Practical exercises using Microsoft Access

Exercise 1: Creating a database

1 Start the Access program by double-clicking on the Microsoft Access icon. These icons may look different depending on your version of Access.

2 Access requires you to provide a name for the new database, or you can browse to open an existing database. Select the option to create a new database and type the name Bookshop. Note that this database is saved in your Documents folder if you do not specify another location.

Fig 8.6 Creating a database called Bookshop

Exercise 2: Creating a table

1 Now that you have created the Bookshop database, it is time to create a database file called a table. Depending on the database program you are using, an empty table, labelled as Table1, may be created for you. If so, then right-click on its label to close and delete it.

2 Microsoft Access provides options to create a table, query, form or report. The Bookshop database will require three tables, called Customer, Product and Order. Each table is created in Design view.
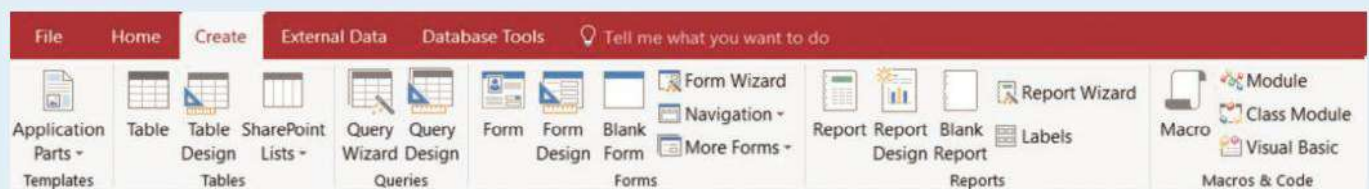

Fig 8.7 Microsoft Access provides options to create a table, query, form or report

3 To create the first table (called Customer), locate the icons or labels that will allow you to Create a Table and view its design. For now, the new table is called Table1.
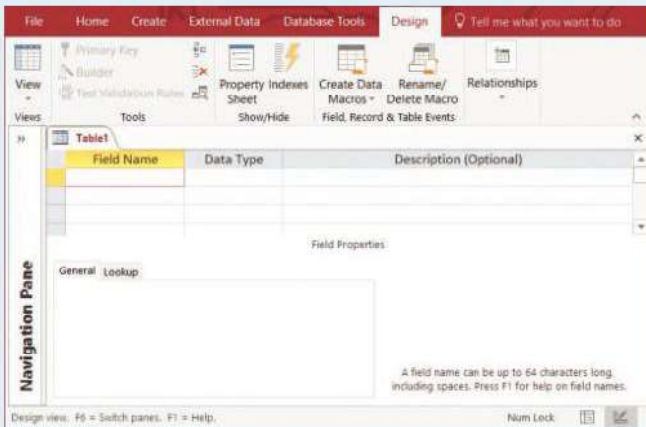

Fig 8.8 Start with a blank table in Design view

4 Click in the first Field Name box and type 'CID', then press *Enter*. In the Data Type column, choose the Text type, press *Enter* and then type the description as 'Customer ID'. Click below to the Field Properties area to type 4 for the field size. Enter the following field names, types and descriptions in your table.

Field name	Field type	Description
CID	Text	Customer ID Number
Last	Text	Customer's Last Name
First	Text	Customer's First Name

5 Note that the CID field is Text, since calculations are not performed on this field, otherwise the Number data type would be chosen. Click again on the CID field name and enter the following field properties:
Field Size: 4
Validation Rule: >999
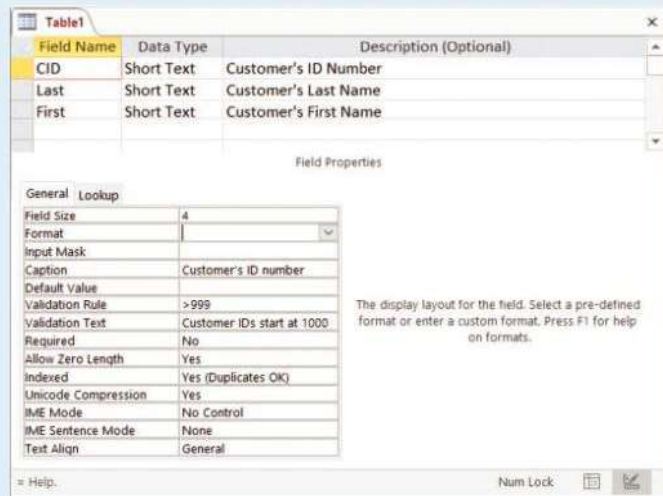Validation Text: Customer IDs start at 1000

Fig 8.9 Entering the design of the Customer table

6 At this point, you should choose one field whose value uniquely identifies each record in a table. If you do not define a primary key, Microsoft Access asks you if you would like to create one when you save the table. For this exercise, make the CID field the primary key, meaning that every item has a four-digit number and no two are the same. To do this, select the CID field and select the Primary Key icon. Then click the Save icon or *Ctrl + S* to save the table. Name the table as Customer and click OK to close the dialogue box. You have created your Customer table.

7 Use the same Bookshop database. Locate the icons or labels that will allow you to Create a Table and view its design.

8 Enter the following field names, types and descriptions in this table.

Field name	Field type	Description
PR-ID	Text	Product ID
Description	Text	Description of product
Cost	Currency	Unit cost of the product

9   Make PR-ID a primary key and save the table as Product.

10 Use the same Bookshop database to create another blank table in Design view. This will be used to create the Order table.

11 Enter the following field names, types and descriptions in this table.

Field name	Field type	Description
CID	Text	Customer ID
PR-ID	Text	Product ID from inventory
QTY	number	Quantity ordered
DISCOUNT	Yes/No	10% discount offered on Product

12 Make CID and PR-ID the composite primary key. Select the CID row, then while pressing the *Shift* key, select the PR-ID row. Then click the Primary Key icon in the Menu bar. Both fields will have the Primary Key icon next to them.

13 Save the table as Order.

CUSTOMER

CID	LAST	FIRST
1122	John	Rich
1124	Aks	Todd
1128	Tedd	Lou
1138	Yod	Ed
1145	King	Bev
1167	Wall	Ann
1170	Cain	Zed

PRODUCT

PR-ID	DESCRIPTION	COST
P3122	Pocket Diary	$8.95
P3429	Jumbo Clips	$4.15
P3430	Small Clips	$2.75
P3639	Round Labels	$3.95
P3745	Receipt Book	$7.55
P3899	Highlighter	$1.75
P3902	Black Pen	$1.25

ORDER

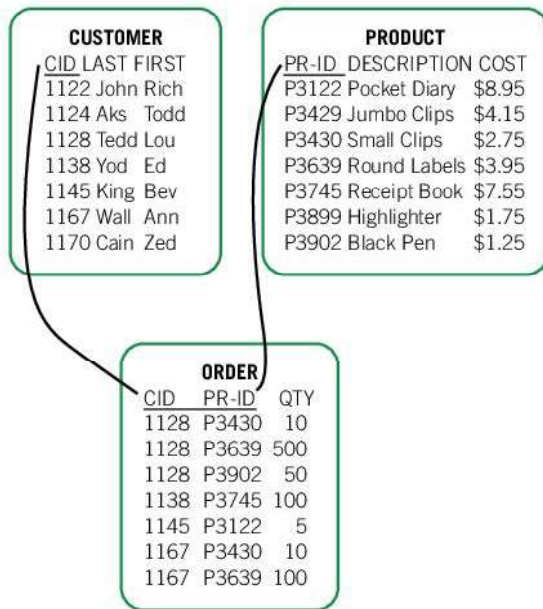| CID	PR-ID	QTY
1128	P3430	10
1128	P3639	500
1128	P3902	50
1138	P3745	100
1145	P3122	5
1167	P3430	10
1167	P3639	100

Fig 8.11 Creating a relationship between pairs of tables for the Bookshop database

Linking tables ensures that the data in the database remains as accurate as possible. For example, if you wish to delete a customer who has placed orders, the database will not allow you to do so until the orders for that customer are deleted. That way, no order can be placed without having a customer's data linked to it.

Questions

1 Use Figure 8.11 to answer the following questions:
   a State whether pairs of tables have a one-to-one relationship or a one-to-many relationship.
   b State the primary key in each table.
   c State the first names of the customers who ordered round labels.
   d State the description of the product that was ordered by the customer with ID 1145.
   e How many customers placed orders?

2 Answer the questions based on these two tables in a Sports database:

ATHLETE

AthleteID	NameOfAthlete	Code	Gender
121	Jade Boyce	U13	F
231	Shade Skeete	U13	F
351	Neil Hall	U20	M
142	Figman McJig	O20	M
187	Eli Jarad	U20	M

DIVISION

Code	Category
U13	Under 13
U20	Under 20
O20	Seniors

   a State the names of the tables.
   b How many records are in the Athlete table?
   c How many fields are in the Division table?
   d In each table, state the most appropriate field that can be used as a primary key.
   e State the name of the table and the field that is a foreign key.
   f Identify the field that is used to link the tables.
   g Explain whether the tables are linked as one-to-one or one-to-many.
   h Explain whether the row for the Under 13 division can be deleted from the Division table.
   i Explain whether the row of data for athlete 142 can be deleted from the Athlete table.
   j Write the name(s) of the seniors.
   k What division is Athlete 231 in?

Practical exercises using Microsoft Access

Exercise 3: Linking tables in the Bookshop database

1 Open the Bookshop database that was created in exercises 1 and 2. Locate the Database toolbar that contains the Relationships icon ⊡ Relationships .

2 Click on the Relationships icon, then click the Show Table icon ⊞ Show Table on the toolbar to make it appear.

3 Double-click on the Customer, Product and Order tables. When you have finished adding the tables, click Close.

4 Now click on the CID field in the Customer table and drag it to the CID field in the Order table.

5 An Edit Relationships window pops up (Fig 8.12). Make sure the Enforce Referential Integrity option is ticked in the checkbox and press OK. This means that Access will help you enforce rules so that your data is valid to start with and remains valid throughout its use.

6 You have created a relationship between the Customer and Order tables.

7 Repeat the procedure in steps 4 to 6 to create a relationship between P-ID in the Product table and P-ID in the Order table.

Exercise 4: Linking tables in other databases

1 Return to the previous example on the Sports database.

2 Create the database called Sports, and then create the two tables.

3 Link the tables using a common primary key, and enter the data in each table.
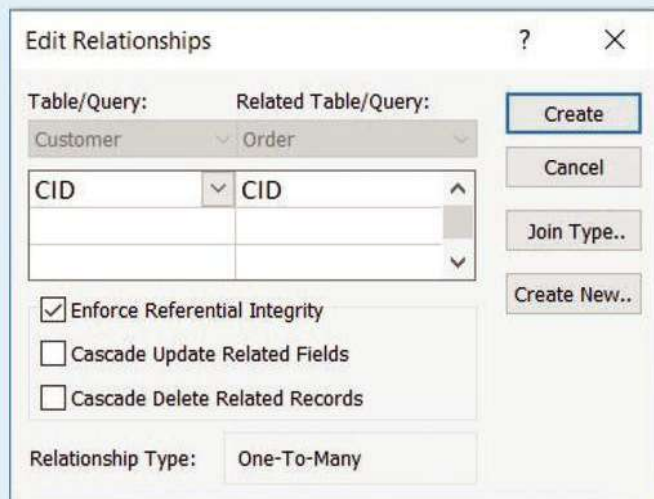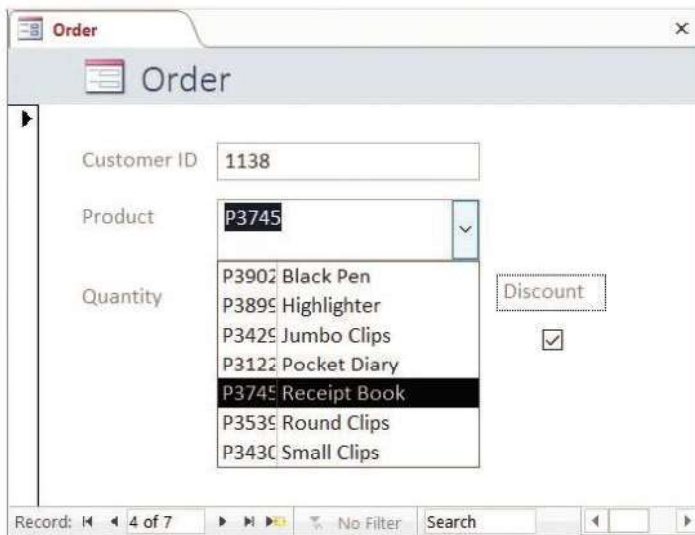
Fig 8.12 Enforcing rules on your data

Fig 8.15 Value lists are a quick and accurate way to enter data. Here a list is shown where only one product can be selected. A check box determines whether a product is eligible for a 10% discount

Other entry options include a check box (Fig 8.15). Instead of typing Yes or No in a field, you can have a check box where a tick means 'Yes' and the absence of a tick means 'No'. Another option is to have radio buttons, also known as option buttons. These methods of data entry reduce the possibility of error when inputting data.

Questions

1 Explain the difference between Datasheet view and Design view when creating a table.
2 State the name of the graphical representation of a table that allows you to quickly add records.
3 State two data entry options that can be used to quickly and accurately enter data in a database.

Practical exercises using Microsoft Access

Exercise 5: Entering data

1 Open the Bookshop database that was created in Exercise 1.
2 Double-click on the Customer table to open it.
3 To switch views between the datasheet and the Design view, simply click the button in the top-left hand corner of the Access program window.
   - Datasheet view [icon] : allows you to enter raw data into your database table
   - Design view [icon] : allows you to enter fields, data types and descriptions into your database table.
4 Click on Datasheet view and enter the data shown below into the Customer table and save it.

CID	Last	First
1122	John	Rich
1124	Aks	Todd
1128	Tedd	Lou

   - To add a new row, press *Enter* or select the next line and enter the information.

- To modify a record if you have made an error, select the record and field you want to update, and replace it with the text you want.
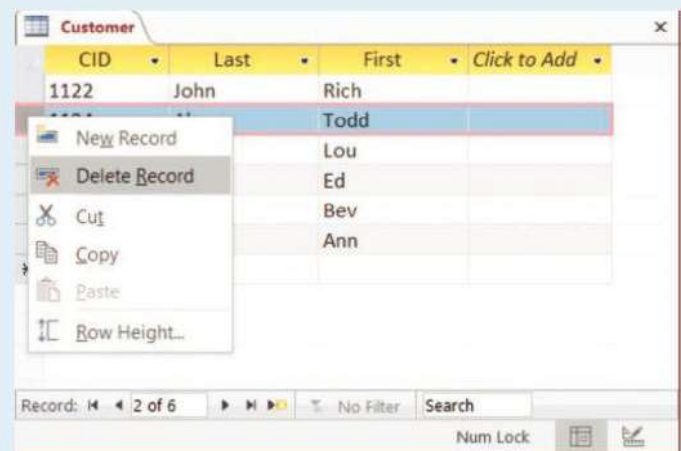- To delete a record, right-click on the row and select Delete Record (Fig 8.16).

Fig 8.16 Deleting a record from the Customer table

5 Click on the first record again and change the CID to 112. Press *Enter* and you should see your validation rules working (Fig 8.17).
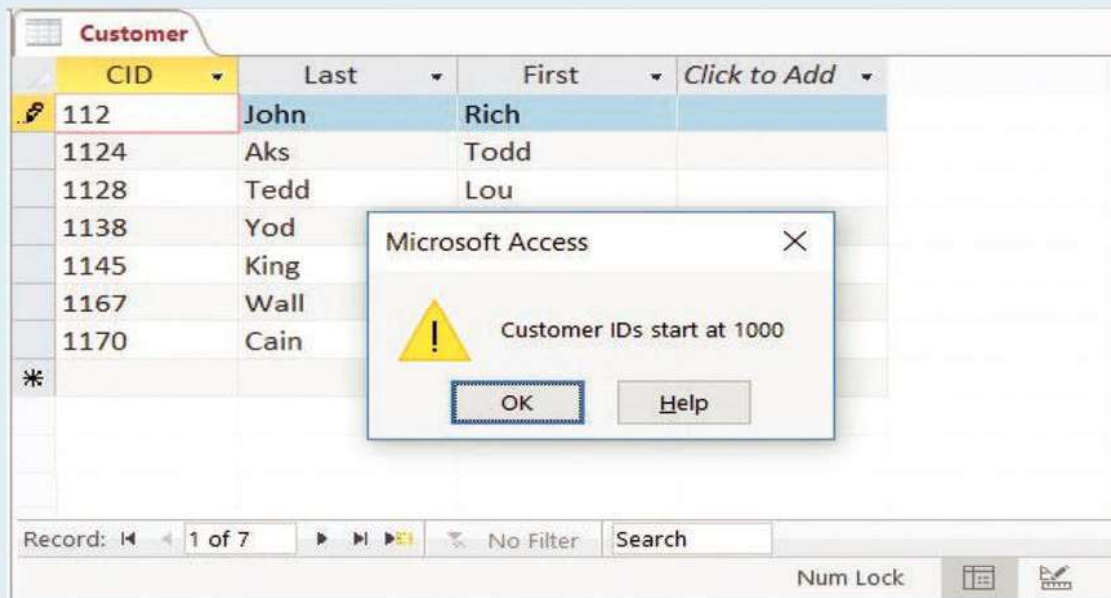
Fig 8.17 *Entering a number that is not valid results in an error message*

6 Select the Product table and double-click to open it.

7 Enter the following records:

PR-ID	Description	Cost
P3122	Pocket Diary	$8.95
P3429	Jumbo Clips	$4.15
P3430	Small Clips	$2.75

8 Select the Order table and double-click to open it.

9 Enter the following records:

Customer ID	Product ID	QTY	Discount
1128	P3430	10	
1128	P3639	500	Y
1128	P3902	50	

Exercise 6: Create a basic form

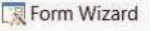Microsoft Access does a very good job of creating a form, and even provides a Form Wizard for creating more complex forms. First, follow these steps to create a basic form:

1 Open the Bookshop database with the Customer, Product and Order tables. Each table should have three records of data.

2 Select the Customer table. Then in the menu or ribbon, select the Create tab and then the Form icon Form .

3 This option creates a simple form using all of the fields in the table.

4 Use the form to enter the following records in the Customer table:

CID	Last	First
1138	Yod	Ed
1145	King	Bev
1167	Wall	Ann
1170	Cain	Zed

➡️

Exercise 7: Create a form using the wizard

1 Select the Product table. Then activate the Form Wizard. In some versions of Access, there may be an icon 📄 Form Wizard , which can also be found in the More Forms option on the ribbon.

2 Select the fields needed for the form by selecting a table or query from the Tables/Queries drop-down menu. To select the fields you want to view on your form use the > arrow to move them from the Available Fields window in the left pane to the Selected Fields window in the right pane. You would use >> if you are selecting all of them (Fig 8.18).

Form Wizard

Which fields do you want on your form?

You can choose from more than one table or query.

T̲ables/Queries

| Table: Product | ∨ |

A̲vailable Fields: S̲elected Fields:

| Description | | PR-ID |
| Cost | | |

> >> < <<

Cancel   < B̲ack   N̲ext >   F̲inish

Fig 8.18 Using the Form Wizard to select fields

3 Click Next.

4 Select the layout you wish and click Next.

5 You may be asked to select the style you desire. Use a light background if you are going to print your form.

6 Click Next.

7 Give your form the name Product and click Finish.

8 You should see your form.

9 Enter the following data using the form:

PR-ID	Description	Cost
P3639	Round Labels	$3.95
P3745	Receipt Book	$7.55
P3899	Highlighter	$1.75
P3902	Black Pen	$1.25

Exercise 8: Completing the data entry with the Order table

1 Use the Form Wizard or another method to enter the following data in the Order table:

Customer ID	Product ID	QTY	Discount
1138	P3745	100	
1145	P3122	5	
1167	P3430	10	
1167	P3639	100	Yes

➡️

Exercise 9: Creating a form with a sub-form

1 Select the Customer table.

2 Activate the Form Wizard.

3 Select the fields needed for the form by selecting a table or query from the Tables/Queries drop-down menu. Use the > arrow to move the CID, then First and Last field names from the Available Fields window in the left pane to the Selected Fields window in the right pane.

4 Practice adding additional fields from the tables so that the fields are selected in the following order:

   a Select the Order Table and add the CID and PR-ID fields (Fig 8.19a).

   b Select the Product Table and add the Description and Cost fields.

   c Select the Order Table again and add the QTY and Discount fields.

5 Click Next.

6 If prompted, view the data by Customer. You will be able to see the form and sub-form in the preview pane (Fig 8.19b).

7 Click Next.

8 Leave the layout option of the sub-form as Datasheet and click Next.

9 Type Customer Form as the name of the main form and leave the name of the sub-form as Order sub-form (Fig 8.19c).

10 Click Finish to see the final form (Fig 8.19d).

11 Locate record 3 to view the orders for the customer Lou Tedd.

12 At the bottom of the form you will see Record: 3 of 7.

13 Add the following order for Lou Tedd. Click in the PR-ID and enter P3745. The Customer ID, description and cost of that product should fill in those fields. Enter 25 for the quantity and leave the discount blank.

14 Click the icon to add a new record. Enter the following record of data for a new order:

CID: 1199

First: June

Last: Jarway

PR-ID: P3745

QTY: 25

Fig 8.19a Selecting the Order table

Fig 8.19b Viewing the data by Customer – you can see the form and sub-form in the preview pane

Fig 8.19c Naming the form and sub-form

Fig 8.19d The final form showing the orders for customer Lou Ted

Exercise 10: Create a form for the Sports database that contains the Team and Division tables

TEAM			
AthleteID	**NameOfAthlete**	**Code**	**Gender**
121	Jade Boyce	U13	F
231	Shade Skeete	U13	F
351	Neil Hall	U20	M
142	Figman McJig	O20	M

DIVISION	
Code	**Category**
U13	Under 13
U20	Under 20
O20	Seniors

1 Create a database called Sports.
2 Create the two tables, choosing the most appropriate data types in each table.
3 Select a suitable primary key for each table.
4 Create a form to enter the data in the tables as follows:
   ◆ Main form: Code and Category from the Division table
   ◆ Sub-form: AthleteID, NameOfAthlete and Gender from the Team table.

Practical exercises using Microsoft Access

Exercise 11: Searching and sorting

1 Use the Bookshop database to create queries to list:

   a the names of the products that cost under $3.00

   b the products that cost more than $5.00

   c the names of the products that are on discount; sort by the name of the product

   d all customers who ordered Black Pens; sort by the customer's last name

   e the customers who ordered products costing less than $5 in quantities of more than 100

   f the customers who ordered products costing less than $5 OR quantities of more than 100

   g all orders except those placed by Customer Lou

   h the names of products that begin with 'R'

   i the customers whose last name begins with 'Y'.

Errors in queries

Sometimes, after you have created a calculated field and run the query, you see a dialogue box asking you to 'Enter parameter value'. This occurs when you spell a field name incorrectly and your database program cannot find the misspelled field name (Fig 8.35). To solve the problem, simply correct the spelling mistake in the field name.
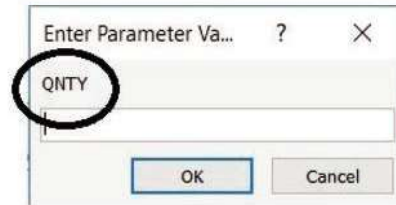
Access could not find the field name QNTY. The correct field name is QTY

Fig 8.35 A Spelling error in a calculated field

Questions

1 Given the field names Firstname, Lastname, Description and Cost, create calculated fields to produce the following:
   a Join the Firstname and Lastname fields so that the result is similar to 'Jane Smith'.
   b Join the Firstname and Lastname fields so that the result is similar to 'Smith, Jane'.
   c Join the Description and Cost fields to produce output similar to 'Black pens cost $1.25'.

2 What is the typical cause of an error in a query?

3 Using the table called Bookshop, write calculations to:
   a find the total cost of each product ordered where Total cost = Quantity × Cost
   b calculate how much discount is deducted if there is 10% discount on the cost of the product
   c find the mark-up on each product where New Cost = cost × 1.10.

4 State the function that will produce:
   a the total cost of all orders
   b the product that is the least expensive
   c the product that is the most expensive
   d the total number of products.

Practical exercises using Microsoft Access

Exercise 12: Calculated fields

1 Use the Bookshop database to create the queries to:
   a calculate how much discount is deducted if there is 10% discount on the cost of the product
   b find the mark-up on each product where New Cost = cost × 1.10
   c find the name of the product that is the least expensive
   d identify the most expensive product
   e calculate the total number of products.

Exercise 13: Creating an aggregate query

1 Open the Bookshop database.
2 To produce a calculated query, create a query, either by activating the wizard or using Design view.
3 Add the Last name field in the Customer table, Cost field in the Product table and QTY field in the Order table to the query.

4 Click on the Datasheet view icon to see the results. Then in Design view, in a new field type Total Cost:[Cost]*[QTY]
5 Remove the checkmarks in the rows for Cost and QTY that show those columns of data, so that only Last and the Total Cost are shown.
6 Click on the Datasheet view icon to see the results.
7 Select the Totals icon on the Menu bar. Your query now has an extra line 'Total' in the design grid, while the Group By option is now shown under each field in the query.
8 Change the Group By in the Cost and QTY columns to Expression, and change the Group By in the Total Cost column to SUM.
9 Click on the Datasheet view icon to see the results.
10 Save the query as 'Total Orders'.

2 Consider the following report. Identify:
 a the data type of each field
 b the grouping field
 c the sort field
 d the calculated field
 e the title of the report
 f the summary function used in the report.

Payroll for September				
Department	**Last Name**	**First Name**	**Days Worked**	**Fees**
Marketing				
	Betham	Milo	28	$4,200
	Janis	Yannick	31	$3,720
	Pimmot	Ross	28	$3,360
	Rithmont	Cath	22	$2,640
Summary for 'Department" (4 detail records)				
			Sum	$13,924
Human Resources				
	Jomes	Mike	28	$3,360
	Steele	Jonat	29	$3,480
	Ummer	Rain	28	$3,360
Summary for Human Resources (3 detail records)				
			Sum	$10,203
			Grand Total	$24,127

Practical exercises using Microsoft Access

Exercise 14: Creating reports

1 Create a report using the Bookshop database.
 a Create the reports in Figure 8.36 and 8.37.
 b Create the report in Figure 8.43.
 c Group the fields by First and Last.
 d Sort by Description.
 e Use the block layout so that the first and last names are on the same row.
 f Give the report the name Order Report.
 g View the report.

2 Use the Sports database that you created in Exercise 10 to produce a report. (The data is shown again here.)

 a Use the fields Category, NameOfAthlete and Gender.
 b Group the report by Category.
 c Sort the data by Gender.
 d Name the report 'Report on Athletes by Category'.

3 Create another report using the Sports database.
 a Group by Gender.
 b Sort by Category.
 c Name the report 'Report on Athletes by gender'.

TEAM			
AthleteID	**NameOfAthlete**	**Code**	**Gender**
121	Jade Boyce	U13	F
231	Shade Skeete	U13	F
351	Neil Hall	U20	M
142	Figman McJig	O20	M

DIVISION	
Code	**Category**
U13	Under 13
U20	Under 20
O20	Seniors

Practical exercises using Microsoft Access

Exercise 15: Importing an Excel file

1 Open Excel and create the following worksheet starting at cell A1. Save it as DATA.

	A	B	C
1	**StudentID**	**Name**	**Age**
2	1123	Angelo	16
3	2212	Shanico	15
4	3346	Franco	17
5	3358	Vanessa	16

Generally, spreadsheet files should be formatted as follows:

a The top row should contain only row headings or field names.

b Either remove any cells that you do not wish to import or copy the ones that you do to another worksheet.

c Save the file.

d Remember the name of the worksheet and the file and its location.

2 Open Access.

a Either create a new database, or open an existing one, depending on where you wish to place the Excel file. For this example, create a database called TEST.

b On the menu, activate the tab with the External Data option.

c Look for the icon to import data and select Excel or the Excel data type depending on your version of Microsoft Access.

d If the name of the file you wish to import is not visible in the Import window, browse to the folder where it is located. In this exercise, browse for the spreadsheet file named DATA and select it.

e You can choose to import it to a new table, or append it to an existing table

f Select the worksheet from the pop-up window or, if you have named a range, select it.

g Click Next.

h If you get a message that the first row contains some data that cannot be used for valid field names, click OK to let the wizard assign valid field names. You can clean this up later.

i If the box 'First Row Contains Headings' is not checked, tick it.

j Click Next.

k Select 'In a new table' and click Next.

l You can change the name and data type of a field while importing:
   i Select the field whose name you wish to change by clicking anywhere in that column
   ii Click Next.
   iii Choose the field name which will be the primary key and click Next. In this example choose StudentID.
   iv Enter the name 'STUDENTS' for this table and click Finish.

m You will receive a message that Access has finished importing the file.

n Click OK.

3 If the Excel file was not formatted properly, and you get an error message, return to Excel and prepare the file as in step 1.

4 If there were blank lines in the Excel file you may wish to delete these 'records'.