter dialog box](image2)

Remove a filter

Remove a filter by clicking on the Filter icon displayed on the filtered field header (Fig. 43.) and then by choosing Clear filter from fieldname command.

![Fig. 43. Remove filter](image3)
4.2 QUERIES

What are queries?

Queries in Microsoft Access are used to extract data from tables that have met a certain condition. They can serve to change the data, and for data analysis. Also, query results can be data sources for forms and reports.

4.2.1 CREATE AND NAME A QUERY FROM ONE TABLE

Using specific search criteria

Queries can be created with the help of Query Wizard or by using Query Design. With Query Design we determine the data with which we want to work with, tables or queries from which this data is, and we define the criteria.

Query Wizard and Query Design are located on the Create tab within the Queries group.

![Create tab](image)

As an example, we will show how to create a query from the following table:

![Furniture table](image)

To run a simple query from a table, run Query Design and choose which data source (e.g. “Furniture” table) to use. Previously saved queries can also be used.
After that, choose the fields that you want to display in a query. The easiest way to do so is to use the drag and drop method, or to use the menu that appears when clicking in one field. In this case, we add Description, Type and Price fields to the query.

Now you can add certain criteria, provided that the text criteria are in quotation marks. For this example, we have set that our query prints all the furniture that is "Chair".
And this is the query result:

![Query result](image)

**Creating queries by using a specific search condition**

To run a query from two (or more) tables, using specific condition(s), we follow all the steps presented in the above example, just using more tables. In addition, the tables that you use must be connected (there must be a relationship) with one another.

For example, we have the *Customers* table (which has the following fields: *ID, Name, Last Name, City, Tel, Address*) and the *Customers interests* table (which has *Product ID, Customer ID* and *Product*). The tables are linked via the *Customer ID* field. We will create a query with just *Name, Last Name* and *Product* fields.

First we add the *Customers* table and the *Customers interests* table. Then, by using the drag and drop method (or menu), add fields to be displayed in the query (*Name and Last Name from the *Customers* table, and the *Product* field from the *Customers interests* table) and run the query.

**4.2.2 Add conditions to a query**

**Adding operators to a query**

We can add operators to criteria, by using one or more of the following operators: = (equals), <> (different from), < (less than), <= (less than or equal to), > (greater than), >= (greater than or equal to).

For example, from the *Furniture* table, we can run a query that will return only records that contain prices greater than €3.000 for which purpose we use the “>” operator.
Query result is as follows:

![Table Example](image)

**Fig. 51. Query result**

### Adding logical operator(s) to a query

Logical operators are: AND, OR and NOT, and we can use one or more logical operators in a query.

For example, NOT “Chair” criteria on the **Type** field will return all table items except chairs as query results. “Chair” OR “Clock” will return all chairs and clocks as query results.

#### 4.2.3 JOKER SYMBOLS AND HOW THEY ARE USED IN A QUERY

Wild characters (* or % or ? or _) are commonly used in conjunction with the **Find & Replace** dialog box to find and replace data in a Microsoft Access database and can be used in queries.

- * coincides with any number of characters. Use an asterisk anywhere in a word, e.g. `tele*` will find telephone, television and telecommunications.
- ? coincides with any alphabetic character, e.g. `p?n` will find words pin and pen.
- [ ] coincides with any character in parentheses, e.g. `c[ei]a` will find words like cesta and cista.
- ! coincides with any character not in parentheses, e.g. `b[lae]a` will find words bila and bola, but not bala or bela.
- - coincides with any character in the range. The range can be specified in an ascending order, e.g. `r[t-v]pa` will find words rtpa, rupa and rypa.
- # coincides with any numeric character, e.g. `19#3` finds 1903, 1913, 1923... 1983 and 1993.
4.2.4 FORMAT QUERY

Add, modify or delete criteria

To modify or delete criteria you need only select it and then change it by typing, or delete it by using the Delete key.

To add more conditions, you can use the OR logical operator or other field criteria, as shown in the figure below.

![Fig. 52 Add criteria](image)

By setting these conditions, the query will return all chairs, clocks and cabinets.

![Fig. 53 Add criteria by entering operators](image)

The query displays all the customers from Zagreb and Split whose last name is not Marušić.

We can add, delete, move and hide/unhide fields via Design View. We have already explained adding, while to delete a field only select it i.e. position the mouse cursor on the header and, when a black arrow appears, press the left mouse button and press the Delete key.

To move a field, select it and press the left mouse button. When a small square appears, you can move the field where you want to by using the drag and drop method.

To hide/unhide a field from the query results, mark (or clear) the Show check box.

![Fig. 53. Show check box](image)

4.2.5 RUN A QUERY

Run a query by choosing the Run command located in the Results group on the Design tab, under the Query Tools tab.

Query results are displayed in the data table called dynaset (Dynamic Set) - the data is selected and sorted according to a query (criteria), from one or more tables. It is not a fixed table, but a dynamic "view" of information that we can change and enter new ones.
5 OBJECTS

Database objects

A Table is the most important element of any database. It is used for data storage. It consists of records that are presented in rows, and fields that are presented as table columns.

Queries provide an overview of one or more tables, enable sorting and selection of data, addition and deletion of data etc.

Forms are used to enter, delete or modify data in tables with data seen in graphical representation and not in tables.

A Report is used when preparing data for printing. It is the database output.

Macros are used to automate actions or procedures. They define actions that are executed in response to specific events (e.g. we run the query by pressing a button to which we have assigned the macro).

Modules are blocks of code written in the VBA programming language (Visual Basic for Applications).

5.1 FORMS

A Form is a database object whose role is to interact with the user. The user does not see the table, but the forms that show the records, which are in this way more easily viewed and edited.

Creating and naming a form

Create a form by first selecting the table, then click the Form button located in the Forms group on the Create tab, and the Microsoft Access application will automatically create a form with all the fields from the table.

A Form can also be created via Form Design or Form Wizard. If you opt for Form Design, add all the fields manually and format them as desired.
5.1.1 USING FORMS

Using forms to add new records

The advantage of using forms is the ability to enter new records without using tables. Click on the New Blank Record button on the record navigation bar which will insert a new record.

Fig. 56. New Blank Record button
Using forms to delete records

By using the navigation buttons on the record navigation bar, select the record you want to delete (while in Form View), and click on the Delete button located on the Home tab within the Records group.

Using forms to add, edit or delete data

Via forms, you can modify and delete old data, and add new ones. Just go to the relevant record and enter new data, or delete the existing data using the Delete key.

In the Furniture example form, the ID field is generated automatically; enter the data for the Description and Price fields manually, and choose Type from the drop-down menu.

![Fig. 58. Modify/delete records via forms](image)

5.1.2 EDIT HEADER AND FOOTER

Add and modify a text in header and footer easily via form in Design View. Modification can also be done in the Layout View.

It is necessary to first select the text in header or footer and enter new text.

![Fig. 59. Enter text into header](image)
6 REPORTS

Simply put, a report prints a list of table records or a query. For this purpose you could use the Print command, but if you want to achieve a more professional look, use reports.

6.1 REPORTS AND DATA EXPORT

6.1.1 CREATE AND NAME A REPORT BASED ON A TABLE OR A QUERY

As with forms, first select a table or a query. Then click on the Report button in the Reports group on the Create tab, and the Microsoft Access application will automatically generate a report. You can also use the Report Wizard, or design the report yourself via Report Design.

The Furniture table was selected and we have created a report (Fig. 60) by using the Report button.

In the Report Design we manually design the report, add fields, and place them where we want.

![Fig. 60. Navigation pane and display of selected table as report](image)

![Fig. 61. Report Design](image)
The Report Wizard leads us through the following steps to define all required elements:

![Fig. 62 Report Wizard](image)

6.1.2 ADJUST DATA FIELDS POSITION AND TITLES IN A REPORT

To modify data fields position and titles within a report, go to **Design View**, select the field, and when the cursor changes to a shape of 4 arrows (directions: up, down, left, right), move the field to a new location via the drag and drop method.
6.1.3 REVIEW OF CERTAIN FIELDS IN A REPORT GROUPED ACCORDING TO CRITERIA

In reports, there can be fields for minimum value, maximum value, average, count, and so on.

Select the field in which you want to get the sum (or other value), click the **Totals** button and select the function you want. The field appears with the sum (or other) in **Report Footer**, which you can place at will.

![Totals drop-down menu with available functions](image-url)

Fig. 64. Totals drop-down menu with available functions

![Sum field in report via Design View](image-url)

Fig. 65. Sum field in report via Design View

6.1.4 EDIT HEADER AND FOOTER

As with forms, the easiest way to add and edit the text in header and footer in report is in the **Design View**. Again, just select the text in header or footer, delete it or enter a new one.

6.1.5 EXPORT A TABLE OR A QUERY RESULT

**Export a table to a spreadsheet (.xlsx)**

To export a table or a query result to a spreadsheet, use the **Excel** tool located in the **Export** group on the **External Data** tab. Press the **Browse** button to select the name and location to save the worksheet. There are several export options:

- **Export data with formatting and layout** – preserves formatting and table data layout
- **Open the destination file after the export operation is complete** – opens the worksheet with exported data (available if you selected the previous option as well)
- **Export only the selected records** – exports only the selected records (available if you
had selected the option to export formatted data and have records selected as well)

Export data to a text file (.txt)

Use the Text File tool located in the Export group, on the External Data tab. Press the Browse button to select the name and location to save the file.

Export data to an XML data file (.xml)

Use the XML File tool located in the Export group, on the External Data tab. Press the Browse button to select the name and location to save the file. In the Export XML dialog box that opens up (Fig. 68.), mark the Data (XML) option.

Fig. 68. Export dialog box - destination format: Excel Spreadsheet

Fig. 69. Export XML dialog box
6.2 PRINT

Set printing layout

From the File menu choose the Print command, and then choose the Print Preview tool. In the Page Layout group, by using the Portrait and Landscape icons, change the page orientation. By using the Size icon within the Page Size group, change the paper size.

Use the Print command

- Click on the File tab, and select the Print command
- Use the keyboard shortcut Ctrl + P
- Click on the Print icon located in the Print Preview tab
6.2.1 PRINT SETTINGS

Print range:

- **All** – use this option to print the entire table, report or query
- **Pages From** – prints a certain page range
- **Selected Records** – prints only the selected records of a table, query etc.

Number of copies:

If you want to print a database object e.g. a table, in several copies, enter the number of copies in the **Number of Copies** field.

![Print dialog box](image)

**Fig. 72. Print dialog box**

6.2.2 PRINT A RECORD BY USING A FORM

For example, if you want to print records from 4 to 8, first position the cursor on the record 4, click on **Record Selector** , press the **Shift** key and use the navigation buttons to navigate to the record 8. Release the **Shift** key and on the **File** menu select the **Print** command.

6.2.3 PRINT A QUERY

After you opened a query by double-clicking it, select the **Print** command from the **File** menu, and if you do not need to adjust the settings, click the **Quick Print** button .

The **Quick Print** button can be added to the **Quick Access Toolbar**, making it easier to use.
6.2.4 PRINT A REPORT

In the navigation pane, select the report that you want to print, press the right mouse button over it, and choose the Print command from the quick menu.

---

* Add a button on the **Quick Access Toolbar** by clicking on the arrow on the right of the toolbar, and select the tools that will appear on the **Quick Access Toolbar** from the drop-down menu. Similarly, in order to remove the tools from the **Quick Access Toolbar**, just click on them so that they are unchecked.
This handbook is intended for learning in conjunction with materials published on the following links:

* Sample exam for module 5 is published at:
  
  http://www.itdesk.info/sample exam/sample exam module 5.pdf

* Solution for this sample exam is published at:
  

* Video presentations showing the work in the Microsoft Access 2010 application are available at the following links:

  - http://www.itdesk.info/en/microsoft-access-2010-using-databases-1/

* Quiz for self-evaluation is published at:
  
  http://www.itdesk.info/en/databases-quiz/
Terms of use:

The website http://www.ITdesk.info/ was launched by a nongovernmental organization Open Society for Idea Exchange in order to actively promote the human right to free access to information and the human right to education.

Feel free to copy and distribute this document, provided that you do not alter its contents!

All freeware programs and services listed on the ITdesk Home Web site at ITdesk.info are the sole property of their respective authors. Microsoft, Windows and Windowsxxx are registered trademarks of Microsoft Corporation. Other registered trademarks used on the ITdesk Home website are the sole property of their respective owners. If you have questions about using or redistributing any of the programs, please refer to the program license agreement (if any) or contact us via e-mail address info@itdesk.info.

These sites contain links to other websites or resources. ITdesk.info team is not responsible for the text and/or advertising content or products that these sites/resources provide, as it is not responsible for any content that is available through them, nor the possibility of the inaccuracy of the content. Use the links at your own risk. Furthermore, the ITdesk.info team does not guarantee:
- that the content on this website is free from error or suitable for any purpose,
- that these websites or web services will function without error or interruption and that they will be appropriate for your needs
- that implementing such content will not violate patents, copyrights, trademark or other rights of any third party.

If you disagree with the general terms of use or if you are not satisfied with the sites we provide, stop using this website and web services. The ITdesk.info team is not responsible to you or any third party for any resulting damages, whether direct, indirect, incidental or consequential, associated with or resulting from your use, misuse of this website or web services. Although your claim may be based on warranty, contract violation or any other legal footing, regardless whether we are informed about the possibility of such damages, shall be released from all liability. Accepting the limitations of our responsibilities is a necessary prerequisite of using these documents, webpages and web services.

Please note that all stated software in this or other documents published at ITdesk.info is stated only for educational or exemplary purposes and that we in any case or manner do not prefer this software over any other similar software not mentioned in the materials. Any statement that would suggest that we prefer some software over other, mentioned or not mentioned in the materials, will be considered as false statement. Only open source software that allows users to become digitally literate without barriers, use the computer and participate in the modern information society has our direct and unconditional support.
project of computer e-education with open access

Publisher:
Open Society for Idea Exchange (ODRAZI), Zagreb

ISBN: 978-953-7908-16-4