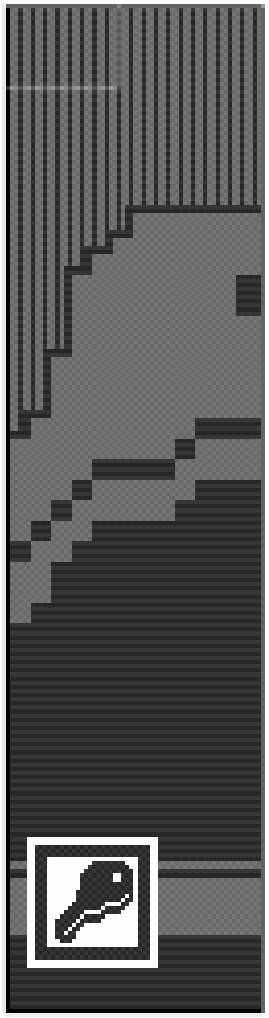
Queen Mary
University of London

Computing Services

# Introduction to Access



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# Contents

# Introduction

A Microsoft Access database contains tables, queries, forms, reports, macros and modules. This course deals with the first four types of *object*.

**Tables** contain the data. The data could be about the students in a college, the books in a bookshop, the goods in a supermarket. Each different individual will have a *record* in the table. Each record contains *fields*. For example, a student record would include a name field, an address field, a course field.

**Queries** ask questions about records in tables and also make overall changes to records in tables.

**Forms** can be designed so that database users can enter and change information using an easy-to-understand layout.

**Reports** can be produced which organise and summarise information from the database.

**Macros** allow you to group Access commands and attach them to events.

**Modules** allow users to program more complex database functions.

Like other Windows applications, Access has a number of ways of doing any one thing. The on-line help for Access is comprehensive and includes many useful examples.

> ***Exercise 1***
>
> Follow the procedure below to launch Access and start a new database named School in the folder *My Documents*

## Starting Access and creating a new database

i) Launch Access. Amongst other choices, you can choose to start a new blank database, or open an existing database. For now, you will be going through the process of creating a database from scratch starting with a blank database.

ii) If the **task pane** or dialog box is not showing, **File☞New Database**

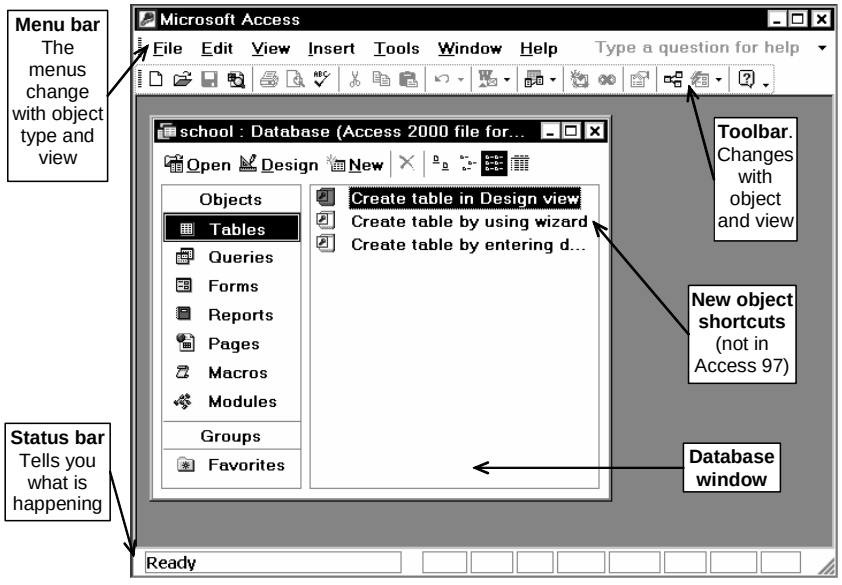
iii) Click **Blank Database** (Access 2000: **Blank Access database** and click **OK**; Access 97: **Blank database** and click **OK**) to display the **File New Database** dialog box.

iv) Type the file name into the **File name** box

v) If necessary move to the drive and folder where you want to keep the file

vi) Click **Create** and the Database window will be displayed

## The Access window




Access 97 has neither Page objects nor the Groups section. Also, the Objects list is arranged horizontally

The Database window is the starting point for most of the work that you will do in setting up and interrogating a database.

## Setting up a table

### Designing a new table

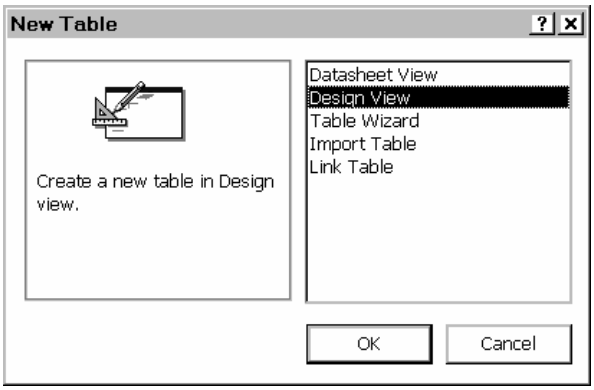
***Exercise 2***

This is the first stage in setting up a database for a language school. Follow the steps below to design a table which contains the following fields in the order shown:

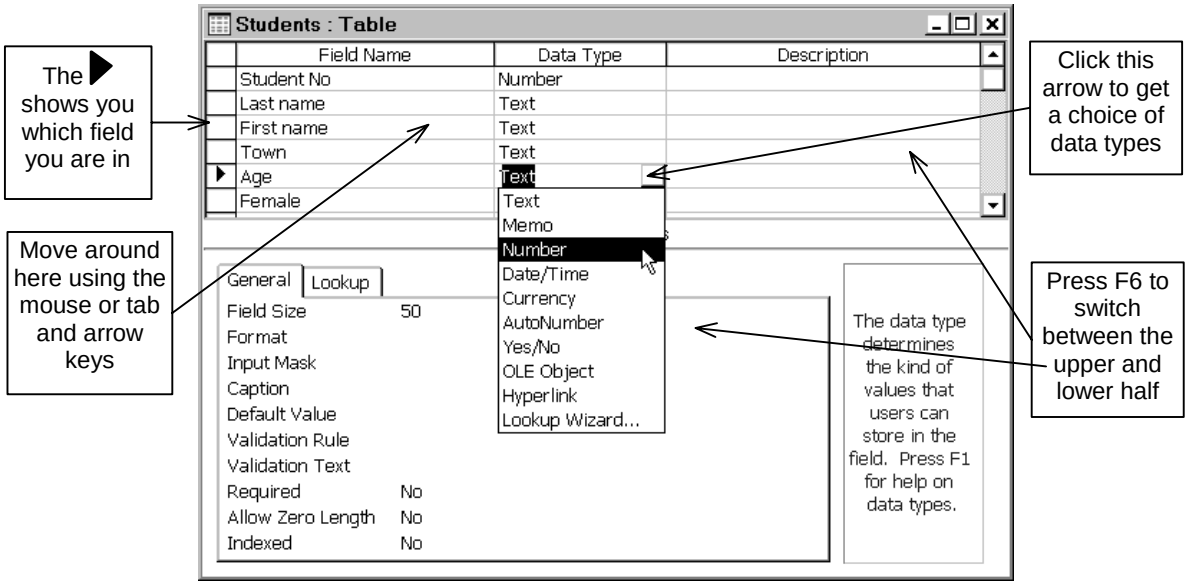
Student No  Last name  First name  Town  Age  Female  Subject1  Subject2  Start date

Make sure that you choose the appropriate data type for each field. If you would prefer not to decide these yourself at this point, read the Hint on page **24**

i) In the Database window, click Tables then click New to display the **New Table** dialog box, shown on the right




ii) Select **Design View** and click **OK** to display a Table design form in the upper pane of a new window, shown below




The lower part of the new window is the Field Properties pane. This way of looking at a table is called ***Design view***. Each row in the table design form corresponds to a field in the database record.

iii) For each field that you want in the database record, do the following:

- Type the name in the **Field Name** cell then press the tab key, ⇆, to go to the **Data Type** cell
- Click ▾ and choose the correct data type from the list. More information on data types is on page 25
- Once you have chosen a data type, press F6 and make any other selections or changes required in the field properties. Press F6 to get back to the upper pane
- Tab to the Description cell and type in text to help when data is being entered

When you have completed a row for each field in the table, you will have designed a record. This is the first step in creating a database using Access.

## Putting data into the table

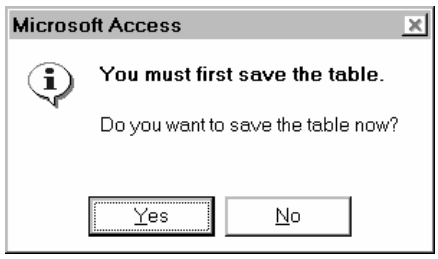
***Exercise 3***

i) Follow the steps below to prepare your table for data entry. When Access asks about saving your table, give it the name Students. Answer **No** to a primary key.

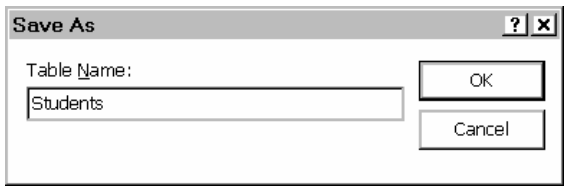
ii) Put the following data into the Students table. You will have to break down the name and address and subjects into parts to fit the table design.

| No | Name and town | Age | Female | Subjects | Start date |
|---|---|---|---|---|---|
| 1003 | Wesley Lewis, London | 32 | No | Spanish, French | 01/09/91 |
| 1100 | Jorge Perez, Oxford | 22 | No | French, Italian | 01/01/92 |
| 1109 | Sunita Ali, London | 44 | Yes | German, Spanish | 09/08/92 |
| 1193 | Lorna Downs, Reading | 52 | Yes | German | 11/02/92 |
| 1298 | Chris Betts, Oxford | 25 | No | Spanish, French | 23/02/92 |
| 1299 | Jane Williams, London | 68 | Yes | French, German | 01/11/92 |
| 1314 | Natalie Davis, Oxford | 27 | Yes | German, Italian | 01/01/92 |
| 1346 | Abdul Majid, Reading | 44 | No | French | 01/03/93 |
| 2105 | Clare Nicol, London | 17 | Yes | Spanish, Italian | 02/11/92 |

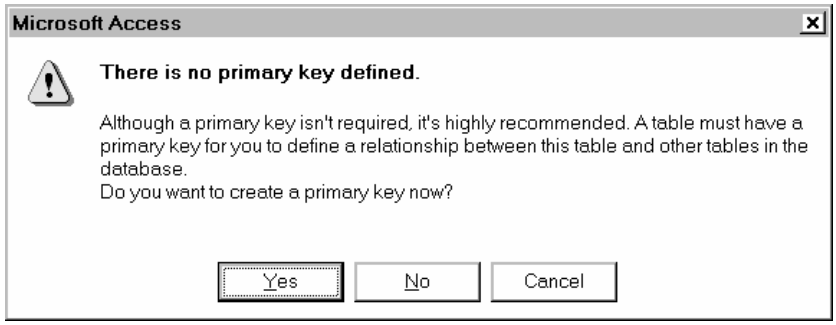
i) Click  or **View☞ Datasheet**. This dialog box is displayed:



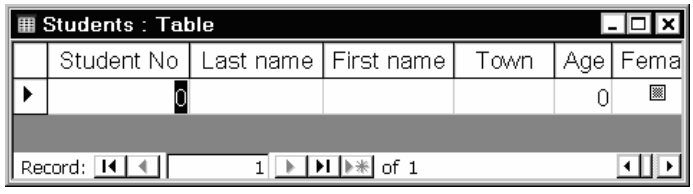

ii) Click **Yes.** The **Save As** dialog box is displayed.




iii) Type in the name you want to give the table and click **OK**. The dialog box to the right will be displayed




iv) Click **No** for now. The empty table will be displayed in ***Datasheet view***:




The first column can contain the following markers:

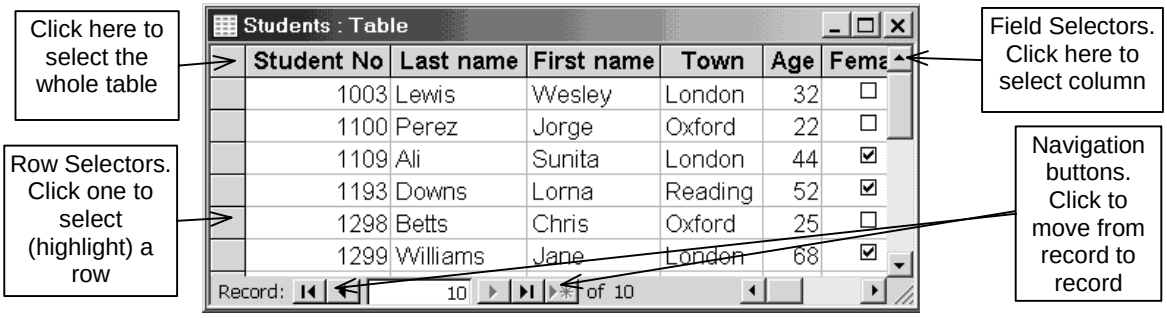
 marks the record currently being entered but not yet saved

 is the next new record marker

 marks the current record

v) Start entering records

See the next page for the table once the data is entered and for information on moving around and selecting in a table.




## Things you can do with tables

***Exercise 4***

Use the techniques below to:

i) Change the subjects being studied by Jane Williams to Italian and Spanish

ii) Add German to the subjects of Abdul Majid

iii) Chris Betts has left the school. Remove his record

iv) Close and save the Students table

v) Make a copy of the Students table and name it Copy of Students

### *Moving around a table*

You can move around a table using any of the following methods:

- Click with the mouse in the cell
- Click a navigation button
- Use the arrow keys on their own or with Ctrl pressed
- Press the tab key
- Press the Enter key to complete the current record and start a new one

### *Selecting cell contents*

| **To select** | **Do this** |
|---|---|
| Whole table | Click on the blank button at the top left of the table |
| A whole row | Move the mouse to the row selector. It changes to ➡. Click once. |
| A whole cell | Click the mouse in the cell selector. This is the area at the left of the cell where the mouse changes to ✚. |
| A word | Double-click it. |

### *Editing data*

| **To** | **Do this** |
|---|---|
| Replace a word | Select the word and type its replacement |
| Replace cell contents | Select the cell and type its replacement |
| Insert characters | Click an insertion point and type them |

### *Deleting records or parts of records*

Select what you want to delete and press the Delete key on the keyboard
Delete single characters using the Backspace or Delete key

### *Closing a table*

To close a table, click its Close box, ☒, or **File☞Close**. Changes are automatically saved.

### *Copying a table*

Do the following to make a copy of a table in case things go wrong:

i) Make sure the table is closed, then select it in the Database window

ii) **Edit☞Copy** and **Edit☞Paste**

iii) Enter a suitable name as the **Table Name** in the **Paste Table As** box

iv) Click **OK**.

## Changing the table design

***Exercise 5***

Follow the steps below to add a new last field called Amount to pay and add the following data to the students records that you have already entered:

| Student | Amount to pay | Student | Amount to pay |
|---|---|---|---|
| Wesley Lewis | £320.00 | Jane Williams | £653.00 |
| Jorge Perez | £325.00 | Natalie Davis | £221.00 |
| Sunita Ali | £432.00 | Abdul Majid | £0.00 |
| Lorna Downs | £216.00 | Clare Nicol | £39.00 |

In the Database window, select the table you want to change and click the Design button. If the table is already open in Datasheet view, click  to switch to Design view.

You can change the table design by adding and removing fields.

You can change field names and properties including data type and length. Be careful how you do this. If you make the field length shorter than the data in it, the excess will be lost. Access will tell you if this is a possibility

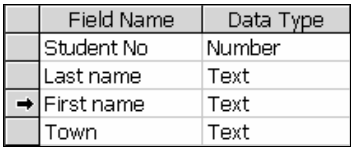
## Changing the order of fields

***Exercise 6***

Follow the steps below to move the **First name** field so that it comes just before the **Last name** field

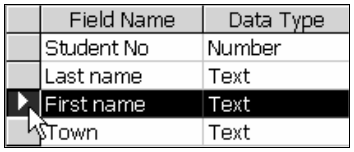
First switch to Design view, then:

1. move the mouse to the row selector, where it changes to ➡



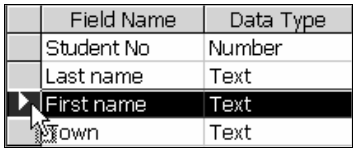
| | Field Name | Data Type |
|---|---|---|
| | Student No | Number |
| | Last name | Text |
| ➡ | First name | Text |
| | Town | Text |

2. click once. The row is selected. Mouse changes to



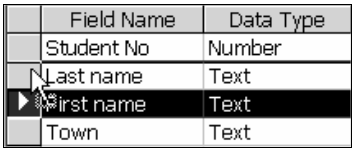
| | Field Name | Data Type |
|---|---|---|
| | Student No | Number |
| | Last name | Text |
| | First name | Text |
| | Town | Text |

3. hold down the left button The mouse changes to



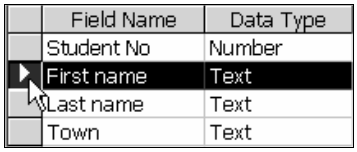
| | Field Name | Data Type |
|---|---|---|
| | Student No | Number |
| | Last name | Text |
| | First name | Text |
| | Town | Text |

4. drag so that thick black line is above the row to move before



| | Field Name | Data Type |
|---|---|---|
| | Student No | Number |
| | Last name | Text |
| | First name | Text |
| | Town | Text |

5. Release the button. The row is moved

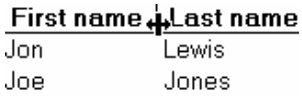


| | Field Name | Data Type |
|---|---|---|
| | Student No | Number |
| | First name | Text |
| | Last name | Text |
| | Town | Text |

## Changing the appearance of a table

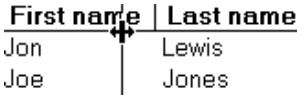
You can adjust field widths in datasheet view to get the best size for the data:

1. Place the mouse over the line between field headers



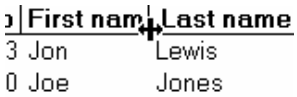
| First name | Last name |
|---|---|
| Jon | Lewis |
| Joe | Jones |

2. Drag to new position



| First name | Last name |
|---|---|
| Jon | Lewis |
| Joe | Jones |

3. Release button



| First name | Last name |
|---|---|
| Jon | Lewis |
| Joe | Jones |

You can also use selections on the **Format** menu to change the **font**, **row height** and other attributes to suit your requirements.

## Adding records to a table

In datasheet view, move to the next new record (marked ✳) and start entering new ones.

***Exercise 7***

Add the following record to the Students table:

| No | Name and address | Age | Subjects | Start date | To pay |
|---|---|---|---|---|---|
| 1441 | Helen Dennis, London | 43 | Spanish, Italian | 01/09/94 | £217 |

## Moving a table column

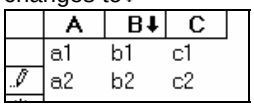
***Exercise 8***

i) Follow the steps below to move the Student No. field so that it is the last field in Datasheet view

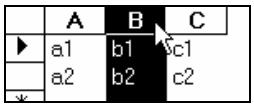
ii) Copy the table again so that you have a spare

Switch to Datasheet view if necessary. Then:

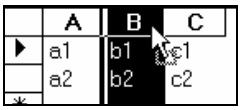
1. Move the mouse to the column selector. The mouse changes to ⬇



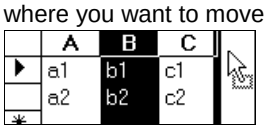

2. Click once to select the column. The mouse changes to



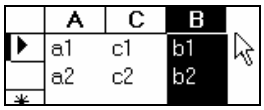

3. Hold down the left button. The mouse changes to




4. Drag until the thick black is where you want to move




5. Release the button




NOTE: Moving a column in this way does not change the order of the fields in the table itself

## Printing a table

***Exercise 9***

i) Enter your name as the last student name in the table

ii) Follow the steps below to print the table and then close it

i) With the table in Datasheet view, **File☞Print Preview** or click .

ii) Check that the layout is satisfactory. You can click the page display with to zoom in and see more detail if necessary.

iii) To change the layout, **File☞Page Setup...** to make the following adjustments:
- to change the position of text, change the margins
- to print so that width is greater than height, choose Orientation Landscape on the Page tab

iv) To return to Datasheet view without printing, click **Close**

v) When the layout is satisfactory, click .

***Exercise 10 (OPTIONAL)***

Switch to Design view and adjust the Field Size property of all the fields so that they are just the right length for the values that you expect them to contain. For help, see the Hint on page 10.

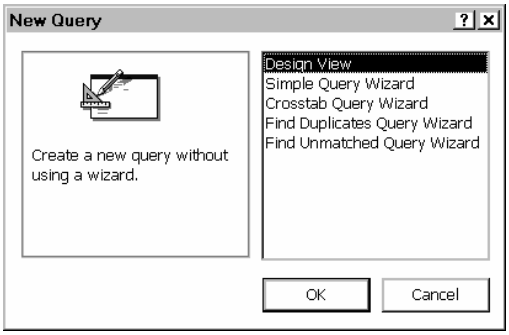
# Queries

## Designing a select query

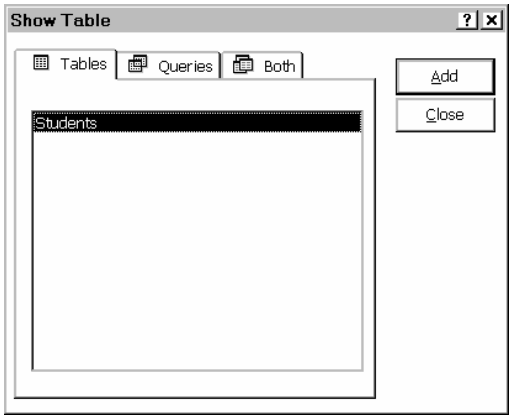
A select query chooses and displays data according to rules (criteria) that you decide.

> ***Exercise 11***
>
> i) Follow the procedures below to:
>
> ii) Create a new query based on the Students table
>
> iii) Put Student No, First Name, Last Name and Age on the QBE grid
>
> iv) Delete Student No from the QBE grid

i) In the Database window, click Queries, then click New to display the **New Query** dialog box:



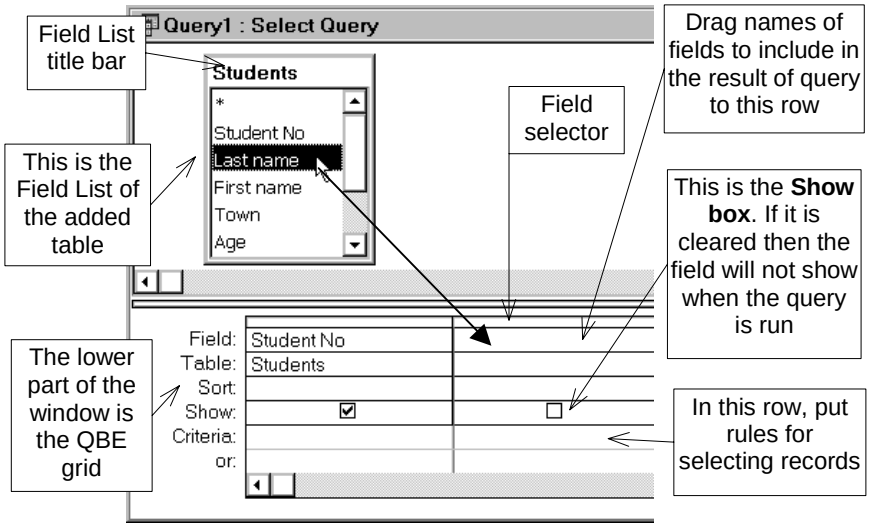

ii) Select **Design View** and click **OK** to display the **Show Table** dialog box (see right)




iii) Select the table that you want to query, click **Add**, then click **Close**. The Query design window will now be displayed as below

iv) In the Query By Example (QBE) grid, put all the field names you want to see when the query is run, as well as any others that you want to use to select records from the table.

v) Set the rules (Criteria) by which records are selected.




- To add a single field to the grid, either drag it from the field list to the grid or double-click it.
- To transfer all fields so that all show on the grid individually, double-click the field list title bar and then drag one of the fields to the QBE grid.
- To delete a single field click on its Field selector (see diagram) and press Delete on the keyboard
- To delete more than one field at once, drag through their selectors then press Delete.

## Criteria

***Exercise 12***
Follow the procedures below to:

i) Set Criteria to select records whose Age is greater than 25

ii) Run the query, check the results and then close it, saving it as Over 25

iii) Create, run and check a query to list all those whose age is 44 or less.

**The Zoom box**
If you are typing a long expression into a cell anywhere in Access, Shift+F2 will open the Zoom box and give you much more space to work in

When you have added all the fields you want, you have to set the ***criteria***. Criteria are the rules by which records are selected.

Criteria are expressions built from operators and values. Some operators are:

| | | | | | |
|---|---|---|---|---|---|
| **<** | Less than | **>** | Greater than | **=** | Equal to |
| **<=** | Less than or equal to | **>=** | Greater than or equal to | **<>** | Not equal to |

**Like** String comparison (a ***string*** is any combination of letters, numbers etc)

**Between...And** Determines whether a value lies within a specified range of values

**In** Determines whether a value is equal to any of the values in a list

If you don't include an operator, Access assumes you mean equals (=).

e.g. 25 in the Criteria for Age selects records (when the query is run) of students whose Age is 25, >25 selects students over 25 and <25 selects students under 25.

After you type an expression and move out of the cell or press ↵, Access translates it and displays the expression using its preferred format.

### Examples of criteria

| If you type | Access turns it into | Which would match |
|---|---|---|
| London | "London" | London |
| London or Dublin | "London" Or "Dublin" | London or Dublin |
| 2/2/92 | =#2/2/92# | 2-Feb-1992 |
| between 5-Aug-92 and 10-Aug-92 | Between #5/8/92# And #10/8/92# | no earlier than 5-Aug-92 and no later than 10-Aug-92 |
| in(Canada,UK) | In ("Canada", "UK") | Canada or the United Kingdom |
| not USA | Not "USA" | countries other than the USA |
| *TT* | Like "*TT*" | names which have TT in them |
| *Imports | Like "*Imports" | names which end with "Imports" |

### Some special criteria expressions and values

To enter a criterion containing a comma, you must put it between double quotes.

e.g. German, Spanish will give a Syntax Error but "German, Spanish" will be accepted.

To match a character string which may have other characters around it, use * which stands for any number of characters.

e.g. *AB* will match any of STAB, ABLE, STABLE, CAPABLE etc.

To match any single character, use ?. e.g H?LL will match HILL, HALL, HELL.

Null matches an empty field. "" matches a blank field.

### Entering criteria

i) Click on the Criteria cell for the field for which you want to set a criterion

ii) Enter the criteria expression

### Running a query

Once you have designed the query, click the Run button,  , on the Toolbar.

### Printing the result of a query

Print the results of a query exactly the same way you print a table. See page 6

## Selecting records using more than one criterion

### Setting criteria for more than one field

Just set the Criteria you want for each field

***Exercise 13***

i) Create and run a query to select all males over 35 and display all their fields

ii) Close it and save it as Males Over 35

### Setting alternative criteria for one field

Put the second criterion in the cell immediately below the first criterion, the third below that, and so on

***Exercise 14***

i) Create and run a query to display just the names and address for all students who are to pay less than £100 or more than £300

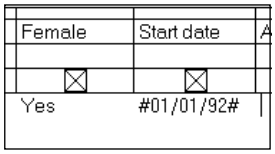
ii) Close it and save it as <100 or >300

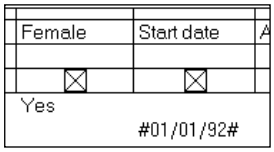
### How criteria combine on the QBE grid

All criteria in the same Criteria row must be true for a record to be selected.

If you want criteria to be alternatives, place them on different rows. For example,

This will select only females who started on 1/1/92




This will select records of females and also anyone (male or female) started on 1/1/92

***Exercise 15***

i) Create and run a query to select all males over 35 and anyone who is to pay less than £200 and display all their fields

ii) Close it and save it as Males < 200

### Combining rules using logical operators

You can also use *logical operators* to combine expressions in criteria. The logical operators are AND, OR and NOT.

X AND Y means that both X and Y must be true

X OR Y means that either X or Y or both can be true

NOT X means that X must be not true

***Examples:***

< 1/1/93 OR >31/12/94 will select dates before Jan 1993 and after Dec 1994

NOT London will select all towns other than London

>=20 AND <=30 will select any number between 20 and 30

***Exercise 16***

i) Create and run a query to select anyone who started before January 1992 or after December 1992 and show all their fields. Save it as Not 1992

ii) Create and run a query to select anyone studying either German on its own or Spanish and Italian together and show all their fields (you will need to use one of the special criteria that are documented on page 8). Save it as German or Spanish and Italian

## Sorting the records in a query

***Exercise 17***

Follow the procedures below to :

i) Produce a list of all records in ascending order of Last Name

ii) Sort and display in descending order of **Amount to pay** the records of students who have more than £200 to pay

iii) Close the Students database

First of all, an example:

The following are in ascending order: Abu, Bill, Gina, Ravi, Wes

The following are in descending order: Zino, Nina, Fred, Dana

Data can be sorted in either ascending (A-Z, 0-9) or descending order (Z-A, 9-0). The results of a query can be sorted according to the values in one or more fields:

i) Click in the Sort cell for a field you want to sort on

ii) Click 

iii) Choose Ascending or Descending from the drop-down list

iv) Repeat (i)-(iii) for further sort fields

**If you change your mind about sorting on a field, select (not sorted) from the drop-down list.**

If you sort on more than one field, Access sorts first on the field which is nearest the left edge of the QBE grid, then on the next sort field to the right and so on.

A well-known example of a list which is sorted on multiple fields is the telephone directory. The residential directory is sorted first on Last name, then on Initials, then on Address.

## Sorting all the records in a table

This is a quick way to sort a table.

i) Click anwhere in the column containing the field that you want to sort on.

ii) Click  to sort in ascending order or click  to sort in descending order.

Note that the table stays sorted only while it is open in datasheet view. If you close it or switch to Design view, it reverts to its original order.

**Example**

To sort on **Last name**, so that Allen is first and Williams is last, click anywhere in the marked area, then click 

| Student No | First name | Last name | Street address | Town |
|---|---|---|---|---|
| 1003 | Jon | Lewis | 34 Band Road | London |
| 1100 | Joe | Jones | 1 High St | Oxford |
| 1109 | Liz | Evans | 35 Old Place | London |
| 1193 | Lorna | Downs | 9 Stowe Road | Reading |
| 1298 | Chris | Betts | 43 Battle Street | Oxford |
| 1299 | Jane | Williams | 56 Long Avenue | London |
| 1314 | Natalie | Davis | 1 Trent Street | Oxford |
| 1346 | Jed | Allen | 78 Frith Road | Reading |
| 2105 | Clare | Nicol | 33 Astor Place | London |

Record: 2 of 9

| **HINT** | Suggested field sizes: | | | |
|---|---|---|---|---|
| | Student No | Integer | Age | Byte |
| | Last name | 20 | First name | 15 |
| | Subject 1/2 | 30 | Town | 15 |

## Designing a form

***Exercise 18***

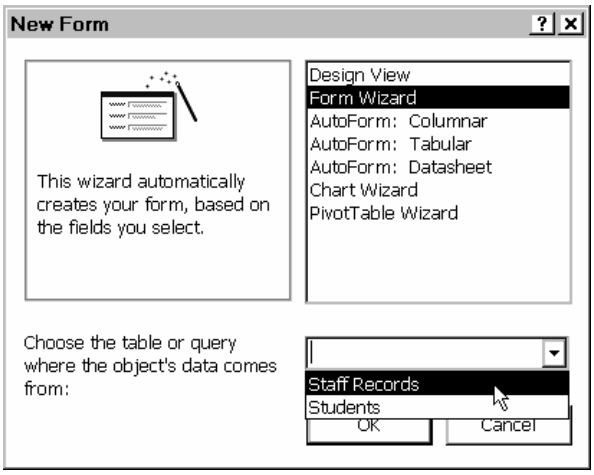
i) Create a table containing the following eight fields. Assign suitable field types.

staffno
lastname
firstname
female
department
job title
salary
start date

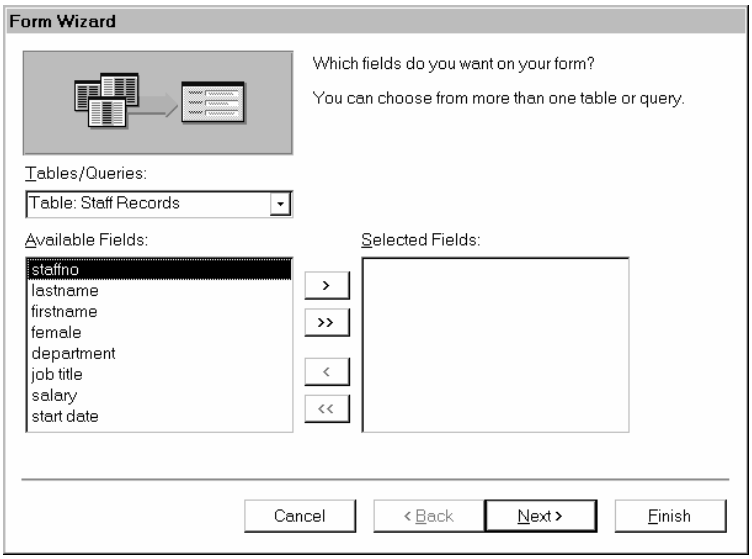
ii) Close the table and name it Staff Records.

iii) Now follow the steps on this page and the next to get the Form Wizards to create a form based on this table

i) Click Forms in the Database window and then click New to get the **New Form** dialog box:

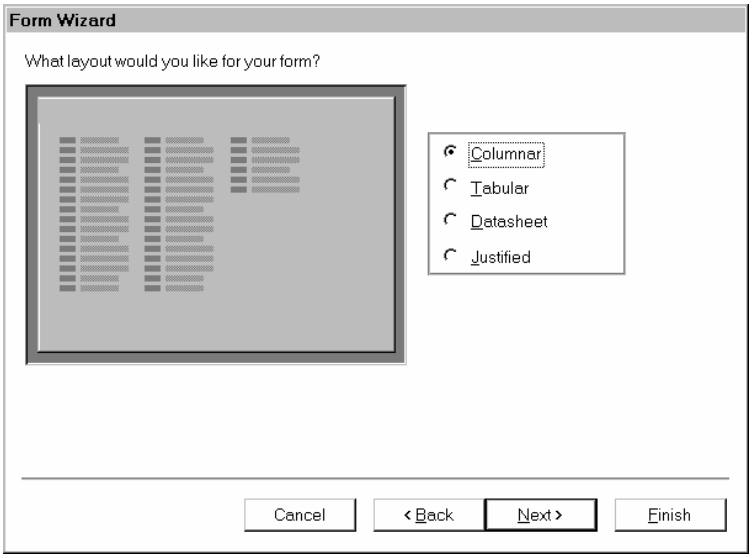



ii) Select **Form Wizard** and open the drop-down list and select the table or query to base the form on. Then click **OK** to display:

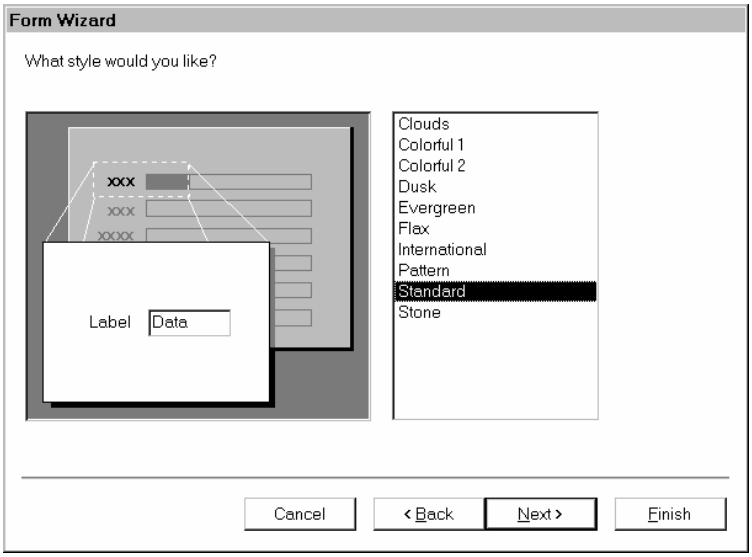



iii) Select the fields you want on the form by clicking the [>>] button to place all the fields on the form at once or click [ > ] to put one at a time.

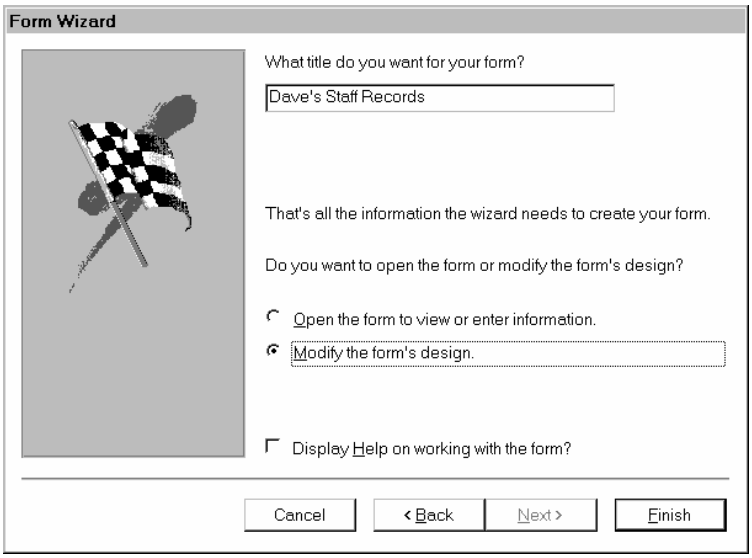
iv) When done, click **Next** to display the next step:




v) Choose the layout that you want and click **Next** to display:




vi) Choose the form style you want and click **Next** to display:



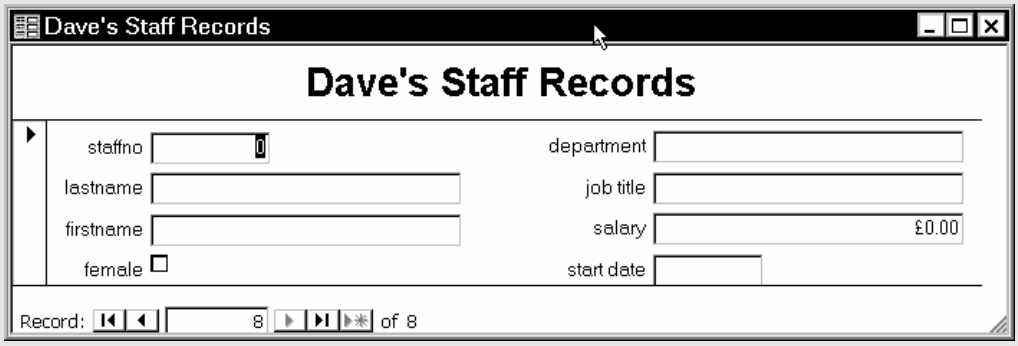

vii) Set the name of the form and choose whether to open it in data entry view or in design view to refine its design. You can also get Access display help on working with the form.

viii) Click **Finish** and the form will now open. If you now need to switch between Form view and Design view, click the **View** button which is on the left of the toolbar.

## Changing the design of a form

***Exercise 19***

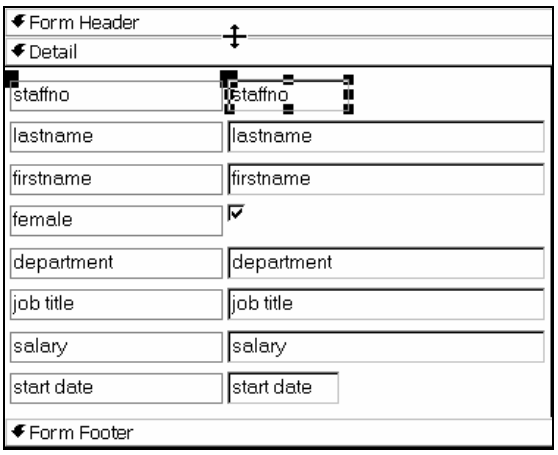
i) Following this exercise, there are details on how to carry out various actions in form redesign. In this exercise and the following exercise, you will redesign the Staff form so that it is a similar to the following:




ii) Change the size of the controls so that they are the best size for the data they are to contain. Switch between Design and Form view to check this. You may want to take another look at this exercise once all the data has been entered

i) If the form is already open in form or datasheet view, either **View☞Form Design** or click the Design button,  , on the main Toolbar.
If the form is not open, select it in the Database Window and click  .

Click  at any time if you want to switch to Form View.

ii) 


You can select a control or its label by clicking it. In the form on the left, the staffno control is selected.

When the cursor is ✋, on the control or label border, you can drag a control and its label around. When it is ☝, on a large handle, you can drag a control and its label separately

When the cursor is a double-headed arrow (↖ etc), on a small handle, you can drag to resize a control or label

When text controls are selected, the toolbar makes formatting tools available:

Use  and  to change the font and size

Use  to set/clear bold and italic

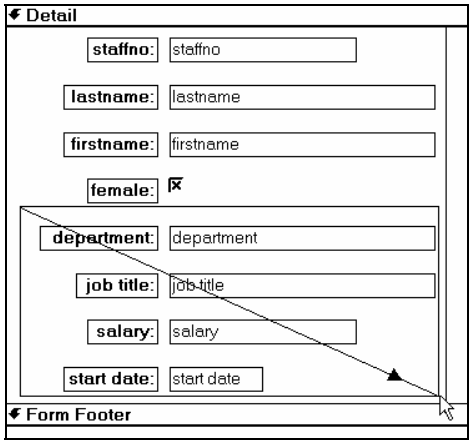
Use  to set alignment

If you click in the control when the cursor is an I-beam, the *contents* become selected and can be edited

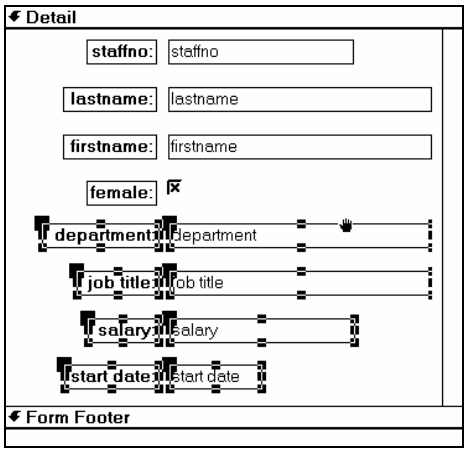
To deselect the contents so that you can resize, move or format a control, click on a blank area of the form

To change the height of a section, move the mouse onto the section boundary, where the pointer changes to ✢, and drag up or down

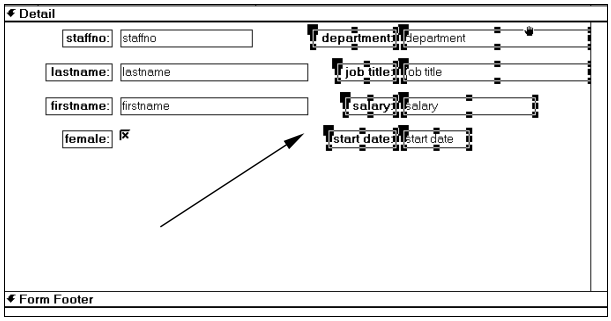
iii) To move a block of controls, you can select them dragging a rectangle around them with the mouse. This is called *marqueeing:*



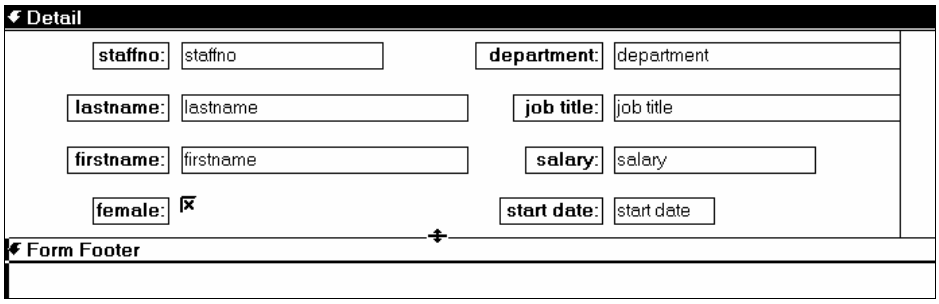

All the marqueed controls are selected:




iv) All the selected controls can now be dragged somewhere else as a group:




v) You can change the size of the form by dragging the border between the Footer and the Detail sections.




You can also drag the vertical boundary line on the right.

## Adding a new control to a form

***Exercise 20***

i) Change the height of the form header to 1cm (0.4in)

Follow the procedures below and on the next page to:

ii) Add a label saying Name Staff Records, where Name is your name

iii) Format the label in a larger font, coloured if you wish

iv) Change the background colour of the main part of the form to light blue

v) Place a picture of your choice onto the form

i) In Form Design view, display the toolbox (**View☞Toolbox** if necessary) and select the Label tool, ***Aa***

ii) Drag a rectangle in the Form Header area

iii) Type the text you want into the rectangle and format it appropriately

## Changing the background colour on a form

In Form Design view, select the item that you want to colour, click arrow on the **Fill/Back Color** tool,  , and select the colour you want.

### Importing an image onto a form

i) In Form Design view, **Insert☞Picture**

ii) Select the picture you want and click **OK**, then resize and move it as required

### Changing the size of a picture

Change the size by dragging a handle. The manner in which the size changes depends upon the Size Mode property of the picture. To change this, right-click the picture and choose Properties. Then, on the Format tab, select the mode required from the Size Mode drop-down list. Zoom would be the most sensible choice in most cases as it displays the whole picture in the correct proportions.

### Using a form to enter and change data

***Exercise 21***

Follow the procedures below to:

i) Use the form to enter your own name and gender into the table and copy the other field contents from the following record:

| staffno | department | job title | salary | start date |
|---|---|---|---|---|
| 9200 | Northern Europe | Lecturer | £17,000.00 | 01/06/88 |

ii) With just this data in the form, use Print on the File menu to print a copy of it.

**NOTE**: It is better not to print a form once more than one data record has been entered because all records would be printed, although you could choose to print just 1 page

iii) Now use the form to enter the following records:

| staffno | name | female | department | job title | salary | start date |
|---|---|---|---|---|---|---|
| 9001 | Angela Watson | True | Northern Europe | Lecturer | £19,000 | 01/01/88 |
| 9002 | James Tucker | False | Northern Europe | Administrator | £12,000 | 02/02/89 |
| 9003 | Daphne Alto | True | Northern Europe | Lecturer | £13,000 | 01/06/90 |
| 9004 | Deidre Piper | True | Southern Europe | Administrator | £18,000 | 04/04/80 |
| 9005 | Simon Byron | False | Southern Europe | Lecturer | £9,500 | 11/10/82 |
| 9006 | Eleanor Hope | True | Asia | Lecturer | £10,500 | 12/02/90 |

Check the records carefully for errors and amend them if necessary.

#### *Moving from field to field in a form*

Use the tab or Return key to move forward and Shift+tab to move backwards through the fields.

When you reach the last field, tab or Return will take you to the next new record.

Alternatively, you can click in a field with the mouse.

#### *Moving through records in a form*

Click  to move to the first record and  to move to the end of the data.

Click  and  to move back and forward one record at time.

To replace data, tab to it and overtype it. To cancel changes to a record while you are still in it, **Edit☞Undo.**

Click  to start a new record.

### Deleting a record in a form

Click the record selector bar,  , and press the Delete key

### Using datasheet view

If you would prefer to see the records in a view similar to a table, click  to switch to Datasheet view. To switch back to Form view, click 

***Exercise 22***

Make the following changes to the Students table:

i) Add a new field named Tutor ID and set its Data Type to be number

ii) Enter the following values in that field

| | | | |
|---|---|---|---|
| Wesley Lewis | 9001 | Jorge Perez | 9001 |
| Sunita Ali | 9003 | Lorna Downs | 9003 |
| Jane Williams | 9005 | Natalie Davis | 9005 |
| Abdul Majid | 9005 | Helen Dennis | 9003 |
| Clare Nicol | 9005 | | |

Close the table, saving your changes

You now have two tables, Students and Staff, each containing a field (**Tutor ID** and **staffno** respectively) taking values from the same set of numbers. You are now going to use those fields to set the link, or relationship between the two tables. But, first you need to set a Primary key in the Staff table.

### Setting the primary key

The primary key is one or more fields whose value or values uniquely identify each record in a table. In a relationship, a primary key is used to refer to specific records in one table from another table. Once you set a primary key for a table, Access will prevent any duplicate or Null values from being entered in the primary key fields. This ensures that no two records in a table are identical .

***Exercise 23***

Follow the procedures below to:

i) Set **staffno** in the **Staff** table to be the Primary key

ii) Create a relationships between the two tables

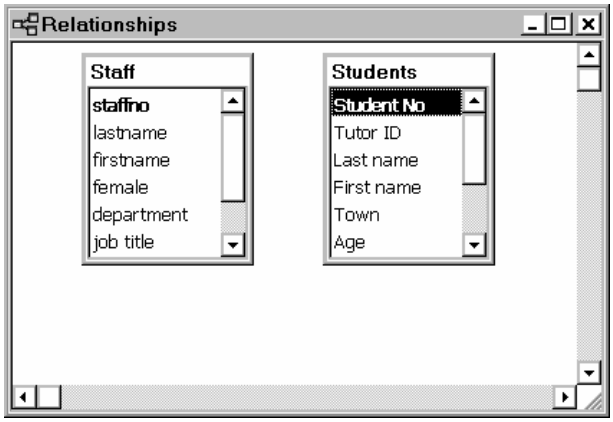
To set a field to be the Primary key, select the field in Table Design view and click  . Repeat to clear a primary key setting.

i) Display the **Database** window

ii) **Tools☞Relationships** to display the **Relationships** window

iii) If the list of tables is not already displayed, click  , the **Show Table** button, and add the tables you want to relate (see page 7 (ii) and (iii) for details)

iv) Set a relationship by dragging a field name from the main to the matching field in the related table.

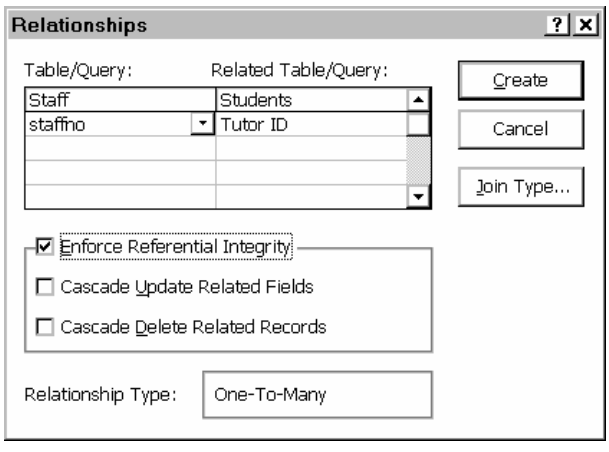



The dialog box on the right is displayed:

v) Click the check box to enforce *referential integrity*. For more information press F1.

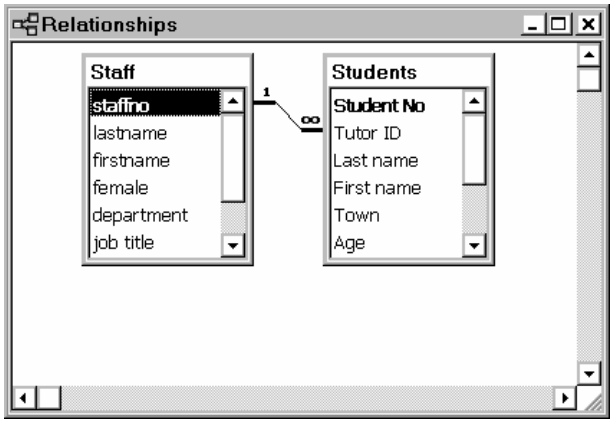
vi) Click the **Cascade** check box(es) if you want to be able, for example, to delete a staff record and all their student records in one action or to change a **staffno** value and automatically change the corresponding student **Tutor ID** values

vii) Click the **Create** button to create the relationship.



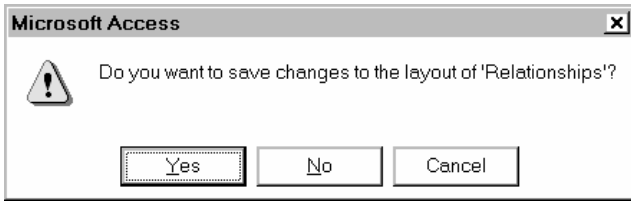
The link is indicated by a blue line.

The **1** at the Staff end of the line joining the two tables and the ∞ at the Students end represent the fact that every member of staff may have a number of students. The relationship is One-To-Many.




viii) Close the **Relationships** window by clicking ☒. The dialog box on the right will be displayed

ix) Click **Yes** to save your changes




This relationship between the two tables is a relationship that exists in the real situation the data is modelling. Thus there is in general more than one student to each member of staff.

Relationships tell Access as a whole how data is related between tables. By setting relationships between tables, you can get Access to enforce *referential integrity rules*.

These rules make sure that relationships remain intact by preventing the addition of records to a related table with no primary key, changing values or deleting records in a primary table which would give orphans in a related table. To define relationships, match the primary key fields in one table with matching fields in the second table.

### Querying linked tables

You can query linked tables.

> ***Exercise 24***
>
> Follow the procedure below to produce a list of staff and their students

i) Start a new query

ii) Add **Staff** and **Students** tables to the **Query** window

iii) Place staff and student name fields on the QBE grid and add the **Department** field

iv) Run the query

## Indexing tables

An index helps Access find and sort records faster. Access uses indexes in a table as you use an index in a book: to find data, it looks up the location of the data in the index. You can create indexes based on a single field or on multiple fields. Multiple-field indexes enable you to distinguish between records in which the first field may have the same value. The primary key of a table is automatically indexed. For more information on indexes, search Help.

### Create a single-field index

> ***Exercise 25***
>
> Follow the procedure below to index the **Student No** field in the **Students** table

i) Open the table in Design view

ii) In the upper portion of the window, click the field that you want to create an index for

iii) In the lower portion of the window, click the **Indexed** property box, and then **select Yes (Duplicates OK)** or **Yes (No Duplicates)**. Select the **Yes (No Duplicates)** option if you want to ensure that no two records have the same data in this field

***Exercise 26***

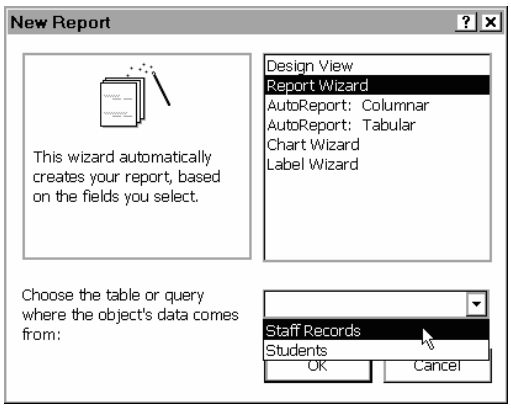
In this exercise, you will create a groups/totals report called Staff Report.

i) Include the following fields: **lastname**, **firstname**, **department**, **salary**

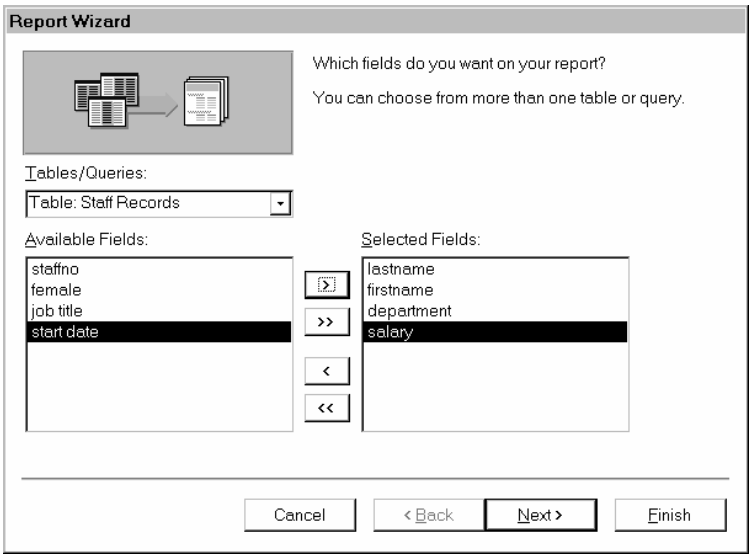
ii) Group on **department**, sort on **lastname** and set **Summary Option** to **Sum** and check the **Calculate percent of total for sums** box

iii) Put your name in the report heading

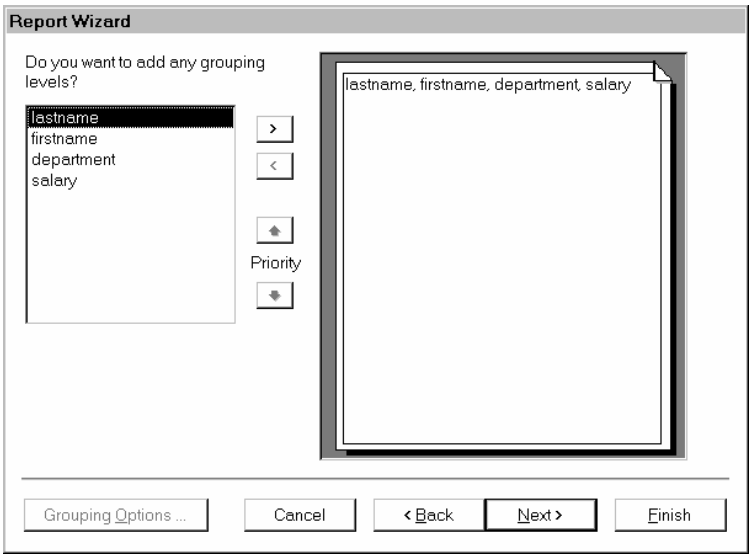
i) Click Reports in the Database window and click New to display the New Report dialog box:



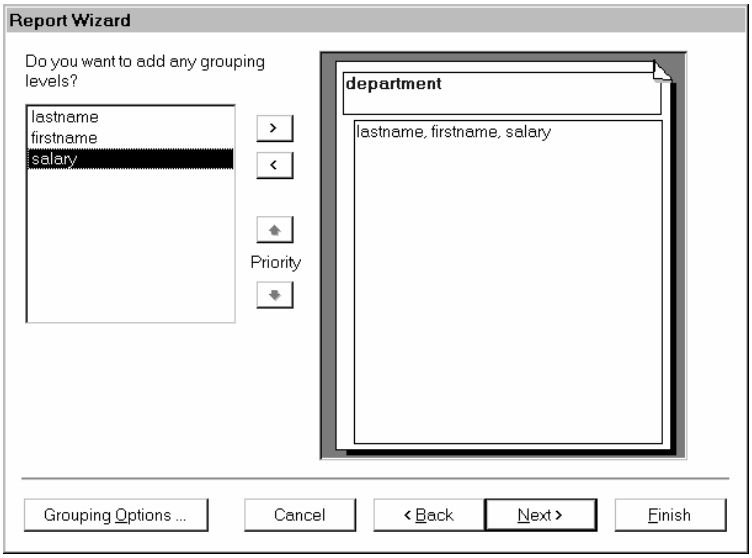

ii) Select **Report Wizards** and select the table or query to base the report on. Click **OK** to get:



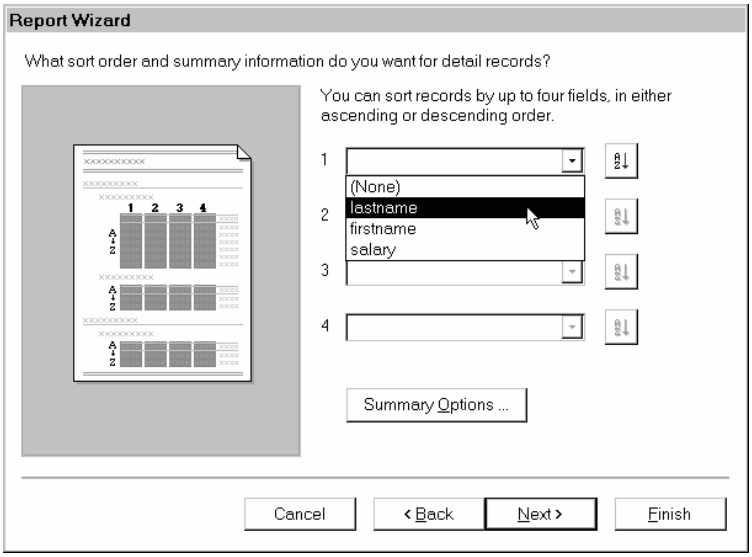

iii) In this box, select the fields you want in the report and click **Next** to display the next step:



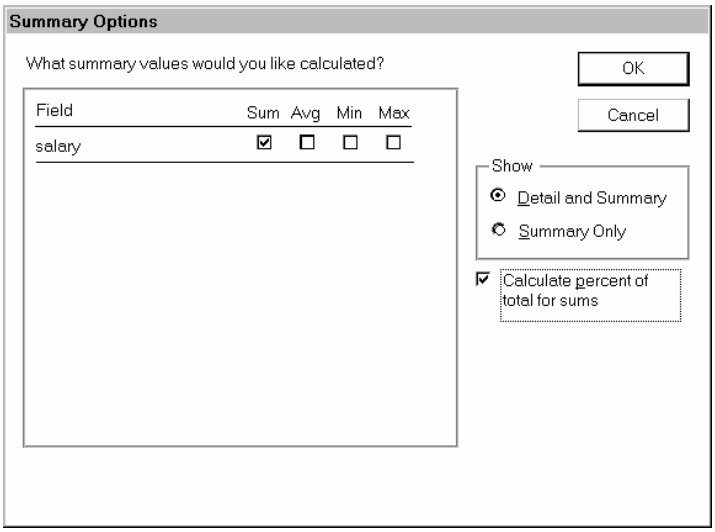

iv) Select a field to group on and click > to display:



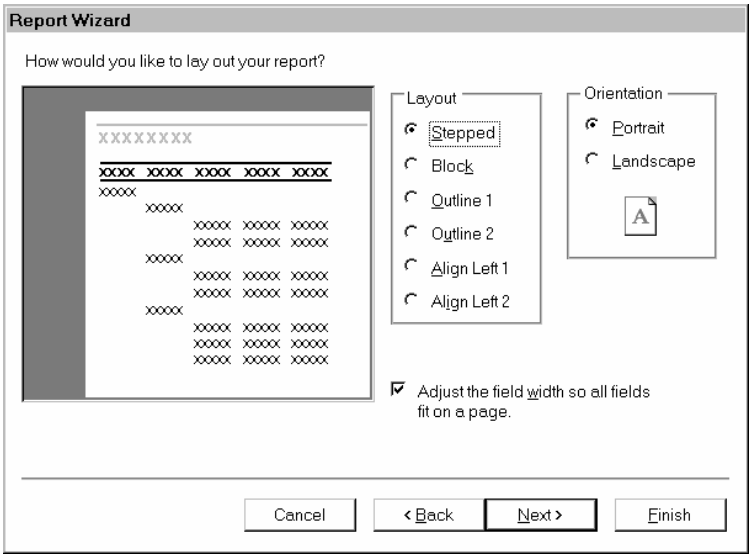

v) Then click **Next** to get:



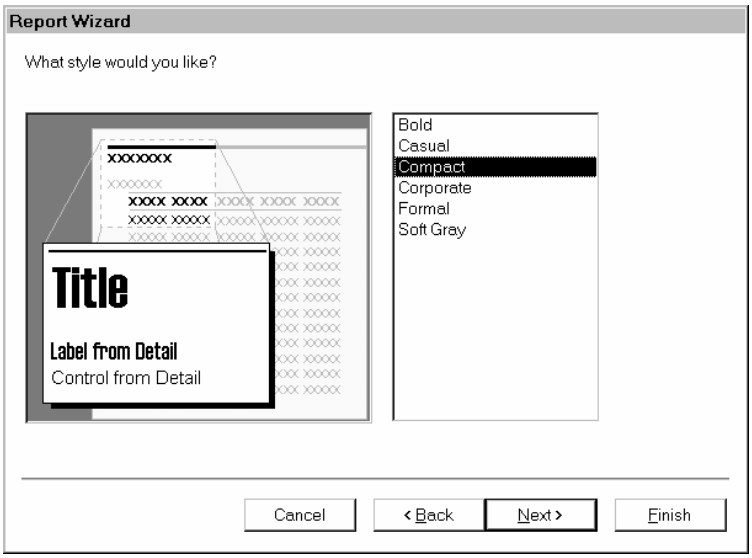

vi) Choose fields to sort on and click **Summary Options...** to display:



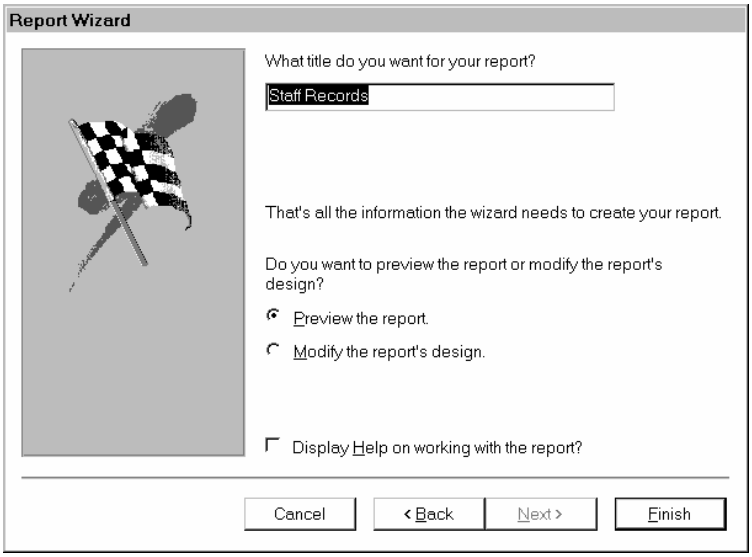

vii) Set the options you want and click **OK**. Then click **Next** to display the next step:




viii) Make any changes you want to the overall look of the report, then click **Next** to display:




ix) Choose the style you want and click **Next** to display:

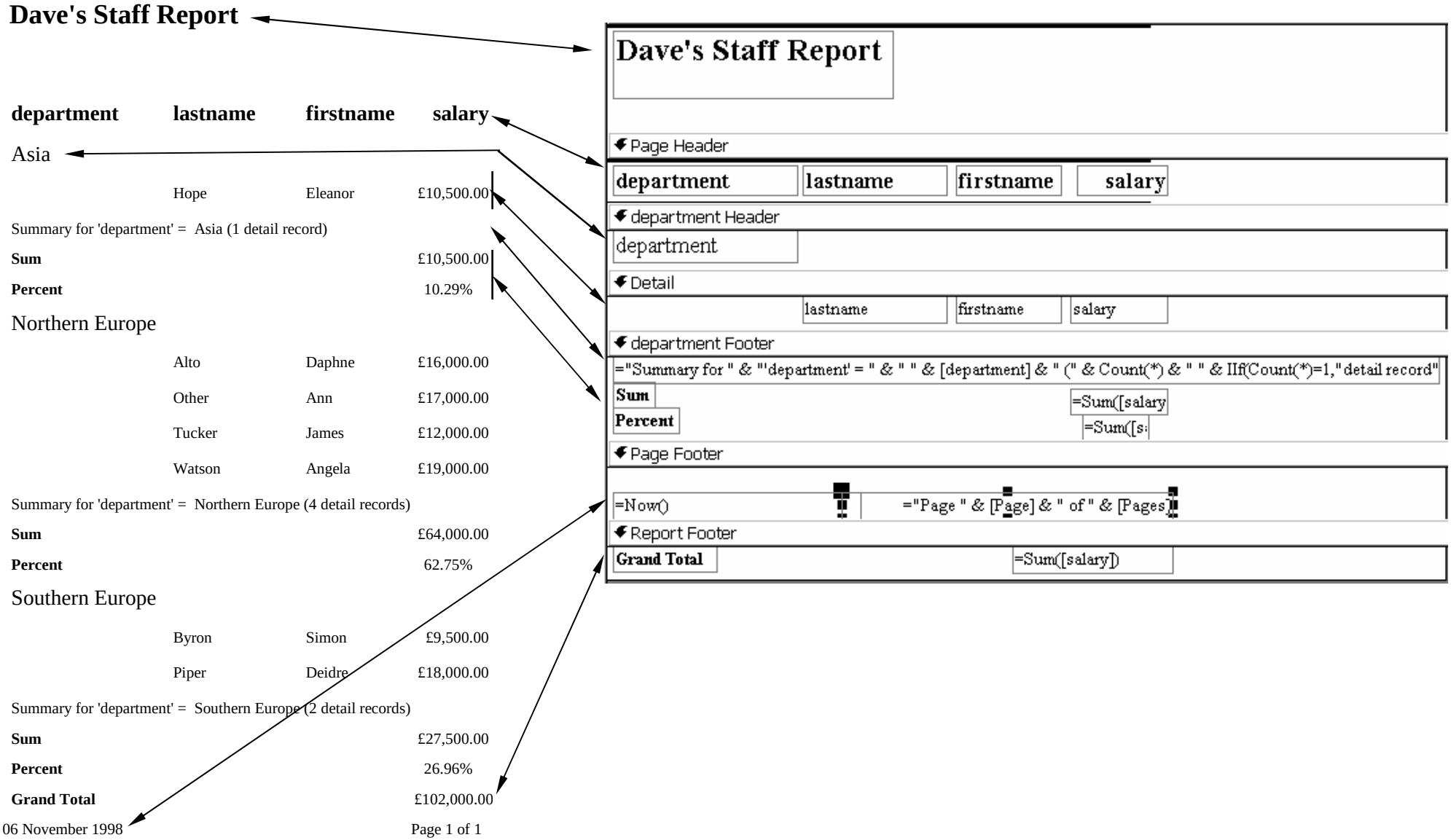



x) Name the report, choose the view in which to open the report and click the Finish button. Access will display the report.

**The next page explains the various parts of a report.**

### A sample report

This shows the relationship between the sections of the report as printed and in design view.



### Redesigning a report

Once the wizard has created a report, you can change it to look exactly as you want. From print preview, click the Design button,  , to get back to Design view.

Alternatively, from the Database Window, select the report and click 

- You can make changes to the layout of the report by dragging and resizing controls as in form redesign
- You can delete controls by selecting them and pressing Delete on the keyboard
- You can move section boundaries by dragging them up or down when the mouse is ✣
- You can remove the Page Header and Footer by doing **View☞Page Header/Footer**
- You can remove the Report Header and Footer by doing **View☞Report Header/Footer**

### Add a field to a report

i) Open the report in Design view

ii) Click  to display the field list:


iii) Drag the field name from the field list onto the report at the desired location

iv) Make any required adjustments of position, size and format

***Exercise 27***

Modify the report as follows:

i) Move the page number so that it is in the centre of the page footer

ii) Move firstname so that it comes before lastname

iii) Move the date field so that it is on the right of the report header

iv) Adjust the Detail section so that there is no extra space between detail lines

v) Delete the field showing salary percentage and adjust the relevant section height

vi) Add the Job Title field to the report

vii) Check the layout in Print Preview

### Export a report to Word/Rich Text Format

This is useful if you want to do more detailed work on the layout of a report. Rich Text Format can be read be any word processor.

i) Select the report in the Database window

ii) **File☞Export…**

iii) Enter a file name

iv) In the **Save as Type** list, select **Rich Text Format**

v) Click **Export**

## Filters

You can create a filter in a table, query, or form. Filters allow you to select records on a temporary basis and are simpler to use than queries.

There are four methods you can use to filter records: Filter By Selection, Filter By Form, Filter For Input, and Advanced Filter/Sort.

If you can easily find and select an instance of the value you want the filtered records to contain, use **Filter By Selection**.

If you want to choose the values you're searching for from a list or if you want to specify multiple criteria, use **Filter By Form**.

If the focus is in a field in a form or datasheet and you just want to type in place the exact value you're searching for or the expression whose result you want to use as your criteria, use **Filter For Input**.

For complex filters, use **Records☞Filter☞Advanced Filter/Sort**. This command allows you to create a filter in way that is almost identical to a select query.

This document covers the first three filter types applied to tables.

***Exercise 28***

Use the procedures below to:

i) Filter By Selection to display all students from London, then remove the filter

ii) Filter Excluding Selection to select all students who are not from London

iii) Filter By Form to select all those studying German as their first subject, then remove the filter

iv) Filter For Input to select all students who owe more than £300, then remove the filter

### Filter By Selection

i) Display the table in datasheet view

ii) Select all or part of the contents of a field:

Students : Table

| Student No | Tutor ID | First name | Last name | Town | Age | Fema |
|---|---|---|---|---|---|---|
| 1003 | 9001 | Wesley | Lewis | London | 32 | ☐ |
| 1100 | 9001 | Jorge | Perez | Oxford | 22 | ☐ |
| 1109 | 9003 | Sunita | Ali | London | 44 | ☑ |

iii) Click the **Filter By Selection** button,  , to apply the filter:

Students : Table

| Student No | Tutor ID | First name | Last name | Town | Age | Fema |
|---|---|---|---|---|---|---|
| 1003 | 9001 | Wesley | Lewis | London | 32 | ☐ |
| 1109 | 9003 | Sunita | Ali | London | 44 | ☑ |
| 1299 | 9005 | Jane | Williams | London | 68 | ☑ |
| 2105 | 9005 | Clare | Nicol | London | 17 | ☑ |
| 1441 | 9003 | Helen | Dennis | London | 43 | ☑ |

Only those records which contain the selected data are displayed.

### Removing a filter

Once you have applied a filter,  becomes the **Remove Filter** button. Click it to remove the filter.

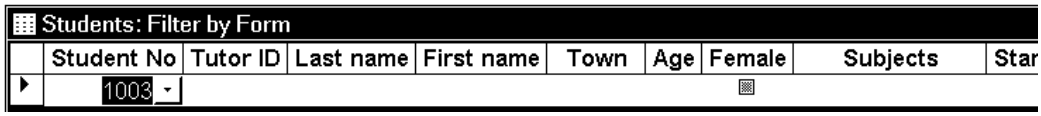
### Filter Excluding Selection

Right click the selection and choose **Filter Excluding Selection**

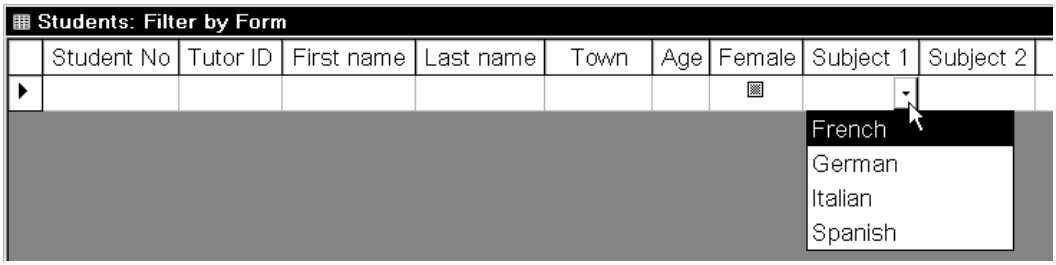
## Filter By Form

i) Display the table in datasheet view

ii) Click the **Filter By Form** button,  . The table collapses to one line and the first cell displays a drop-down arrow:




iii) Clear any values in fields that you do not want to set a criterion on. Click the field in which you want to specify the criteria that records must meet to be included in the filtered set of records. Enter your criteria by selecting the value you're searching for from the list in the field (if the list includes field values), or by typing the value into the field:




If you specify values in more than one field, the filter returns records only if they contain the same values you specified in each of those fields

iv) Click the Apply Filter button, 

### Notes on going further with Filter By Form

- To find records in which a check box, toggle button, or option button is or is not selected, click the check box or button until it's the way you want. To return it to a neutral position so that it won't be used for filtering records, continue clicking the check box or button until it is grey.
- To find records in which a particular field is empty or not empty, type Is Null or Is Not Null into the field
- To find records using a criteria expression, type the expression into the appropriate field or enter one using the Expression Builder
- To specify alternative values that records can have to be included in the filters results, click the Or tab at the bottom of the window, and enter more criteria

## Filter For Input

i) Display the table in datasheet view

ii) Right-click in the field you want to select upon, click in the **Filter For** box on the shortcut menu, and type the criterion value. To specify more complex criteria, type the complete expression using the appropriate combination of identifiers, operators, wildcard characters, and values to produce the result you want.

iii) To apply the filter and close the shortcut menu, press ↵. To apply the filter and keep the shortcut menu displayed (so that you can specify additional criteria for the field), press TAB. Enter new criteria, and then press TAB again. Repeat until you have just the records you want.

| **HINT** | **Suggested data types:** | | | |
|---|---|---|---|---|
| | Student No | Number | Age | Number |
| | Last name | Text | Female | Yes/No |
| | First name | Text | Subject1/2 | Text |
| | Start date | Date | Town | Text |

# Appendix A

### Exporting a table to Excel

i) In the Database window, select the (closed) table

**ii) File☞Export…**

iii) In the **Save as type** box, select the Microsoft Excel version that you want to export to

iv) If necessary, change the **Location** and **File name**

v) Click **Export**

### Importing a table from Excel

i) **File☞Get External Data☞Import…**

ii) Select the file to import and click **Import** to start the **Import Spreadsheet Wizard**

iii) Follow the steps to import the table, making choices as required

# Appendix B

### Data types

| | |
|---|---|
| **Text** | (Default) Text or combinations of text and numbers, as well as numbers that don't require calculations, such as phone numbers. Up to 255 characters. |
| **Memo** | Up to 65,535 characters of text or combinations of text and numbers. |
| **Number** | The Field Size can be:<br>**Byte** Stores numbers from 0 to 255 (no fractions).<br>**Integer** Stores numbers from –32,768 to 32,767 (no fractions).<br>**Long Integer** (Default) Stores numbers from –2,147,483,648 to 2,147,483,647 (no fractions).<br>**Single** Stores numbers from –3.402823E38 to –1.401298E–45 for negative values and from 1.401298E–45 to 3.402823E38 for positive values.<br>**Double** Stores numbers from –1.79769313486231E308 to –4.94065645841247E–324 for negative values and from 1.79769313486231E308 to 4.94065645841247E–324 for positive values. |
| **Date/Time** | Date and time values for the years 100 through 9999. |
| **Currency** | Currency values and numeric data used in mathematical calculations involving data with one to four decimal places. Accurate to 15 digits on the left side of the decimal separator and to 4 digits on the right side. |
| **AutoNumber** | A unique sequential (incremented by 1) number or random number assigned by Access whenever a new record is added to a table. AutoNumber fields can't be updated. |
| **Yes/No** | Yes and No values and fields that contain only one of two values (Yes/No, True/False, or On/Off). |
| **OLE Object** | An object (such as an Excel spreadsheet, a Word document, a graphic, a sound file, or other binary data) up to 1 gigabyte in size linked to or embedded in a Access table. |
| **Hyperlink** | Text or combinations of text and numbers stored as text and used as a hyperlink address. |
| **Lookup Wizard** | Creates a field that allows you to choose a value from another table or from a list of values by using a list box or combo box. Clicking this option starts the Lookup Wizard, which creates a Lookup field. After you complete the wizard, Access sets the data type based on the values selected in the wizard. |