22CSIS01P

Introduction to Information Systems

Lab (1)

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An Information system is an integrated set of components for collecting, storing, and processing data and for delivering information. In other words it is a combination of information technology and data information that support management and decision making.

As such we need to define the main component of such systems which is Data and the most important product that such systems produce which is Information.

Data is defined as any reliable raw materials that are collected through different ways based on observations and / or records.

Information is the result of processing data and can be further used to make informed decisions in a number of applications.

In order for an information system to function properly; all the gathered observations (namely data) need to be structured and stored so as to be easily processed for further use. As such, a database is created in order to logically connect all the data together.

Main Components of a database are:

➢ Tables
➢ Attributes (Fields)

In order to create a simple database for this module, we will be using Access which is provided by the Microsoft Office Suite. Microsoft Office is an office suite of desktop applications, servers and services. It includes Word for documents, Excel for spreadsheets, PowerPoint for presentations, Access for databases and much more. Microsoft Access is one of the simple tools that can be used to create a complete information system.

Example 1:

Domain of interest:

➤   University **Tables**:

Definition: Tables are main concepts that interact with each other in a specific domain of interest. Think of a table as anything that can be described with more details. For example:

➤   Student

➤   Course

➤   Teacher

➤   Department

Attributes:

Definition: They are considered the further details or rather description of a particular table. For example the attributes of the Student table include:

➤   Student_id

➤   Student_name

➤   Student_address

➤   Student_phone_number

Example 2:
Domain of interest:

➤   Electronics store **Tables**:

➤   Product

➤   Customer

➤   Branch

Attributes: (to be determined by students)

Example 3:

Domain of interest:

➢   Hospital **Tables**:

➢   Table name 1

➢   Table name 2

➢   Table name 3 **Attributes**:

➢   Table 1 attributes:

o   Attribute 1 o

Attribute 2 ➢ Table

2 attributes:

o   Attribute 1 o

Attribute 2

Working with Access

A **Database** is a data structure that stores organized information so that it can be easily accessed, managed and updated.

A Database is made of **Tables** and these tables are made of different **Data Types** to form **Table Rows** and **Table Columns**.

Tables are the heart of any database because they represent the main components of the database. Each table organizes the information regarding a single topic (domain or interest or database name) into rows and columns.

Table Columns each table column is an attribute that describes the database component. There should be at least 5 columns per table in order to properly describe the component.

Table Rows each table row represents data which is known as a record.

Data Types there can be different types of data in a table including numeric, text, Date ….. etc.

Tables look like the cells of a spreadsheet with columns and rows.

In the **Student Table** example Table above, there are **Four Attributes** containing data about Students, which are; Student ID, Student First Name, Student Last Name and Date of Birth. Below the Field / Attribute headings, there are **Three Records** containing data for each Student.

Tables in Access Database

Each Database consists of a group of tables that are related/ connected together. The tables in Access have the same structures of simple tables, which consist of normal Columns and Rows as explained above.

When planning a database table, most database designers will decide which column headings or **Attributes** they are going to use. This is the basis of the table structure. The actual **data** for the table **Records** is added later and is not a part of the design process.

To be able to create an **Access Table**, you should create an **Access Database** first which will contain the tables.

A. Create an Access 2013 Database:

The first step in creating an Access 2013 database is to create a **blank database** file. This is done From the Getting Started Screen when you launch Access. The file is saved into one of your

PCs folders (which you specify). The procedure for doing this is outlined below.

1. <u>Launch Access</u>

To begin, launch Access by clicking on the desktop icon, or choose Access from the start menu. This brings up the GETTING STARTED WITH MICROSOFT OFFICE ACCESS screen.
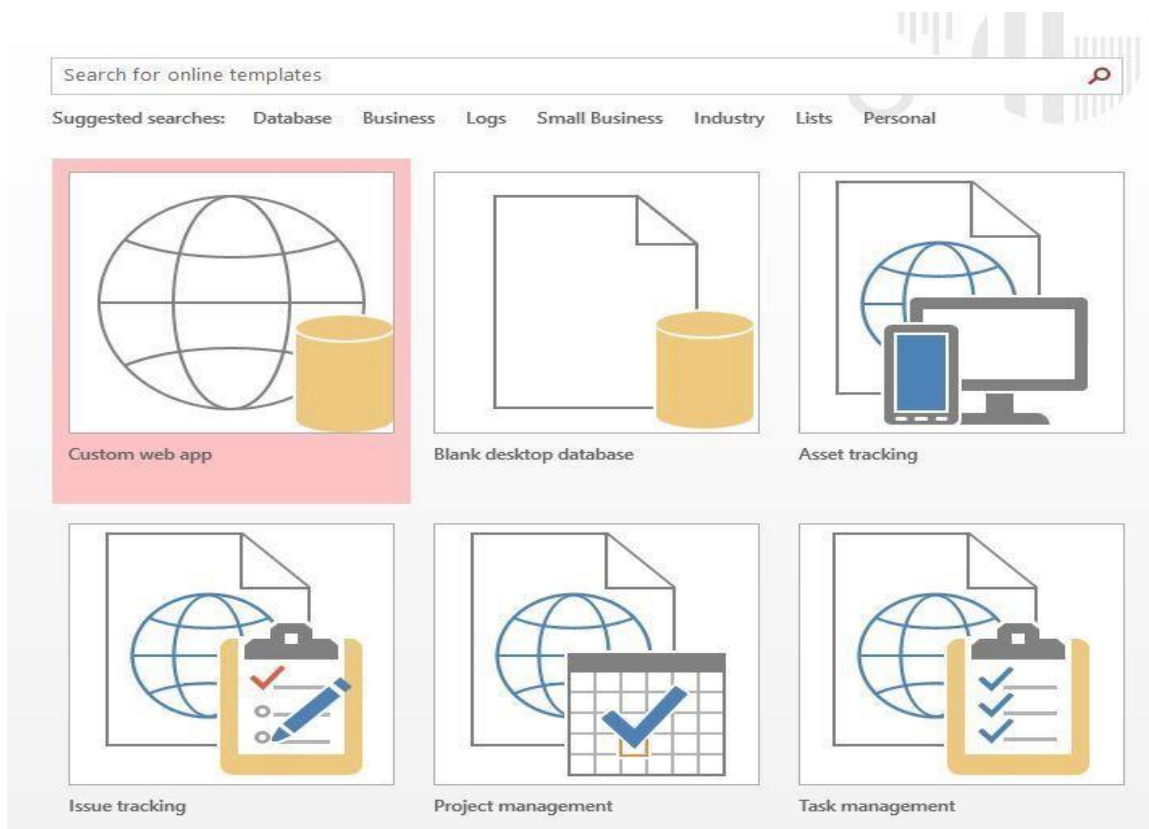
2. <u>Select Blank Database Template</u>

Towards the top left of the screen you will see a "**Blank Database**" icon. Click this icon to bring up the Blank Database pop up window. This is where you will enter details about the database file that you are about to create
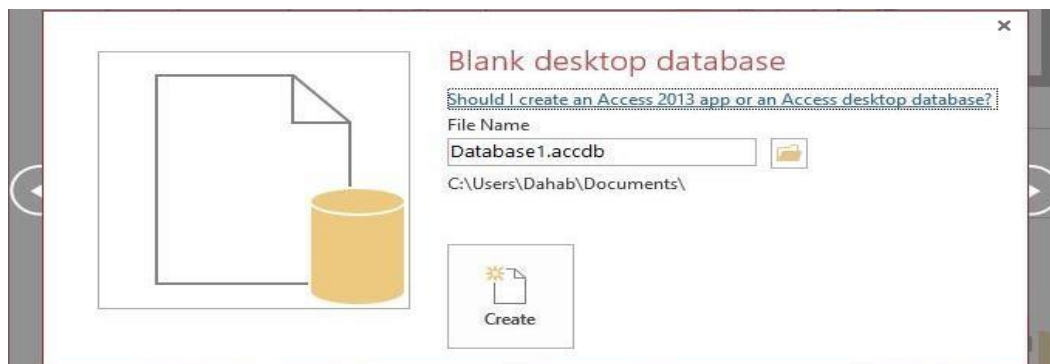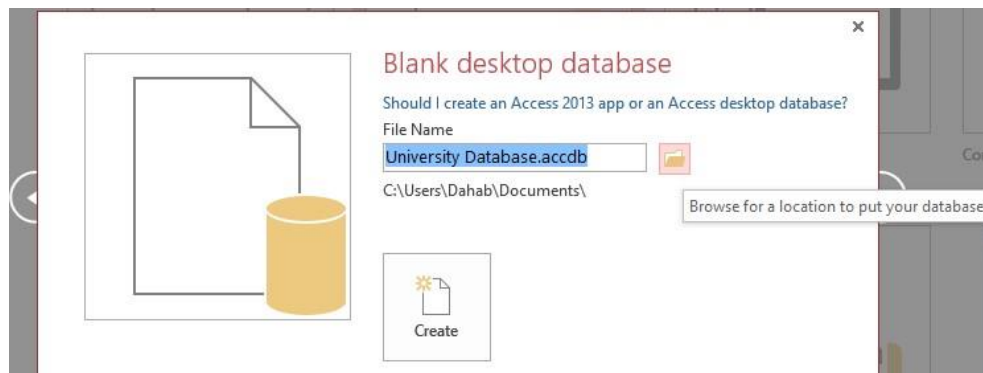
3. <u>Create a name for your database</u>

Begin by entering a name for your database under file name text box, for example, University Database.

4. <u>Browse and select the folder where you want to save the file</u>

Next, click the folder icon and browse for a folder to put your database. Once selected you should see the file path below the textbox.

5. <u>Click Create</u>

All you need to do now is click the "Create" command button below, and your database file saves to the location that you specified, and opens for you to work on.

You are now ready to work on your newly created database file.

The next step is to create an **Access Table**

B. Create a Table in Access:

1. <u>Open database file</u>

If you created a blank Access database, you are now ready to create a new table. Begin by opening your existing database file, if it is not already open (this can be done by clicking on the Access icon). You should see the file name that you created on the top bar (if you can't see it, click the folder icon to browse for the file then click on the file name to bring up your database)

> If at that stage you get a security warning underneath the ribbon, click where it says
> **Options**, select **"Enable this content"** radio button in the pop up window then click ok.
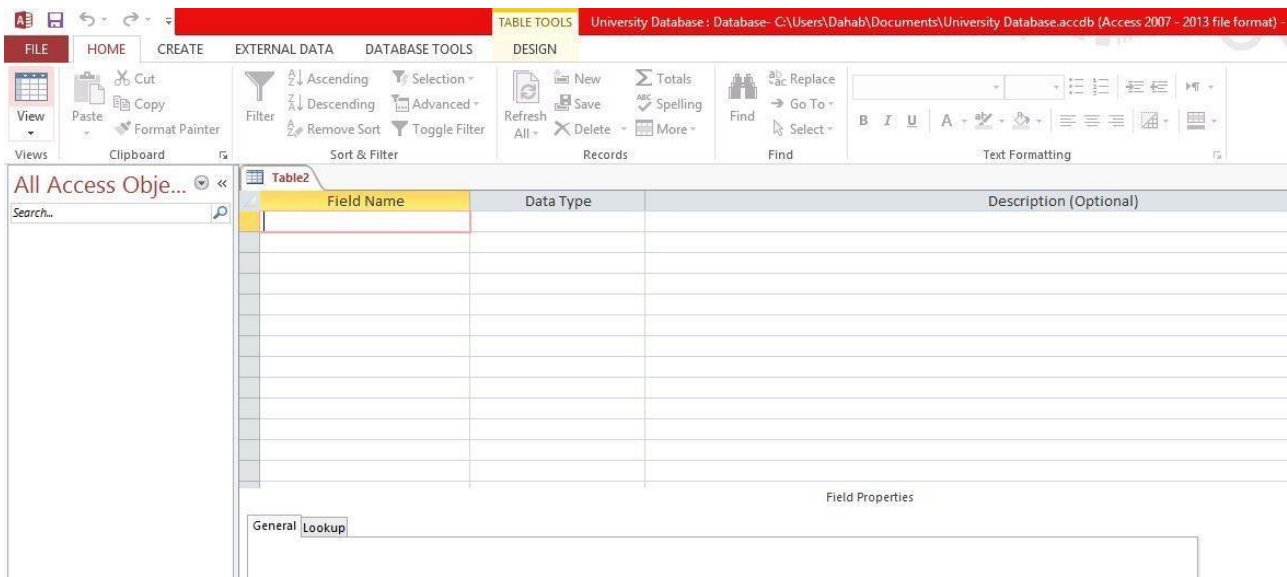> Your database file should now by <u>fully open</u>.

Database
Name
Name
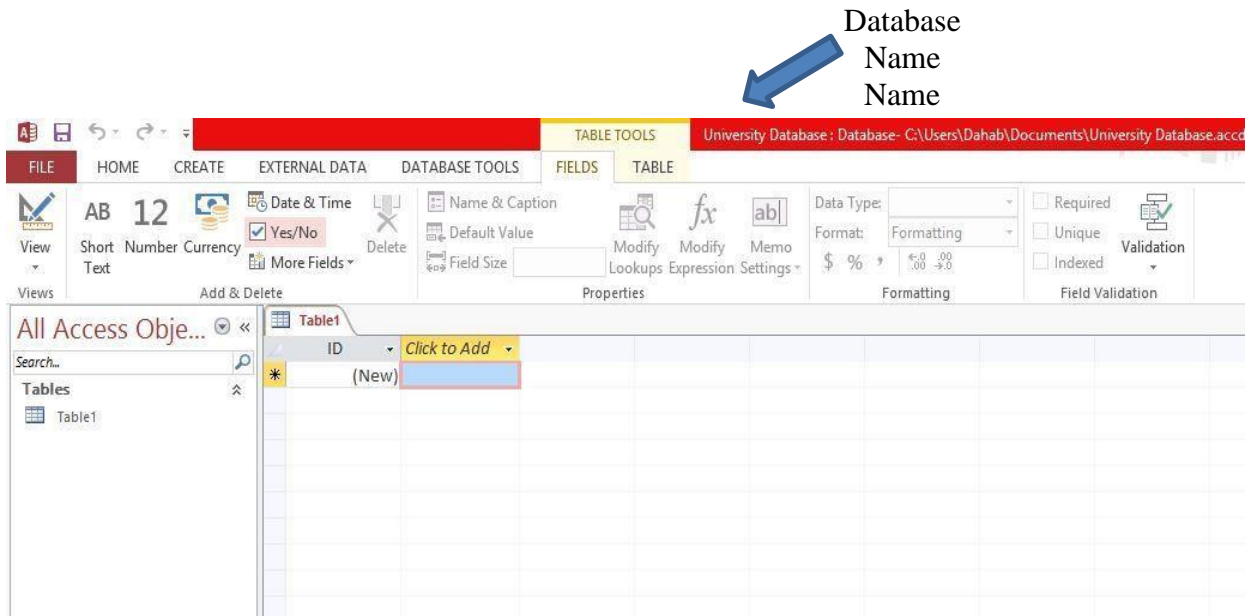
2. **Create Table**

Select the **Create** tab on the Access ribbon. Next, select the **Table Design** icon from the **Tables** group. This creates a new table.
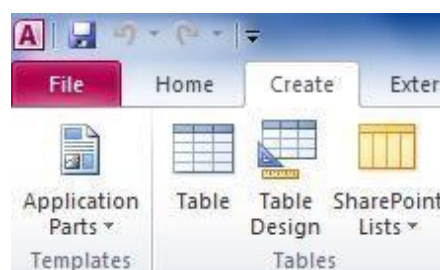
When selecting **Table Design**, the following window will appear


3. Creating fields in Design View

This brings up the **Table Design Grid** where you enter each **Field / Attribute** name and its **Data Type**. The first field we are going to create is the **ID field**, which is the "StudentID". This field will contain a **unique reference number** for each record.
Enter the name "**StudentID**" into the first column of the first row in the grid.

Since we want Access to automatically generate a unique reference number every time a new record is added, select **AutoNumber** from the drop down list in the **Data Type** column.
A description can also be added to describe each field but this is not necessary at this point.
The rest of the attributes with their data types are going to be filled as follows:
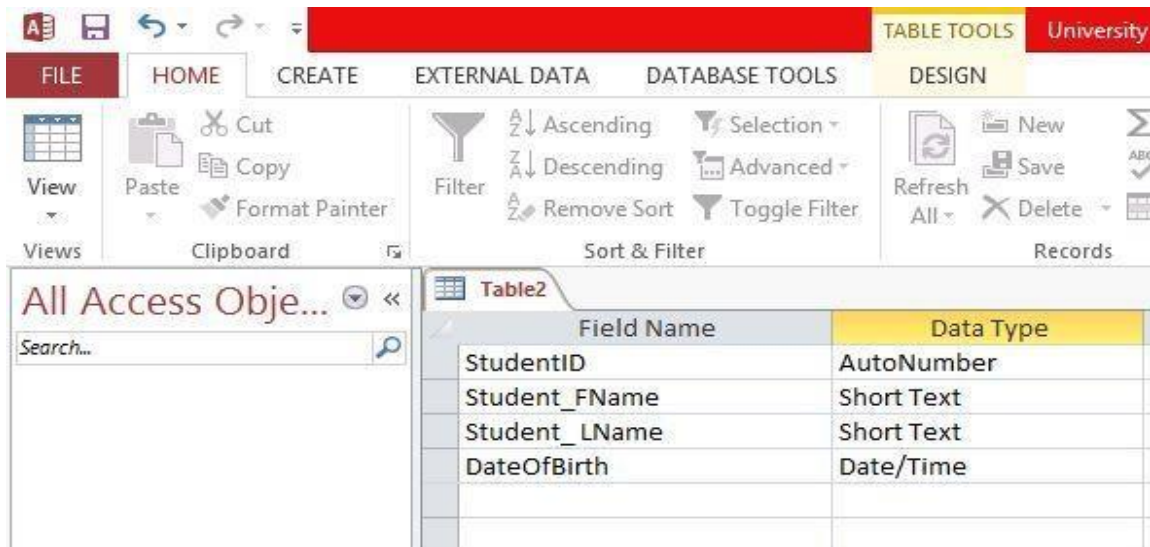
Before you save the table, you will need to choose the **Primary Key** (the unique reference number); in this case, it is the **StudentID**. To do so, either right click on the row and select **"Primary Key"** or simply select the row and choose the primary key icon from the ribbon.
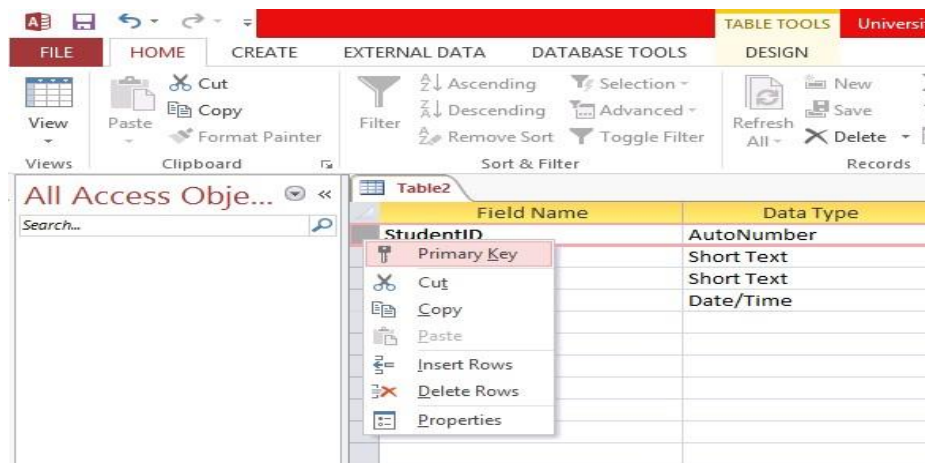

Note that the symbol of the key should now appear next to **StudentID**

You can now save the table by clicking the **save icon** on the top left of the screen above the Access Ribbon. Then assign a name to your table, in this example, we'll call it **Student**. Then press **OK**.
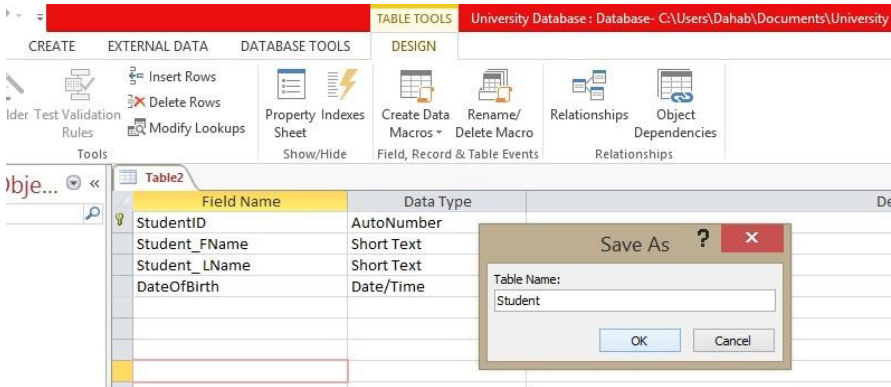
4. Viewing tables in Access

To view your table, select **Datasheet View** under **Views** icon which is found under the **Design Tab**. This shows the table in the form of rows and columns and this is where your entered data will appear.
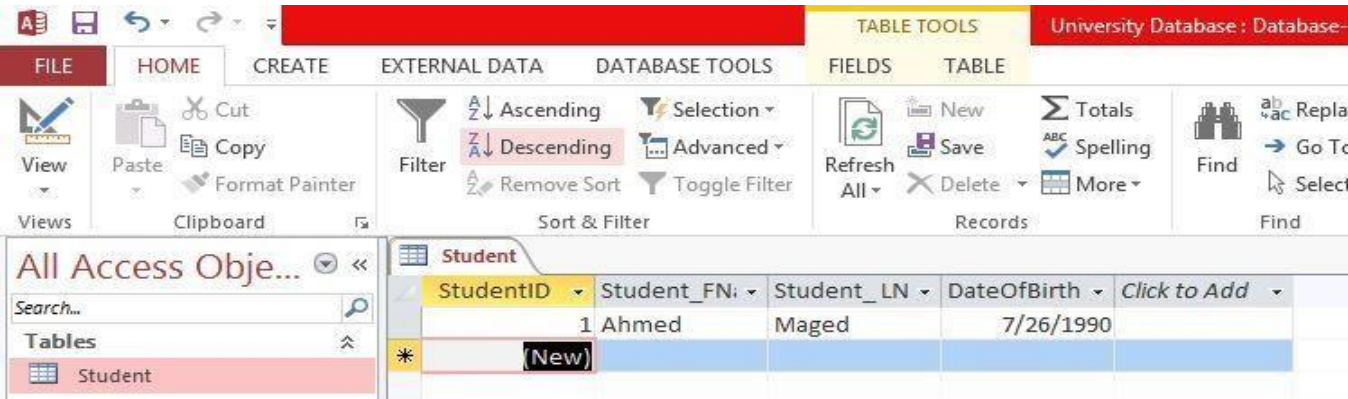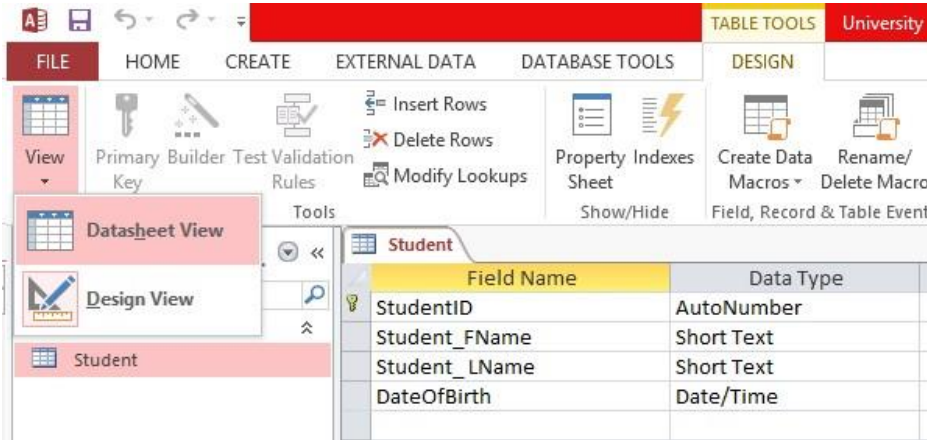
5. Data entry in Datasheet View

To test the table, the first record has been entered where **Student_ FName** is *Ahmed*, **Student_LName** is *Maged* and **DateOfBirth** is *26/07/1990* as shown in the table above.

➢ Notice how the **Student_ID** was not added manually due to automatic incrementalism as a result of **Data Type: AutoNumber**.

➢ At the end there is a column with the heading **"Click to add"**, this is used when you need to add more fields or attributes to your table.

Do It Yourself

Create the following tables on Access and make sure that you correctly set the primary key and the data types. You then need to add 4 records per table (you would have 12 records in the entire database)

1. Course
2. Staff_member
3. Department