EDEXCEL FUNCTIONAL SKILLS

ICT

Study Module 4

Working with structured data

4 Working with structured data

By the end of this module, you should be able to:

▶▶ use field names and data types to organise information in a table

▶▶ enter and edit records

▶▶ search and sort records

▶▶ analyse and draw conclusions from a set of records

Introduction

In this module, you will learn how to work with structured data and how to extract useful information from it.

Skill Standards covered

At Level 1, you can...		At Level 2, you can...	
2	Interact with and use ICT systems to meet requirements of a straightforward task in a familiar context	**2**	Select, interact with and use ICT systems safely and securely for a complex task in non-routine and unfamiliar contexts
2.1	Select and use software applications to meet needs and solve straightforward problems	2.1	Select and use software applications to meet needs and solve complex problems
5	Use search techniques to locate and select relevant information	**4**	Use appropriate search techniques to locate and select relevant information
5.1	Search engines, queries	4.1	Search engines, queries and AND/NOT/OR, >,<,>=,><=, contains, begins with, use of wild cards
7	Enter, develop and refine information using appropriate software to meet the requirements of straightforward tasks	**6**	Enter, develop and refine information using appropriate software to meet requirements of a complex task
7.1	Apply editing, formatting and layout techniques to meet needs, including text, tables, graphics, records, numbers, charts, graphs or other digital content	6.1	Apply a range of editing, formatting and layout techniques to meet needs, including text, tables, graphics, records, numerical data, charts, graphs or other digital content
8	Use appropriate software to meet requirements of straightforward data-handling task	**7**	Use appropriate software to meet the requirements of a complex data-handling task
8.3	Use field names and data types to organise information	7.3	Use appropriate field names and data types to organise information
8.4	Enter, search, sort and edit records	7.4	Analyse and draw conclusions from a data set by searching, sorting and editing records

A Organising data

Look at this data about people who belong to a loyalty card scheme.

115000, male, Jordan, Barker, 3 Argyll Road, LLANBEDR, NP8 4MQ, 077 2601 1894, 249, 31.125, 14-Feb-08

126382, female, Maisie, Porter, 95 St Andrews Lane, DALBLAIR, KA18 8QR, 079 3091 0649, 250, 31.25, 12/12/2009

129887, male, Zachary, King, 44 Petworth Rd, DWYGYFYLCHI, L34 3XB, 079 3632 2915, 499, 62.375, 28/08/2008

134116, male, Jake, Murray, 99 Simone Weil Avenue, WAUNCLYNDA, SA19 9BY, 079 5299 1386, 500, 62.5, 19-Jan-08

136988, male, Peter, Whitehouse, 40 Fraserburgh Rd, LINBY, NG15 6FV, 078 5174 8205, 749, 93.625, 19-Jul-10

It is not at all clear what the data means.

Here is most of the data, with some labels added. Now the data is meaningful.

Card No.	Gender	First Name	Surname	Points	Cash Value	Joined Date
115000	male	Jordan	Barker	249	31.125	14-Feb-08
126382	female	Maisie	Porter	250	31.25	12/12/2009
129887	male	Zachary	King	499	62.375	28/08/2008
134116	male	Jake	Murray	500	62.5	19-Jan-08
136988	male	Peter	Whitehouse	749	93.625	19-Jul-10

Each member has a record, with the same data items stored in **fields**. The column headings are the **field names** and tell us what each field contains.

By storing data in an organised way, it becomes much easier to manage. You can sort the records and search on different fields.

Since there is likely to be more than one person with the same first name or surname, a unique identifier is often used. The first field is often used to uniquely identify the record. Can you think of any unique numbers associated with you?

Here is an extract from a table showing sales transactions in a supermarket. Every till transaction is given a unique identifier.

> **Tip**
>
> Choose field names that are meaningful and help make sense of the data.

> **Tip**
>
> If necessary, make the columns of a table wider, use the 'wrap text' feature or change the text orientation to make sure that headings are displayed in full.

Ref No.	Date	Time	Items	Total net	Discount	Payment
001	5-Aug	9:17	12	£26.50	£0.00	Cash
002	5–Aug	9:22	10	£30.10	£1.25	Card
003	5-Aug	9:26	2	£45.95	£1.50	Card
005	5-Aug	9:39	18	£153.75	£5.40	Card
006	5-Aug	9:44	9	£84.10	£3.00	Cash

Which software application should I use?

Both spreadsheet and database software can handle large amounts of structured data. If you are working with data stored in a single table, then spreadsheet software should suffice. You will need more powerful database software to handle data stored in related tables.

> **Skill Builder 4.1**
>
> - ■ Digital asset SB4.1.1 contains information about members of a customer loyalty scheme.
> - ■ Save the file in your user area.
> - ■ Open the file in a spreadsheet application.
> - ■ Use a suitable method to make the field names visible.
> - ■ Embolden the field names to make them stand out from the data stored in the table.
> - ■ Add your name in the footer.
> - ■ Save the file.

Data types and formats

The computer handles different types of data in different ways. You will see in Module 5 how to do calculations on numbers.

Type	Description	Examples of formats
Text	Text or combinations of text and numbers such as addresses Numbers that do not require calculations, such as phone numbers or membership numbers	Upper case, lower case
Numbers	Numeric data that can be used in calculations	Decimal places, currency, percentages
Date/Time	Date and time Date only Time only	05/06/09 17:03 Various date formats such as: 05/06/09, 5 June 2009 Various time formats such as 17:03, 17:03:59, 05:03PM

B Using data

One method of making information easier to read is to sort it into a particular order. Think about the Loyalty Scheme table. You might want to list members in alphabetical order of surname. Alternatively, you could sort them by the number of loyalty points they have collected or by the date they joined the scheme, in descending order.

Number order

Here is a simple table that lists different types of street. It is sorted in **ascending** number order on the first column. This just means that the order of the rows starts with 1 and goes in sequence up to 5.

No	Type of way	Description
1	road	paved surface for vehicles
2	alley	narrow street
3	lane	part of a motorway
4	path	route for walkers
5	causeway	raised roadway

Here is the same table sorted in **descending** number order on the first column.

The rows are now in the reverse order. Notice that the position of whole rows has changed, not just the numbers in the first column. This is very important. When information in a table is sorted, each row is treated as a unit and the whole row is moved up or down.

No	Type of way	Description
5	causeway	raised roadway
4	path	route for walkers
3	lane	part of a motorway
2	alley	narrow street
1	road	paved surface for vehicles

Alphabetical order

Information can be sorted to follow the order of the letters in the alphabet: a, b, c, d, etc (ascending order) or z, y, x, w, etc (descending order).

Here is the same table sorted in ascending alphabetical order on the second column. Notice that the first letter of each word in the second column has been used to determine the order of the rows (for example, 'causeway' comes before 'lane', because 'c' comes before 'l' in the alphabet).

No	Type of way	Description
2	alley	narrow street
5	causeway	raised roadway
3	lane	part of a motorway
4	path	route for walkers
1	road	paved surface for vehicles

Here is the table sorted in ascending alphabetical order on the third column. There are two entries that start with 'p' and two that start with 'r'. To decide on the order of these pairs it is necessary to look at the order of the following letters. So, 'raised' comes before 'route' because the second letter 'a' comes before 'o'. For 'part' and 'paved' it is necessary to look at the third letter in each case to decide the order.

No	Type of way	Description
2	alley	narrow street
3	lane	part of a motorway
1	road	paved surface for vehicles
5	causeway	raised roadway
4	path	route for walkers

Skill Builder 4.2

Definition	Land type	Description
1	desert	area where rainfall is below 250mm in a year
2	tundra	cold, dry treeless plain
3	swamp	wetland dominated by trees
4	marsh	wetland dominated by grasses
5	grassland	open, dry area dominated by grasses
6	forest	area with high density of trees

- ■ 🔴 Digital asset SB4.2.1 contains definitions of different types of land.
- ■ Save the file in your user area.
- ■ Open the file in a spreadsheet application.

Tip

If you are asked to rank the records in a table, this simply means sort them in order of the values in a specified field.

- Sort the table on each of the three columns, first in ascending order and then in descending order. Does it behave as you expect?
- Can you explain the order of the 'swamp' and 'marsh' entries when the table is sorted on the 'Description' column?

It is also possible to sort on more than one field.

Skill Builder 4.3

- 🔴 Re-open digital asset SB4.1.1 in a spreadsheet application.
- Sort the table on 'Gender' followed by 'Points'.
- What happens if you select the 'No header row' option in the 'Sort' dialogue box?
- Find out what other sort options are provided by your spreadsheet software. When might they be useful?

What do you need to know?

You can apply a filter to data stored in a table to locate a record or group of records quickly. You tell the filter what you are looking for and it filters the records to show only those that contain the information you seek.

Searching on one field

Any field in a table of data can be searched.

<=18 is an example of a search criterion. '<=' is called an operator. There are lots of operators you can use in a search – on their own or in combination.

Operator	Means	Example	
=	equal to	=500	must be 500
<	less than	<500	must be less than 500
<=	less than or equal to	<=500	must be less than or equal to 500
>	greater than	>500	must be greater than 500
>=	greater than or equal to	>=500	must be 500 or greater
<>	not equal to	<>London	must not be London
NOT	not	NOT 100	must not be 100
OR	or	cat OR dog	must be either cat or dog
AND	and	>0 AND<10	must be greater than 0 and less than 10

Searching on more than one field

You can enter search criteria for several fields. For example, you may want to search for all the female members of the loyalty card scheme who have earned more than 500 points.

Using wildcards

Use ? as a placeholder for a single character. For example, a search for 'Sm?th' would find 'Smith' and 'Smyth'.

Use * as a placeholder for a group of characters. A search for '*on' would find 'Southampton', 'London' and 'Brighton' and all other towns with names ending in 'on'.

Tip

If you are using text in a search, be careful to match it to the text in the table. For example, if you are searching for 'February' and there are no results, it may be because the months are stored in the table as 'Jan', 'Feb', 'Mar', etc.

	A	B	C	D	E	F	G
1	Card Numbe	Gender	First Name	Surname	Street	Town	Postcode
2	182213	male	Owen	Bradley	78 Trinity Crescent	WHEEN	DD8 2SO
3	201132	male	Ethan	Nixon	30 Annfield Rd	BEARSDEN	G61 4BY
4	178771	male	Finlay	Kirk	61 Vicar Lane	SARNAU	LL23 3BI
5	208309	female	Hollie	Gray	16 Town Lane	SOUTH HYKEHAM	LN6 0MH
6						KIRK MERRINGTON	DL16 5DR
7						OUTLANDS	ST20 2BM
8						LOWER FARRINGDON	GU34 7QR
9						BURLEYDAM	SY13 0HI
10						OLD BUCKENHAM	NR17 5LI
11						TUNDERGARTH MAINS	DG11 1CR
12						CULDUIE	IV54 3ZX
13						BURNFOOT	FK14 8JD
14						GREAT WRATTING	CB9 0IR
15						VENNINGTON	SY5 3IK
16						COURT BARTON	EX17 2UL
17						NOWTON	IP29 1VZ
18	201895	female	Isabelle	Young	73 Main Rd	FOREST LODGE	PH18 1TE
19	201994	female	Danielle	Steele	96 Lamphey Road	THORNAGE	NR25 2BY

Find and Replace

Find   Replace

Find what: *on*

Options >>

Find All   Find Next   Close

Skill Builder 4.4

- ▪ 🔴 Re-open digital asset SB4.1.1 in a spreadsheet application.

- ▪ Select any cell in the sheet. Click the 'Data' menu and drag down to the 'Filter' option. In the sub-menu that opens, click the 'AutoFilter' option.

- ▪ Click on the filter arrow in the 'Card Number' column. The drop-down menu will list all the numbers in this column. What happens when you click on one of them?

- ▪ Open the filter on the 'First Name' column. Click on '(Custom...)' in the list. Enter 'Peter' into the dialogue and click 'OK'. How many people are called Peter?

- ▪ Use filters to find details of:
  - the person whose card number is 180210
  - everyone who lives in St Leonards
  - everyone whose post code contains the letters 'ES'
  - everyone who has more than 500 points
  - everyone who has less than 50 points
  - everyone who has between 100 and 125 points
  - all members of the loyalty scheme whose telephone number starts with 077
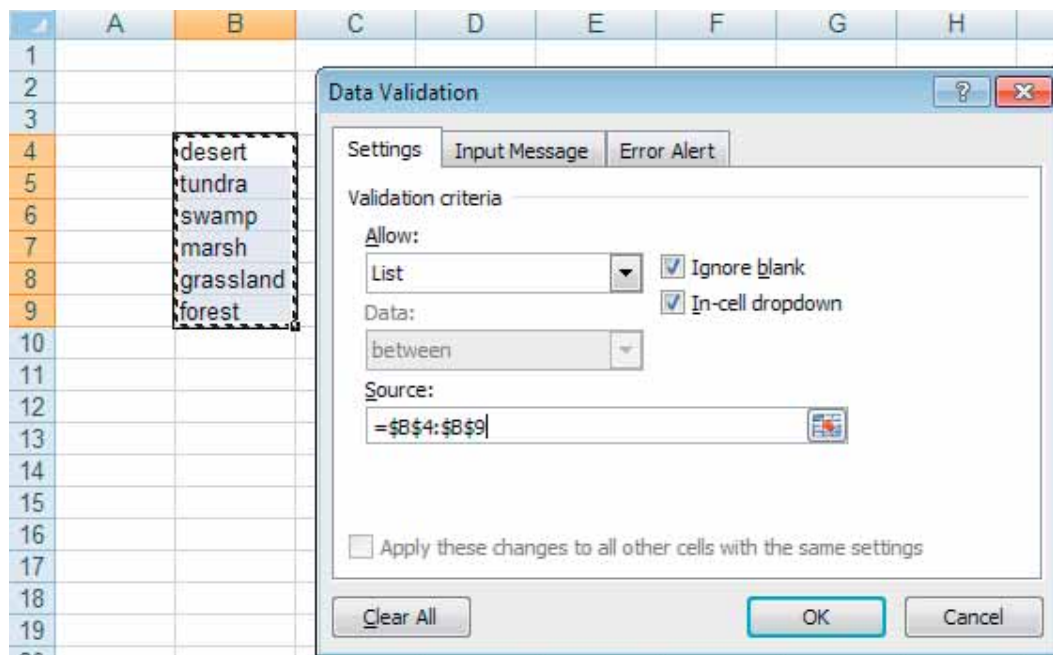
Entering and editing records

There are various ways of entering new records into a table. You can enter data manually via the keyboard, drag and drop with the mouse or import data. Whichever method you choose, always make sure that the new data goes into the right location. If you get it wrong, it will cost you time and effort to put it right. Worse, if you do not notice your mistake, all subsequent work will be based on misleading or incorrect information!

Skill Builder 4.5

🔴 Make these changes to the records in digital asset SB4.1.1 , then re-save the file.

- ▪ Peter Slater has changed his mobile phone. His new number is 077 4768 9332.

- ▪ Amy Johnson has recently signed up to the loyalty scheme. Her card number is 20999, her contact details are: 13 London Crescent, Sleaford NG34 8YY; mobile 078 7463 7788. Amy has earned 10 points.

Keeping the rubbish out

The information you get out of a table is only as good as the data you put in. One way of controlling what goes in is to create a drop-down list of options.

In the toolbar, click on 'Data', then 'Validation' and explore options to help you keep the rubbish out.

Making tables clear and easy to read

Tables of information can sometimes be difficult to understand. To make your tables clear and easy to read:

■ Use titles that make it clear what the table is about.

■ Make sure column headings are meaningful and displayed in full.

■ Check column alignment. This can cause problems if you have a right-aligned column next to one that is left-aligned.

■ Use the date function to insert the date into the page footer.

■ Switch on grid lines.

■ Hide columns that contain unnecessary information.

■ Use landscape orientation and adjust the margins to fit everything onto one page.

	A	B	C	D	I	J	K	L	M	N
1	Card number	Gender	First Name	Surname	Points	Cash Value	JoinedDate			
2	115000	male	Jordan	Barker	249	£31.13	14-Feb-08			
3	126382	female	Maisie	Porter	250	£31.25	12/12/2009			
21	180210	female	Keira	Allen	86	£10.75	05/02/2010			

Footer

To format text: select the text, then choose the font button.

To insert a page number, date, time, file path, filename, or tab name: position the
insertion point in the edit box, then choose the appropriate button.

To insert picture: press the Insert Picture button. To format your picture, place the
cursor in the edit box and press the Format Picture button.

OK   Cancel

Left section:

Data as of 01 August 2010
Printed: &[Date]

Center section:

Right section:

This screenshot illustrates that some columns are hidden (address and telephone details in columns E–H).

Use the footer to display information such as date, file name and page numbers.

If you want to give the date when the data was created or collected, enter that date directly into the footer. If you click on the calendar button, the footer will always show the current date.

C Wrapping up

Skill Check – make sure you know how to:

✓ enter suitable field names

✓ adjust column widths

✓ use the wrap text and text orientation features

✓ enter and edit records

✓ *limit entries into a field (L2)*

✓ add a field to a table

✓ sort on one field

✓ *sort on two fields (L2)*

✓ search on a single field

✓ *search on more than one field (L2)*

✓ *use relational and logical operators in a search (L2)*

✓ *use wild cards in a search (L2)*

✓ hide columns

✓ enter information into a footer

✓ *use the date function (L2)*

Test Tips

■ In Task 2 of the test, you are likely to be required to enter, sort and search records and process numerical data.
■ You should aim to make the table as clear and easy to understand as possible.
■ Have a look at the mark schemes for Task 2 of the sample tests to see what marks are awarded for.