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Chapter 2

Microsoft Access

Module
Computer Science (L2)

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1. Microsoft Access Definition

Microsoft Access is one of the office software. It is a relational DBMS that allows to store and display linked data. Each database created on Access can be composed of tables, queries, forms and sub forms, reports and sub reports and macros.

Figure 1: Microsoft Access Logo

2. Access Program Functions

Access is used to store a database or a collection of DBs, each DB is a collection of files used to store a big amount of data without affecting the performance of the DB. The important functions in Access are:

- Addition of a new data to the DB files.
- Deletion of old and not needed data.
- Update an existing data.
- Search and inquire about a certain information in the DB.
- Organize and range the data in the DB.
- Display the data in reports and forms.
- Calculate the final sum, subtotal, or arithmetic mean of required data.

3. Access Program Properties

- Create a big amount of tables and link them with relationships.
- Add and delete data from the DB in an easier manner.
- The ability to search and inquire about any information in the DB in many ways and print it.
- The ability to create data entry forms as needed.
- The ability to create and print formatted reports.
- The ability to incorporate images and graphics into forms and reports.

4. Databases Objects

4.1. Tables

- They are the important component of a DB, this because they are the principal file that contains the completed data.
- DB may contain one or more than one table, each table is a collection of records, each record contain a set of fields that store the information.
- Tables are linked with relations using the primary key that allows to get the information in the real time.
- Each filed must have a name that represent the property of an entity.
- The data stored in the field of a table must have a type.

The following table summarize the data types with the description of each type:

Data type	Description
Short Text	Allows any alphanumeric characters, up to 255 characters. Stores text and numbers not used in calculations.
Number	Numeric data used for storing mathematical calculations.
Date/Time	Stores date and time information for a year range between 100 and 9999.
AutoNumber	Creates a unique number for each record.
Yes/No	This is a binary field (only two answers, Yes/No, True/False).
Lookup Wizard	The lookup wizard allows you to link the field to another Table or to type in a list of your own creation.
Attachment	Stores files like digital images.
Currency	Stores currency values and numeric data featuring one to four decimal places.
Hyperlink	Stores a combination of numbers and text, used as a hyperlink address.
Long Text	Typically used for lengthy alphanumeric or text data, up to 63,999 characters.
Memo	Stores a large quantity of text information.
OLE	holds graphics, sounds, and other object Linking & Embedding objects.
Text	holds characters, numbers, punctuation marks, and special symbols.
Calculated	Creates an expression that uses data from one or multiple field.

Note:

Descriptions will be displayed in the status bar in the Data view of Forms.

- The field may have also some properties that vary depending its data type.

For example you can change a text field size but you can not do that for a numeric field.

Property	Description
Field Size	Limits the size of Short Text fields. It can be set from 1 to 255. Be careful changing the size of fields if records have already been entered into the table.
New Values	Appears only for AutoNumber fields and allows you to specify the increment value between new numbers.
Format	Allows you to change how numbers and dates are displayed. If you have formatted numbers in Microsoft Excel, then the formats used here will be familiar to you.
Input Mask	Allows you to force data entry into predefined formats, such as phone numbers (e.g. (03) 9851 4000) where brackets, spaces, dashes etc are used for the data.
Caption	Captions are used in forms and reports in place of the normal field name.Captions are handy when you have used truncated or abbreviated field names (e.g. EmpNo can be made to appear as Employee Number).
Decimal Places	Allows you to specify the number of decimal places for numeric fields.
Default Value	Allows you to specify a default value that will appear in the field whenever a new record is created. This can be standard text or, in the case of dates, can be an expression (i.e. a formula) that displays the current date.
Validation Rule	Allows you to specify a rule for the data to ensure that data is entered correctly. For example, you can specify a rule that a number has to be greater than 1,000 or that the date must be today or later etc.
Validation Text	Displays a message to the user when data entered into a field with a validation rule doesn't match what the validation rule requires.
Required	Ensures that data is entered into the field. Access will not move off the record until data has been entered into the field.
Allow Zero Length	If nothing is entered into a text field it is deemed to be of null length. If you wish to enter an empty string (" ") you must select this property. Note that this is an advanced concept.
Indexed	Indexes are used to list data in a specific order, speed up searching, and/or restrict the entry of duplicate values. They will be explained in greater detail later.
Smart Tags	Smart Tags are used to obtain specific data for the field. They can be used to obtain stock quotes, exchange rates, etc. Again, they are an advanced concept.
Text Align	Allows you to determine where in a column (left, centre or right) data will appear.

- The Datasheet View of a table allows you to create and modify the data within a grid structure based on the settings in the Design View.

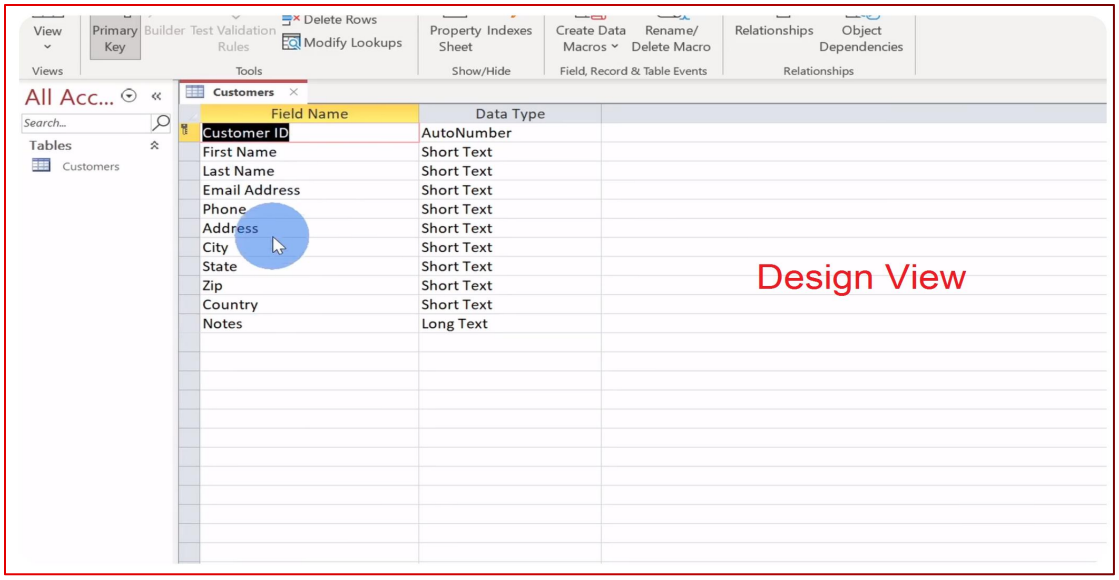

Figure 2: Design View of a table in MS Access

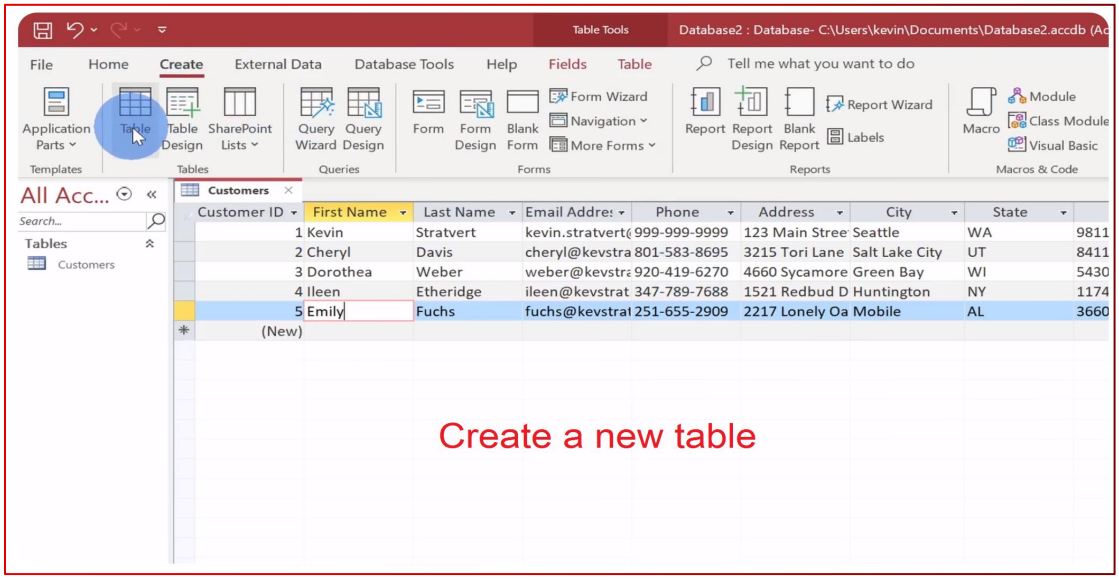

Figure 3: Datasheet View of a table in MS Access

4.2. Queries

- A query is a specific or a filtered collection of information extracted from the data stored in the table according to certain condition or specific properties (criteria or limitations).
- A query can pull from multiple tables and allow you to limit the records.

For example, we can find the customer name of the order 1 and we can find the orders made by Robert Roe. Also we can display all the customers with inactive status.

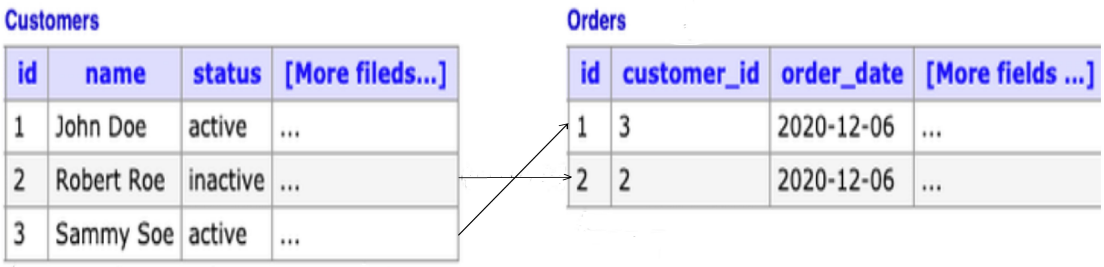

Figure 4: A query example from the DB tables

4.3. Forms

- A form is a user friendly window that is used to view and edit (entry) the data in the tables of a DB.
- The form helps the user to enter data quickly and accurately, ensuring that data updates are implemented consistently across all affected tables within the database.

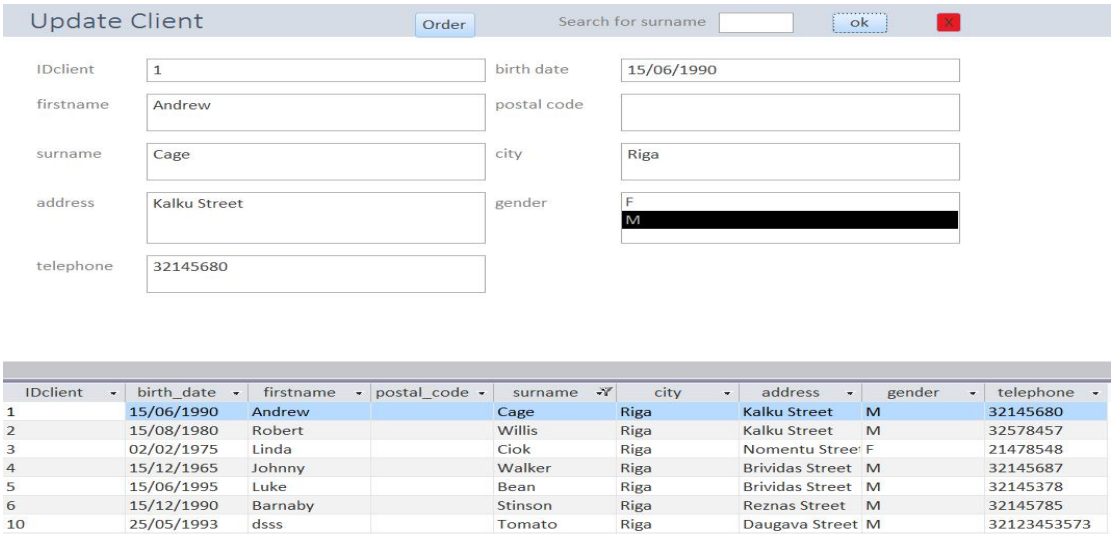

Figure 5: A datasheet View of a form

4.4. Reports

A report is used to extract key data from the database and represent it in an easy to read format, often for consumption by people (such as decision makers) not otherwise directly involved with the DB.

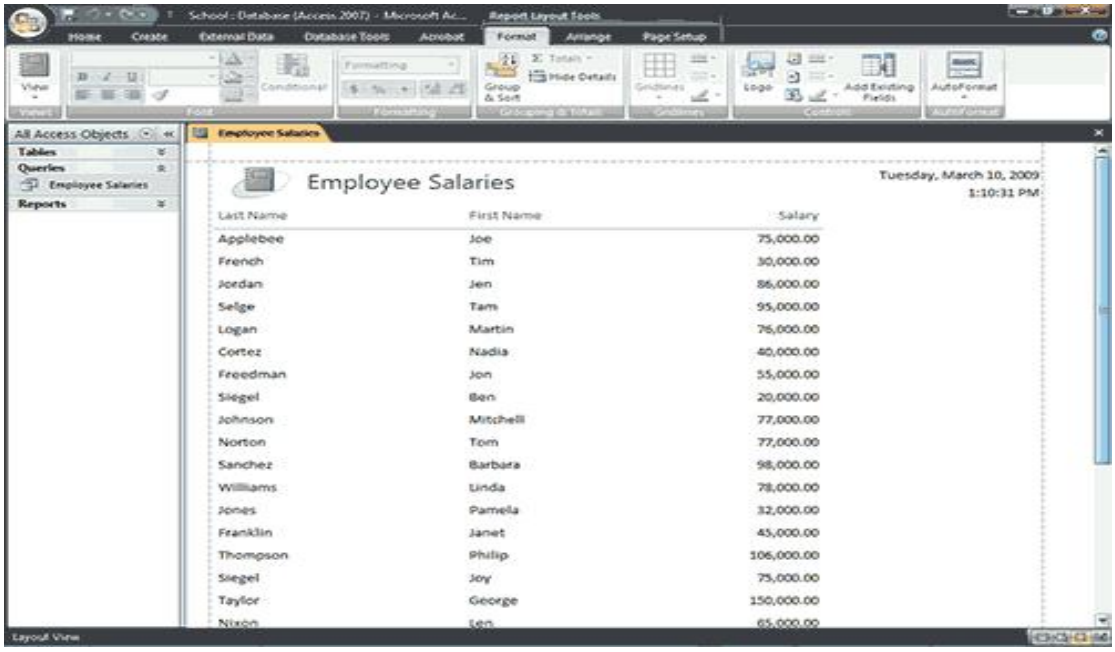

Figure 6: A datasheet View of a report

Note:

We must distinguish between a query and a report:

The query finds the information in the database for us. It is a way to create a list that meet a set of criteria we define, and the report is a more powerful way to display and analyze the information. It will have some special functions that aren't included in the Query Preview, such as the ability to group results, add aggregated fields, and summarized giving fields. Reports analyze data and are designed to calculate and present data in a more formal design.

4.5. Macros

- A macro in Access is a tool that allows you to automate tasks and add functionality to your forms, reports, and controls.
- For example, if you add a command button to a form, you associate the button's OnClick event to a macro, and the macro contains the commands that you want the button to perform each time it is clicked.
- We can use macros to execute a query, to open a table, to print a report, to insert new records in a table, to delete or edit records.

5. How to Design a Database

a) Determine the purpose of the DB.

b) Determine the entities (tables).
c) Determine the properties of each entity (fiels of the table).
d) Determine the relationships between the entities (tables).
e) Refine the design and try to enter a simple data into this design, create forms, queries, and reports.