

## Skill Set 2

# Creating a Database

By the end of this Skill Set you should be able to:

Design and Create a Working Database

Design and Create Database Tables

Use Data Types

Use Field Properties

Understand Primary Keys

Save Tables

## Exercise 10 - Table Design

### Knowledge:

Before creating a new database it is important that all tables to be used are designed to meet the requirements.

**Tables** are the basic components of databases, they are the only object to contain actual data. Every database must contain at least one table. Other objects such as **Queries, Reports, and Forms** are ultimately based on the tables. It is important to take care over the design of these tables.

A **Table** is defined as a number of connected **Fields**, where each field has a **Field Name**, a **Field Type** and can be further defined by several other **Properties**. **Field Types** and **Properties** are described in detail in later exercises. Examine the sample table shown below.

<b>Employee</b>	<b>Date of Birth</b>	<b>Department</b>	<b>Salary</b>
Ron Grimes	27/03/77	Packing	£15000
Shona Piquet	03/12/90	Finance	£13500
Tariq Hassan	15/06/84	Research	£18000

The table is made up of four fields.

- The **Employee** and **Department** fields are defined as **Text** fields and will accept any characters.
- **Date of Birth** is a **Date** field and will only accept valid dates, then display them in the appropriate date format.
- **Salary** is a **Currency** field that will only accept numeric values and then display them with a predefined currency symbol.

There are currently three records shown in this table, representing 3 employees. More records can be easily added and would not change the design of the table.

The fields that you include in your table determine what you can get out of it. For example, the table above would allow you to analyse salary by department, but not salary by job grade or look at length of service because job grade data and start dates have not been included.

It is important to use appropriate **Data Types**:

- **Text fields** are fields which can contain any characters. Numbers in text fields cannot be used in calculations.
- **Numeric fields** are usually fields such as values and amounts that you might want to use in a calculation.

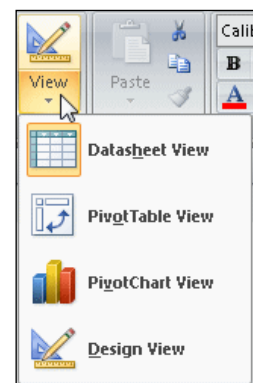
## Exercise 10 - Continued

- **Currency** fields are numeric fields that Access adds formatting to, such as currency symbols.
- **Date** fields will only accept valid dates.

Try to think ahead when allocating field types. An item code may consist of all numbers, but you are unlikely to want to do calculations with it, but one day you might want to add characters, e.g. **87654321A**, better to make it **Text**.

### Activity:

1. Start Access and open the database **Estate Agent**.
2. Open the **Premises** table.
3. Click the drop down arrow at the bottom of the **View** button in the left of the **Ribbon** to see the available views of a table. Only **Design View** and **Datasheet View** will be needed in this course.
4. Click **Design View** from the list of views (this is also the current setting for the main **View** button).
5. The table is now displayed in **Design View** showing the names of the fields, and the types of data.



Premises	
Field Name	Data Type
Property	Text
Address	Text
Town/City	Text
Type	Text
Price	Currency
Floor Area	Number
Offers	Currency
Date Added	Date/Time

**Note:** The actual data itself is not shown in this view.

**Note:** The **Field Names** are the same as the **Column Headings** seen in **Datasheet View**.

6. Look at the different **Data Types** used in this database.
7. Close the table and the database.

## Exercise 11 - Creating a Blank Database

### Knowledge:

When a database is first created, it is given its own unique name, and then immediately saved, before any further work is done. The saved database at this stage will contain no objects (tables, queries, etc.) and no data.

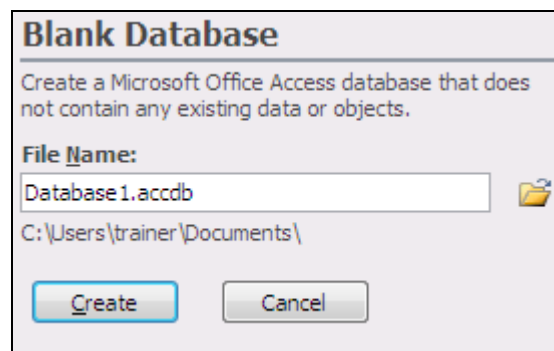
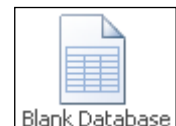
After creating the empty database, the next step is to design and create at least one table. Once a table has been created, it becomes possible to start entering data and to create other objects which may be required.

The following exercises demonstrate how to create a database from scratch, starting with the database itself, then a table within the database and finally the entry of data records.

The example task will be set in a sports centre. They need a simple single table database to keep track of all the courses they are running. The database will be called **sports**.

### Activity:

1. With Access open, click the **Blank Database** icon on the **Getting Started** window. The **Blank Database** area is displayed on the right.

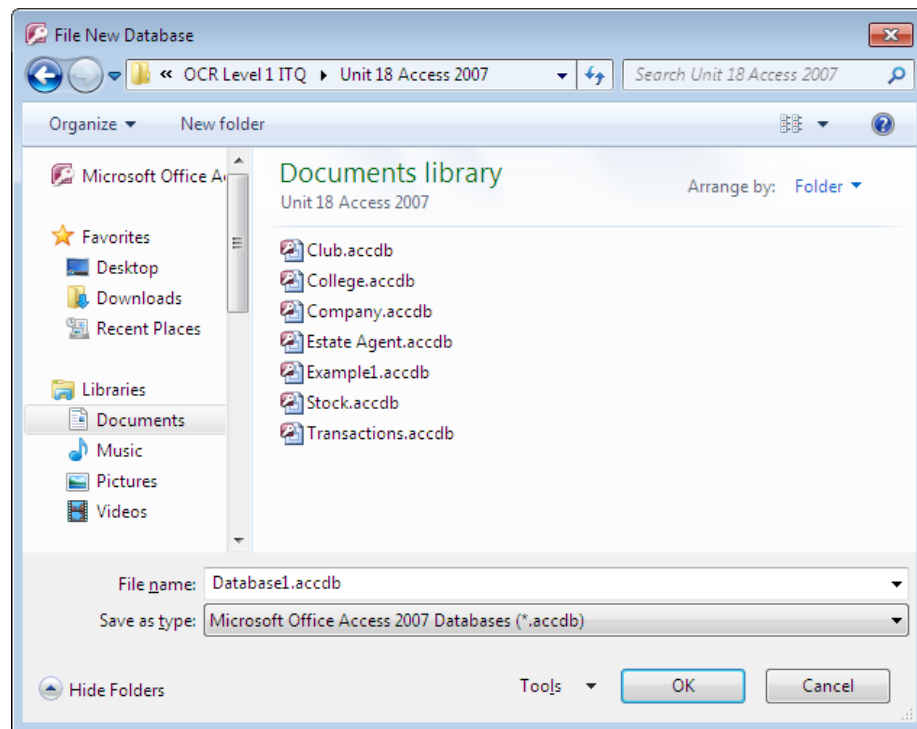


2. Click the **Browse** button, , to display the **File New Database** dialog box. Use this to locate the folder where the database is to be stored. For this exercise, the supplied data folder will be used.

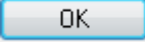
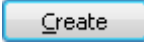
**Note:** The default location for created databases is the **Documents** library/folder. If the data files for this guide have been downloaded according to the instructions given on page 3, a **Data Files** folder will be present.

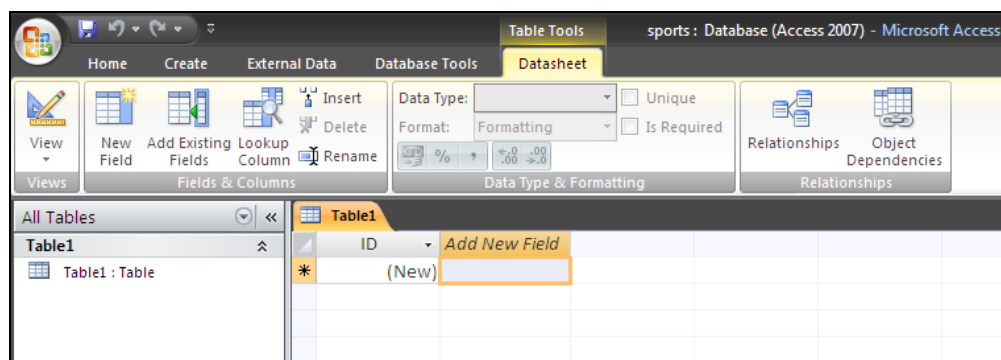
3. Double click on **DATA FILES** in the view area displayed on the right, then **OCR Level 1 ITQ**, and finally **Unit 18 Access 2007**.

## Exercise 11 - Continued



**Note:** Depending on the version of Windows that you are using, the dialog box you see may appear slightly different to that shown above.

- A default workbook name (**Database#**) is displayed in the **File name** box. Click on the name to highlight it, then type **sports** to overwrite it (file extensions are added automatically) then click .
- Click  in the **Getting Started** window. The new database is created and is displayed with the database name in the **Title Bar** at the top of the window. A new default table is opened ready to be defined.



- In order to demonstrate the general method of creating tables, close the default table, by right clicking on the **Table1** tab, and selecting **Close** from the shortcut menu.
- Leave the **sports** database open for the next exercise.

## Exercise 12 - Creating a Table

### Knowledge:

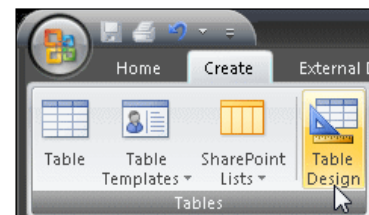
**Tables** can easily be created in **Design View**.

Before creating the database table, it is necessary to consider what fields will be needed for the task of recording the schedules.

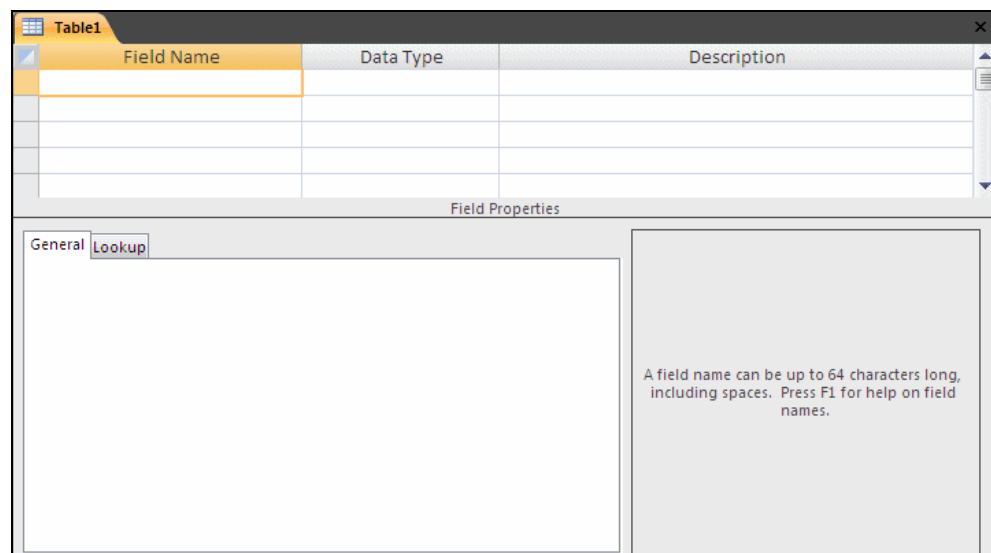
The name of the course, the location, the tutor, where and when it is being held, and the start date would seem to be relevant. To avoid confusion with course titles, a unique course code would also be useful. Looking ahead, the cost of the course may be useful if the database were to be expanded.

### Activity:

1. Make sure the **sports** database is open. Display the **Create** tab and click the **Table Design** button. A new table appears in the work area in **Design View**, which allows the structure of the table to be defined.



2. Notice that the window is divided into two areas. The upper half of the **Design View** screen allows fields for the table to be defined. The lower half has panels to specify more detailed properties of each field, as well as some explanatory text, specific to the property being defined.

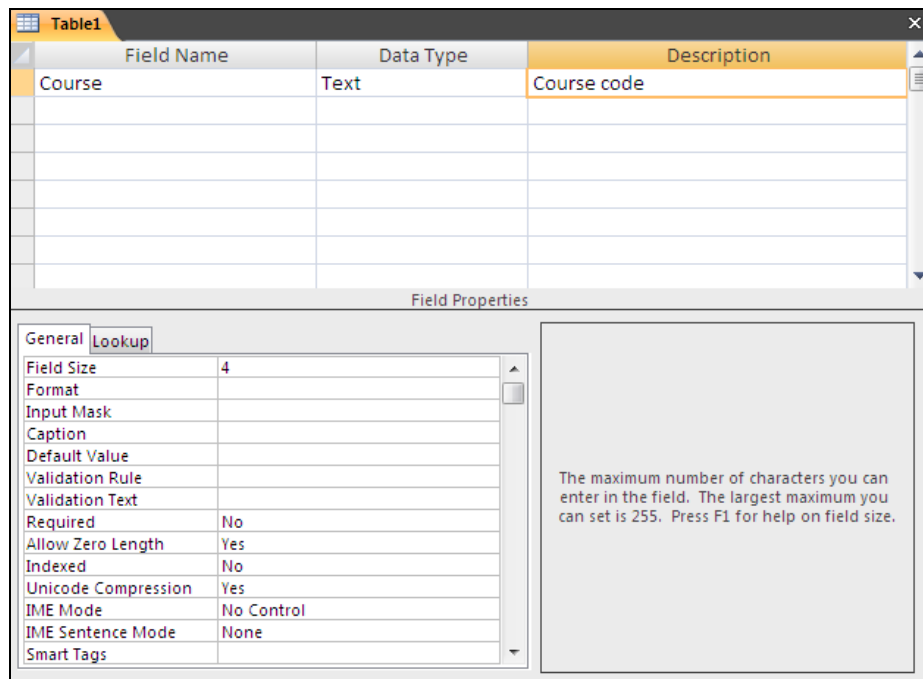


**Note:** If a Property Sheet panel is shown at the right of the screen, click the **Property Sheet** button on the **Design** tab of the **Ribbon** to remove it.

3. In the first **Field Name** row, enter **Course** as the name of this field.
4. Press <Tab> to move to the **Data Type** column. The default setting of **Text** is correct for this field so press <Tab> again.

## Exercise 12 - Continued

- The cursor is now in the **Description** column; this column is optional. Enter **Course code** into this column.
- In the **Field Properties** section in the lower half of the window, notice that the default **Field Size** for a text field is 255 characters. The design of the course code only requires 4 characters, so double click on 255 to select it and type 4. Now up to four characters only will be accepted by this field.



- Click in the **Field Name** for the second row to start the next field.
- Enter four more fields with **Field Names** of **Title**, **Tutor**, **Location**, and **Day**. Enter each **Data Type** as **Text** and use the **Descriptions** as shown below. Leave all **Field Sizes** as the default 255 characters. Press <Tab> to complete each entry and move to the next line.

**Note:** Some words (called reserved words) such as **Date** and **Name**, have a special meaning for Access and should not be used as field names.

Field Name	Data Type	Description
Course	Text	Course code
Title	Text	Course title
Tutor	Text	Course tutor
Location	Text	Course location
Day	Text	Day of the week

- Leave the table open in this view for the next exercise.

## Exercise 13 - Using Data Types

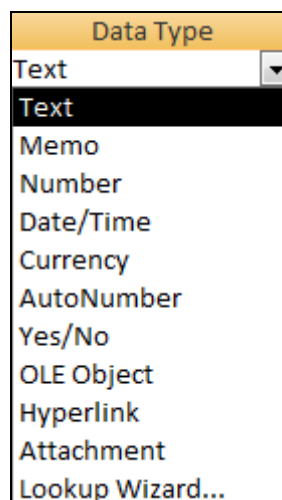
### Knowledge:

Each field in a table must have a **Data Type** defined. There are many different **Data Types** but the only ones relevant at this level are **Text**, **Number**, **Currency** and **Date/Time**.

Correct setting of **Data Type** helps to maintain the accuracy and consistency of this data field throughout the system (data integrity) as it can restrict the data that will be allowed. For example a **Date** field will only accept valid dates as entry, and text characters will not be allowed in a **Number** or **Currency** field.

### Activity:

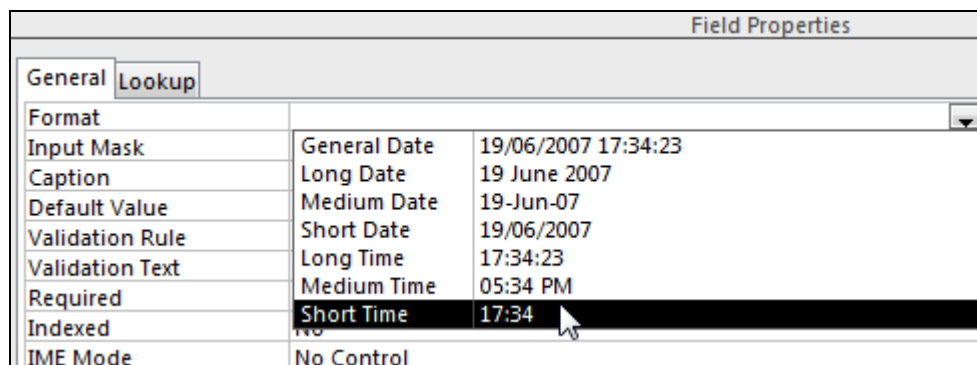
1. The database **sports** should still be on screen from the previous exercise with the new table open in **Design View**.
2. In the first *blank* row of the table, enter a **Field Name** of **Cost**, then press **<Tab>**.
3. Click on the drop down list in the **Data Type** field to see the options available.



4. Select **Currency** then press **<Tab>** to move into the **Description** column and type **Cost per session** then press **<Tab>** again.
5. Enter **Time** as the next field name and press **<Tab>**.
6. Select **Date/Time** as the **Data Type**. Enter **Starting time** as the description.
7. This field can have more formatting applied. Click on **Format** in the **Field Properties** section and click the arrow at the right edge of the field to display the drop down list.
8. Look at the available formats in the list then select **Short Time**. This defines how the field will be displayed. It will be displayed with the format **09:30**.



## Exercise 13 - Continued



9. Add another field with a **Field Name** of **Start Date**, a **Data Type** of **Date/Time** and a **Description** of **First session date**.
10. Set the **Format** property in **Field Properties** to **Short Date**. This means the date will be displayed with the format **21/09/2010**.
11. The table should now look like this:

Field Name	Data Type	Description
Course	Text	Course code
Title	Text	Course title
Tutor	Text	Course tutor
Location	Text	Course location
Day	Text	Day of the week
Cost	Currency	Cost per session
Time	Date/Time	Starting time
Start Date	Date/Time	First session date

12. Leave the table displayed for the next exercise.

## Exercise 14 - Saving Tables

### Knowledge:

A table, like any other database object, must be saved after it has been created so that it will exist within the database.

Access will prompt you if there is no primary key when a new table is saved.

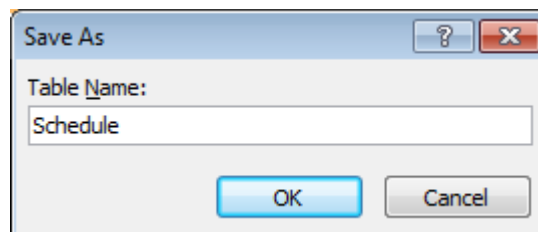
### Activity:

1. The database **sports** should still be on screen from the previous exercise with the new table open in **Design View**.
2. Save the table by clicking on the **Save** button on the **Quick Access Toolbar**.



**Note:** An alternative method of saving is to right click on the **Table1** tab and select **Save**.

3. As the table has not been saved yet, the **Save As** dialog box is displayed. Enter the **Table Name** as **Schedule**.



4. Click **OK**.
5. You will be prompted to create a new field in the table to use as a primary key. Primary keys will be created and explained in the next exercise, so at present there is no need to create a new field. Click **No**. The table is saved without any extra fields added.
6. Notice the object tab for the new table now displays **Schedule**. Leave the table open in **Design View** for the next exercise.

## Exercise 15 - Primary Keys

### Knowledge:

Many tables have one field defined as a **Primary Key**. This is a special field which uniquely identifies each individual record in a table. This is often a field such as a serial or ID number.

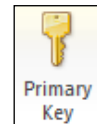
A **Primary Key** field is automatically **Indexed**, that is, records will be displayed in order of this field, whenever they are entered. A **Primary Key** field must be unique (cannot contain any duplicate values), and must be entered on every record.

For a table of motor vehicles, registration number would be a good choice as primary key because this is always unique. Some tables, however, do not have a suitable field. For example, in a table of customer records, customer names or post codes may not be unique. In this case, a new field can be defined, such as customer number, and a unique value of this field can be assigned to every record.

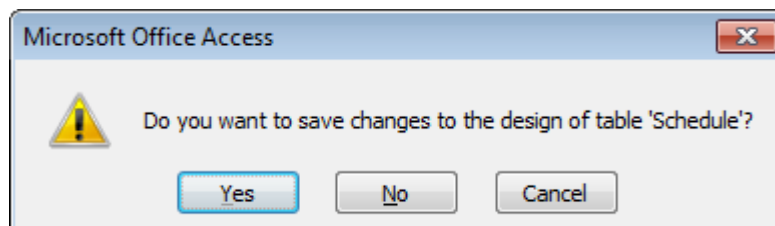
**Note:** *Primary Keys are useful in a single table database to help maintain data integrity, but they are essential for linking tables in a multi-table database.*

### Activity:

1. The **Schedule** table in the **sports** database should be open in **Design View** from the previous exercise. This table already has a course code field which is a good choice for a **Primary Key**, (unique and required for every record).
2. Click anywhere in the **Course** field.
3. Click the **Primary Key** button in the **Tools** group of the **Design** tab. The **Course** field is now defined as the **Primary Key**, which is indicated by a small icon next to the field.



4. Close the **Schedule** table by right clicking the object tab and selecting **Close** from that menu, or by clicking the close button, **X**, on the right of the **Object Area**. As the design of the table has changed since it was last saved, a warning message will be displayed.



5. Click **Yes** to save the latest version of the table then close the **sports** database.

## Exercise 16 - Develop Your Skills

You will find a *Develop Your Skills* exercise at the end of each Skill Set. Work through it to ensure you've understood the previous exercises.

1. Create a new database named **builder** to record details for goods received by a building supplies company.
2. Create a new table in **Design View**. Do not save it until all the fields are defined.
3. Add seven fields to the design using the information below to define **Field Names**, **Data Type** and **Field Properties** settings (add relevant descriptions if you wish).

Receipt Number	This will be 4 text characters- 0001, 0002 etc
Item	Text description of item, 30 characters
Details	Text details, 50 characters
Received	Date/Time field (short date)- Date received
Quantity	Number field (integer)- Quantity of item received
Cost	Currency field - Cost per unit of the item
Location	3 character text

4. Make the **Receipt Number** field the **Primary Key** for the table.
5. Save the table as **Goods Received**.
6. Close the database. This database will be used again in the **Develop your Skills** exercise for the next section.

**Note:** The answers are listed in the **Answers** section at the end of the guide.

## Summary: Creating a Database

The skills in this Skill Set are concerned with the creation of databases and tables, and with the types of data that are held within a database. You have seen how data is structured in a table, how to create a new database, and how to design, build and save a simple table.

You will also have learned how to define the data stored in a database table by setting field characteristics such as name and type, and how fields can be further defined by field properties such as size and formatting.

The importance of defining a primary key for a table is also covered.

Your OCR ITQ evidence must demonstrate your ability to:

- Create a database table for a purpose using specified fields:
  - Know the purpose of your database and what fields are required in your table to meet this purpose.
  - Use appropriate names and properties for tables and fields.
- Understand structured data:
  - Tables, fields and records
- Understand field characteristics:
  - Data type
  - Field name
  - Field size
  - Format
  - Primary key