

DATABASES

With Ms Access
An Introduction

What is a Database?

- **An organised collection of data generally stored and accessed electronically from a computer system.**

What are DBMS?

- *A Database Management System is a software that handles the storage, retrieval and updating of data in a computer system*

Examples of DBMS

- My SQL
- Oracle
- Sqlite
- Microsoft Access
- Dbase2

Database Elements

- Tables
- Records
- Fields

Definitions

- A field is part of a record and contains a single piece of data for the subject of the record.
- A record is composed of fields and contains all the data about one particular item in the database
- A database table is composed of fields and records that hold data. They are also called datasheets.

A typical database table

STID	STNAME	STDOB	STHOME DISTRICT	STNEXT OF KIN
JL/001/11	Oketa Johnson	24/5/2000	Gulu	Oketa James
JL/002/11	Mande Isaac	25/7/1998	Kapchorwa	Kiprotich John
JL/003/11	Kanshabe Mjorine	12/3/1999	Mbarara	Busingye Jane

Fields: STID, STNAME, STDOB, etc.

Records: JL/001/11, JL/002/11, etc.

Tables, Records and fields

In a relational database:

- Tables can also be called “Relations”
- Rows, or Records are also called “tuples” or “entities”
- Columns, or fields are also called “attributes”

Relational databases

- Relational databases connect data in different tables through the use of “key fields”

Keys

- **Primary key:**

This is the key that uniquely identifies each record in a table e.g. STID, Index no.

Note: All tables in a relational database should have a primary key.

The primary key is a column, or set of columns, that allows each row in the table to be uniquely identified. No two rows in a table with a primary key can have the same primary key value.

Keys contnd

- **Foreign key:**

This is a field (or collection of fields) in one table that uniquely identifies a row of another table or the same table. i.e. the foreign key is defined in a second table, but it refers to the primary key or a unique key in the first table.

Creating a database

To create a new database, do the following:

- Start Access.
- On the **New** tab in Backstage view, click **Blank Database** or **Blank Web Database**.
- On the right, type a name for your database in the **File Name** box.
- To change the location in which you create the file, click **Browse** next to the **File Name** box, browse to and select the new location, and then click **OK**.
- Click **Create**.

Creating a database contnd

- Access creates the database, and then opens an empty table (*named Table1*) in Datasheet view.
- Access puts the cursor in the first empty cell in the **Click to Add** column of the new table.
- To add data, begin typing — or you can paste data from another source, as described in the section [Paste data from another source into an Access table](#), later in this article.

Notes:

- Entering data in Datasheet view is designed to be very similar to entering data in an Excel worksheet. The main restriction is that data must be entered in contiguous rows and columns, starting at the upper-left corner of the datasheet. You should not try to format your data by including blank rows or columns as you might do in an Excel worksheet, because doing so will waste space in your table. The table merely contains your data. All visual presentation of that data will be done in the forms and reports that you design later.

Notes: Contd

- The table structure is created while you enter data. Any time that you add a new column to the datasheet, a new field is defined in the table. Access sets the data type of the field based on the type of data that you enter. For example, if you have a column in which you have entered only date values, Access will set the data type of that field to Date/Time. If you later attempt to enter a non-date value (such as a name or a phone number) in that field, Access displays a message informing you that the value does not match the data type of the column. When possible, you should plan your table so that each column contains the same type of data, whether it is text, dates, numbers, or some other type. This makes it much easier to build queries, forms, and reports that select just the data that you want.
- If you do not want to enter data yet, click **Close** .
- **Note:** Access will delete Table1 if you close it without saving.

Database objects

- MS Access uses “objects” to help the user list and organize information, as well as prepare specially designed reports.

Database objects contnd

- When you create a database, Access offers you Tables, Queries, Forms, Reports, Macros, and Modules.

Database objects contnd

Databases in Access are composed of many objects but the following are the major objects:

- Tables
- Queries
- Forms
- Reports

Designing a table

- Database tables are designed in consideration of type of data to be stored.
- Common data types used in Ms. Access Include:

Data types

1. **Text:** Used for text or combination of text and number of numbers which do not require calculations. E.g. Phone numbers, postal codes, etc.
2. **Memo:** Used for lengthy text and numbers e.g. Notes or description.
3. **Number:** Used for data to be included in mathematical calculations
4. **Date/Time:** Used for only dates and time data formats
5. **Currency:** Used for monetary values

Data types Contd

6. **AutoNumber:** Used for unique sequential or random numbers that are automatically inserted when a record is added.
7. **Yes/No:** Used for Boolean values with only one of two allowed e.g. True/False, On/Off, etc.
8. **OLE Object:** Used for OLE objects like pictures, sound that were created in other programs
9. **Hypertext:** Used to store a location of a file on the computer or network.
10. **Lookup Wizard:** Used to allow the creation of dropdown list of values that can be read from another table.

Creating a table (*practice*)

- Create the following table with its data types specified(Save as Students Record):

Field Name	Data Type	Description
Adm No	Text	Student's Admission number in School
FirstName	Text	Student's First Name
LastName	Text	Student's Last Name
Date of birth	Date/Time	Student's date of birth
Class	Number	Student's year of study
Fees Paid	Currency	Student's amount of fees paid

Entering data in a created table

- In a created table, data is entered just like in an excel sheet
- Note: A primary key field can never be null
- Trial exercise

Creating custom currency symbols

- In design view of the created table
- Choose the data type of the desired field to “CURRENCY”
- In the Field properties insert the following format: “Shs”# (Just to set currency to Shs), OR “Shs”#,##0 (To set currency to Shs and also separate thousands).

Calculated fields in tables

- Open the table in Data sheet view
- Scroll horizontally to the right most column(Add column)
- Click to add column heading
- Select “Calculated” as the data type
- Select the Data type to be output
- Build the Expression e.g. [Quantity]*[Unit price]

Or [Unit price]*20/100

Calculated fields in forms

- Select the “Fields” tab, locate the “Add & Delete group” and click the “More Fields” drop down command
- Hover your mouse over “Calculated Field” and select the desired data type e.g. Number or Currency.
- Build the expression

Calculated fields in forms

Contd

- If you are building an Access form based on a query and notice you will need to add a calculated field, you don't need to redesign your query — just add the calculated field to your form. For example, say you are creating a form based on the Orders query, which consists of fields from the Orders and Order Details tables. You notice the query does not have a calculated field for the Total Purchase Price ($\text{Quantity} * \text{UnitPrice}$), which you want to appear on your form. Follow these steps to add a field for this calculation:

Procedure

- Open the form based on the Orders query in Design Mode.
- Click the text box tool in the Database Toolbox.
- Click and drag in the form where you want to display the calculated field.
- Click and drag to select the Text Box Label and enter *Total Purchase Price*.
- Right-click the Unbound text box.
- Click Properties.
- Under the Data tab, click in the Control Source text box and enter the following formula:
`=If(IsNull([Quantity]*[UnitPrice]),0,([Quantity]*[UnitPrice]))`

Calculated field to give age

- In Table:

Age:(Now()-[Date of Birth])/365-25

- In Query:

- DateDiff("yyyy",[DOB],Date())
- Or Year(Now())-year([DOB])