GCSE ICT Worksheets

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Information and data

A computer system processes data. The data is input and the computer system does things to it. For example, the data might be sorted, searched and certain items selected or calculations might be performed on it. The result of this processing is information.

The table below shows data that has been input, the processing that has been carried out on it and the information that has been output as a result. Complete the blank spaces in the table.

| Data input	Processing done	Information output
A set of numbers: 1, 4, 2, 3.	Numbers added together.	A sum of the numbers: 10.
A set of surnames: Green, Jones, Smith, Allison.	Surnames sorted into ascending alphabetic order.	1 ....
A set of numbers: 1, 4, 2, 3.	2	A list of numbers: 1, 2, 3, 4.
A set of students' names and test marks: Jane Jones – 53, Alan Smith – 73, Mary Allison – 68, Tracy Brown – 75, Stephen Jones – 66.	3	Jane Jones – C, Alan Smith – A, Mary Allison – B, Tracy Brown – A, Stephen Jones – B.
A set of students' names and test marks: Jane Jones – 53, Alan Smith – 73, Mary Allison – 68, Tracy Brown – 75, Stephen Jones – 66.	Data searched to find the name and mark of the person who came top in the test.	4 ....
A set of students' names and test marks: Jane Jones – 53, Alan Smith – 73, Mary Allison – 68, Tracy Brown – 75, Stephen Jones – 66.	Data sorted into ascending alphabetic order by surname and then by first name for identical surnames.	5 ....
A set of students' names and test marks: Jane Jones – 53, Alan Smith – 73, Mary Allison – 68, Tracy Brown – 75, Stephen Jones – 66.	6	Jane Jones – 5, Alan Smith – 2, Mary Allison – 3, Tracy Brown – 1, Stephen Jones – 4.
A list of fruit and vegetables: Bean, apple, pear, banana, orange, pea, cabbage.	7	Bean, pea, cabbage.
A list of fruit and vegetables: Bean, apple, pear, banana, orange, pea, cabbage.	8	Bean, cabbage, pea.

Using computers

Computers are used for tasks that have a large volume of data to process, that are repetitive, and that require speed and accuracy. Computers can be essential when one or more of these factors are involved.

1 Read through the following tasks and decide which of the factors would justify using a computer to accomplish them. More than one factor could apply to a situation. Put a tick or a cross in the grid as relevant.

Task	Volume of data	Repetitive task	Speed important	Accuracy important
Printing GCSE examination result slips for all the Year 11 pupils in a school. The results are received on Wednesday and need to be handed out on the following Thursday.				
Printing individual timetables for new students joining the school in September. The timetable data and student data is available in June.				
Printing the percentage of absent students in each year group for each day during the previous week. The headteacher wants the information by the following Tuesday.				
Processing the data collected from the cheques paid into the bank each day so that customers' bank accounts can be updated.				
Automatically shutting a nuclear reactor down if it starts to overheat.				
Addressing 1000 envelopes for a mail order company to send information about a special offer to customers who have not ordered anything in the past year.				

2 Label each of the following statements to show if it is an **input**, an **output**, a **process** or a **file**.

a A printed list of students who were absent on Wednesday afternoon.   ....

b Presence/absence data for the week.   ....

c Student data stored on the computer system.   ....

d Searching a file of students to find who was absent on Wednesday afternoon. ....

e A teacher would like to produce an absence report for Wednesday afternoon. Use the statements above (a to d) to complete the flow chart below. Write the letters a to d in the boxes as appropriate and add arrows to show how the data flows through the system.
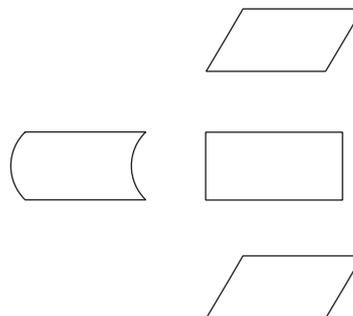
Input devices

1 Listed below are 20 input, output and storage devices that might be found in a computer system. Tick the boxes beside each of the **input** devices:

- CD drive ☐
- Digital camera ☐
- Dot-matrix printer ☐
- DVD drive ☐
- Graphics digitiser ☐
- Graph plotter ☐
- Hard disk drive ☐
- Ink-jet printer ☐
- Joystick ☐
- Keyboard ☐

- Laser printer ☐
- Light pen ☐
- Microphone ☐
- Mouse ☐
- Scanner ☐
- Tape unit ☐
- Touch-sensitive screen ☐
- Touch pad ☐
- Trackerball ☐
- Visual display unit (VDU) ☐

2 Write down three considerations you might take into account when choosing which input device to use for a particular situation.

a ....

b ....

c ....

3 Name each of the input devices described below:

a This device is good for inputting text. An advantage is that you do not need any special training or skill to use it. Another plus point is that, besides being able to input text, the device can also be used to input pictures.

  ....

b This device can also be used to input text by reading it aloud. Additional voice recognition software is needed for this method of input.

  ....

c This device is excellent for inputting technical drawings and plans. It allows accurate input of graphical data but it does take up some room on a desk.

  ....

d This device is useful for inputting text in a wide variety of situations. Even large amounts of text can be input by people who have been trained to use it.

  ....

e This device does the same job as a mouse but, instead of moving the device, the user moves a finger over a special flat surface. It is often found on laptop computers.

  ....

4 Name three input devices that you might find on a typical home computer.

a ....

b ....

c ....

Output devices

1　Listed below are 20 input, output and storage devices that might be found in a computer system. Tick the boxes beside each of the **output** devices:

- CD drive ☐
- Digital camera ☐
- Dot-matrix printer ☐
- DVD drive ☐
- Graphics digitiser ☐
- Graph plotter ☐
- Hard disk drive ☐
- Ink-jet printer ☐
- Joystick ☐
- Keyboard ☐
- Laser printer ☐
- Light pen ☐
- Microphone ☐
- Mouse ☐
- Scanner ☐
- Tape unit ☐
- Touch-sensitive screen ☐
- Touch pad ☐
- Trackerball ☐
- Visual display unit (VDU) ☐

2　Write down three considerations you might take into account when choosing which output device to use in a particular situation.

a　...

b　...

c　...

3　Name each of the output devices described below:

a　This device produces hard copy output. It is useful for printing two copies at the same time but it is rather noisy.

　　...

b　This device produces hard copy output. It produces good quality colour output and, since it is reasonably cheap to buy, many home computers have one of these attached.

　　...

c　This device produces high quality hard copy very quickly. It has a higher purchase price but cheaper running costs than other high quality printers. However, it is limited to monochrome output except in really expensive models.

　　...

d　This is the only device that can produce large-scale output in colour. It is the only option for producing A3 or larger size architectural drawings and plans.

　　...

e　This is the most common output device but it does not produce any permanent record of the output.

　　...

4　Name three output devices that you might find on a typical home computer.

a　...

b　...

c　...

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Computer hardware

1 Listed below are 20 input, output and storage devices that might be found in a computer system. Indicate what type of device it is by writing one of the following letters beside it: **I** for input devices, **O** for output devices, **S** for storage devices.

- CD drive   ….
- Digital camera   ….
- Dot-matrix printer   ….
- DVD drive   ….
- Graphics digitiser   ….
- Graph plotter   ….
- Hard disk drive   ….
- Ink-jet printer   ….
- Joystick   ….
- Keyboard   ….

- Laser printer   ….
- Light pen   ….
- Microphone   ….
- Mouse   ….
- Scanner   ….
- Tape unit   ….
- Touch-sensitive screen   ….
- Touch pad   ….
- Trackerball   ….
- Visual display unit (VDU)   ….

2 Complete the following sentences by choosing the correct words from the list below:

     data   floppy disk drive   CD-ROM drive   information   hard disk drive

A computer system is made up of a base unit that holds the processor. There are two read/write backing storage devices inside the base unit. These allow data to be saved before the computer is switched off. These are the .... and the .... Another storage device is often present. While this does not allow data to be saved, it does allow it to be read. This device is called a .... Peripherals are attached to the base unit to allow .... to be input and .... to be output.

3 Label the boxes on the diagram below as **input**, **output**, **processor** or **backing storage** and put arrows on the lines between the boxes to show how data moves through a computer system.
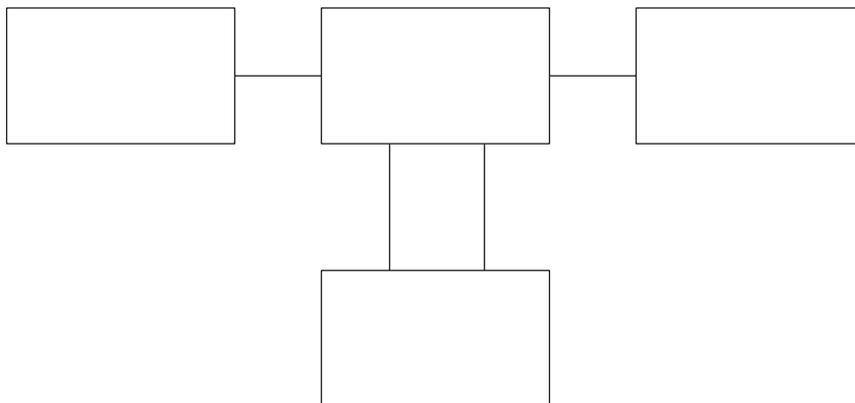
Media, memory and access

1 Different storage media have different capacities. Some media can be written once by the user, some many times. The table below lists a number of different storage media. Complete the table to show the characteristics of each:

	CD-ROM	CD-R	CD-RW	DVD-ROM	DVD-RAM	Floppy disk
What is the approximate storage capacity in megabytes?						
Can it be written once?						
Can it be written many times?						

2 What does ROM stand for? ....

3 What does RAM stand for?..

4 Put the following characteristics alongside the appropriate type of memory chip:

   • volatile   • non-volatile

   • stores the start-up program   • stores the program being worked on

   • data put in during manufacture   • data can be changed.

   a RAM...

      ....

   b ROM ....

      ....

5 Data can be accessed either sequentially or directly on some devices. Other devices allow only sequential access. Tick or cross the boxes to show what type of access is possible for each of the storage devices:

Device	Sequential	Direct
Floppy disk drive	☐	☐
Hard disk drive	☐	☐
Tape unit	☐	☐
CD-ROM drive	☐	☐

Computer software

The following list describes some of the software that can be run on a personal computer:

- **CorelDraw** – A drawing program that can be used to create pictures, for example, for presentations, reports and advertising material.

- **GHOST®** – Makes a compressed copy of a computer's hard drive. It can be used to restore the computer if the hard disk is damaged or corrupted.

- **Linux®** – Allows a computer to work on a network as a workstation or as a file server. The program will communicate with the network and control peripherals.

- **Microsoft® Windows 2000** – Controls peripherals and provides a graphical user interface to make operating the computer easier.

- **Microsoft® Word** – A word-processing program that can be used for a wide range of tasks which process text.

- **MYOB®** – An accounts package for small businesses.

- **WinZip®** – Compresses files so that they take up less storage space on the computer's hard drive.

Use the list above to answer the following questions.

1   Name two kinds of operating systems software:

     a ....   b..

2   Name two kinds of utilities software:

     a ....   b..

3   Name two kinds of generic application software:

     a ....   b..

4   Name a non-generic application software ....

5   Name four other generic applications that you have used:

     ....

     ....

     ....

     ....

6   Complete the following sentences by choosing the correct words from the list below:

                     ROM   program   operating system   RAM

When a computer is first switched on, only one .... is stored in its central memory. Since the computer has only just been turned on, the .... has no data stored in it. This means that this program must be stored in .... The program is called the **bootstrap** or **boot program**. Its job is to check that essentials like the memory, keyboard and disk drives are working. Then it loads the .... from either the hard drive or the floppy drive. Once this has loaded, the bootstrap program hands over the operation of the computer to it.

At the supermarket

The diagram below shows a supermarket system where several point of sales (POS) terminals are connected to a single computer through a device called a **multiplexer**. The multiplexer is a switching device that allows the computer to connect to each POS in turn. During the brief connection time, data can flow between the particular POS and the computer.

```
        ┌─────────────────┐
        │  Mini-computer  │
        └─────────────────┘
                 │
                 ▼
        ┌─────────────────┐
        │   Multiplexer   │
        └─────────────────┘
         │    │     │    │
    ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐
    │POS 1│ │POS 2│ │POS 3│ │POS 4│
    └─────┘ └─────┘ └─────┘ └─────┘
```
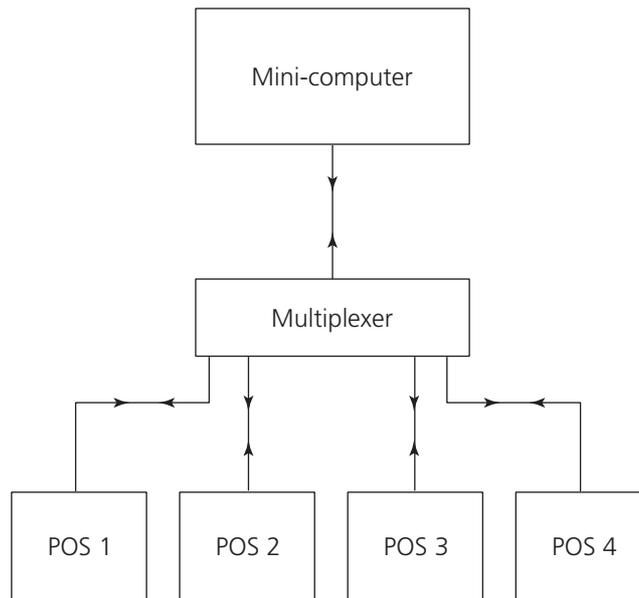
1 What name is given to the type of operating system that the mini-computer is running in this situation, where several users (one at each POS) are using the computer at the same time?

   ....

2 Name two tasks that the operating system will be doing that are special to this type of operating system.

   a ....

   ....

   b...

   ....

3 List three input and three output devices that would be found at each POS.

   Input devices   **Output devices**

   ....

   ....

   ....

Vocabulary test 1

Match each of the words in the list below to its definition:

Backing store	**Byte**	**CD-ROM**
Data	**Digital camera**	**Dot-matrix printer**
DVD-ROM	**Joystick**	**Multi-tasking system**
Multi-user system	**OCR**	**Operating system**
Plotter	**RAM**	**Scanner**
System flow chart	**Touch-sensitive screen**	**Volatile storage**

1   An input device where the user selects an item from the
    computer screen by pointing to it.   ....

2   An impact printer that prints by firing pins at an inked ribbon
    to make dots on the page.   ....

3   The unit used to measure storage capacity. Equivalent to one
    character's worth of storage.   ....

4   Values input to and stored in a computer system.   ....

5   Where data is stored when not actually being processed
    by the computer.   ....

6   A computer system where several users appear to have
    access to the computer at the same time.   ....

7   A device that produces hard copy output by drawing on the
    paper using a series of pens.   ....

8   Optical character recognition. A system of scanning written
    characters so that they are recognised for input to a computer. ....

9   Optical storage that is read-only.   ....

10 Storage where the data is lost when the power is turned off.   ....

11 A diagram that uses special symbols to represent the flow of
    data through a computer system.   ....

12 Random access memory – stores the user's data and software.   ....

13 An input device used to digitise pictures or as part of an
    optical character recognition system.   ....

14 A computer program that is present in memory all the time
    that the computer is working. It controls and manages the
    computer system's resources.   ....

15 A computer system where several programs are loaded into
    central memory at the same time.   ....

16 A device that would be suitable as an input device for
    a computer game.   ....

17 A device used to capture images of objects or people for
    later downloading to the computer.   ....

18 A high capacity storage medium that can hold over 9 MB of
    data or several hours of video data.   ....

Databases

A database stores data. It is made up of a number of records. One record stores data about one thing such as one person, one patient or one stock item. Each record is made up of a number of fields. A field stores one item of data about the thing, such as the person's surname or the stock item price. All the records in a particular file will be made up of the same fields.

A database can be used in the following situations:

- A computer shop stores details of what it has in stock so that it can automatically reorder items that are running low.

- A used car saleroom uses a database to keep track of which cars it has so that it can find a car to match a customer's needs.

- A large factory keeps details about its employees in order to pay them each week.

1   In each case, data will be stored in a file. The following sentences describe each of the three files. Complete the sentences by choosing the correct words from the list below. Some words can be used twice.

employee   car   file

a   The computer shop stores its data in the stock file. One record in this file is about one item of stock.

b   The car saleroom stores its data in the cars file. One record in this file is about one ....

c   The factory personnel department stores data in the .... One record in this file is about one ....

2   Fill in the field names for the records in the three files using the words below. Some words may be needed more than once:

Colour	**Date of birth**	**Description**
Engine capacity	**Hours worked**	**Make**
Minimum quantity	**Model**	**Name**
Number in stock	**Number of previous owners**	**Pay rate**
Payroll number	**Price**	**Registration number**
Reorder quantity	**Stock number**	**Supplier**
Tax code	**Total pay this year**	**Total tax this year**
Year		

Stock record	Car record	Employee record

3 Here are some values for the fields for one item of stock in the computer shop. Write out the stock item field names along the top of the table and an appropriate value from the following list underneath each field name:

Laser printer   6   1   3   5309   £920.00   Hewlett Packard

Field name							
Value							

4 The key field uniquely identifies a record. No other record will have the same value key field. Often, the only way to achieve a unique value is to make something up. Account number, catalogue number and stock number are examples of made-up key fields. What is the key field for each of the three records you have worked on?

a Stock record key field.

b Car record key field.

c Employee record key field.

Different fields can hold different types of data. The type of data that a particular field will store is decided when the database is designed. Some of the different types of data that can be stored are: text, memo, number, date, time, yes/no.

- **Text** would be used to store data like a name or an address: it would hold a few hundred characters.

- **Memo** is used for longer pieces of text, or text that would take up several lines. An example might be Report Comment in a pupil file.

- **Date** and **Time** fields are used to store dates and times.

- A **Yes/No** field can store any data where there are only two possible values.

Number data types are used only where the field is likely to be involved in numeric calculations or comparisons.

5 Complete the table below to show which data type would be best suited for some of the fields that you used in question 2. Use the following field names:

- Minimum Quantity

- Registration Number

- Date of Birth

- Colour

- Payroll Number

Field name	**Data type**

Selecting data

A database stores a lot of data. When you want to get information from it, you usually want to see only a selection of the data. You might want to select particular records. For example, you might select stock records for items of stock that need reordering.

A special database language can be used to select records. This language is used to make up a condition. The database will then only show records where the condition is true. Here is an example condition that will select records from the file of videos where the video rating is PG:

FOR category EQUALS "PG"

The condition always starts with the word **FOR**. Then there is a field name, followed by the condition word. In this case, the condition word is **EQUALS**. Other condition words are:

- **GREATER THAN**
- **LESS THAN**
- **GREATER THAN OR EQUAL**
- **LESS THAN OR EQUAL**

FOR	—	A field name	—	GREATER THAN LESS THAN GREATER THAN OR EQUAL LESS THAN OR EQUAL EQUALS	—	"Text" Number A field name A date
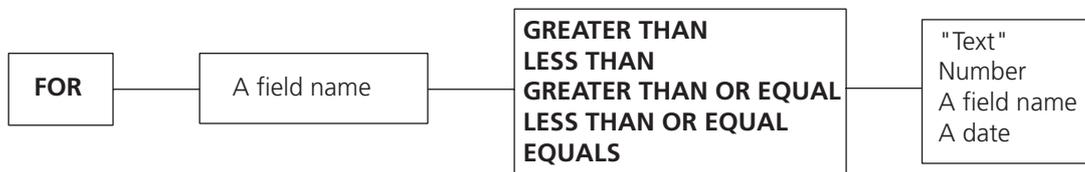
The command is always put together the same way. Notice that if the last part is text, it is put in inverted commas, as shown above.

All the questions in this section use the files, fields and records listed on the information sheet (page 44).

1 Write down the condition that will select the correct records in each of the following cases. Remember that each condition has to start with a **FOR** and it must have an **EQUALS**, **GREATER THAN** or **LESS THAN** in the middle.

a Cars that are red.

....

....

b Employees who have worked more than 40 hours this week.

....

....

c Videos that are due back tomorrow or later.

....

....

d Items of stock where the number in stock is less than the minimum quantity.

....

....

e Cars that cost no more than £5000.

....

....

Selecting the right records is only half the problem. We also have to tell the database which fields we want to print. This is done using the word **LIST**, followed by the fields we want to see. The following instruction will tell the database to print the video Title, Date Due Back and Category fields. Note that a comma is used to separate one field name from another:

LIST Title, Date Due Back, Category

2   Which command would be needed to tell the database to print the following? Do not forget that each of these instructions must start with **LIST**.

a   The Payroll Number and Name from an Employee Record.

....

b   The Model and Colour from a Car Record.

....

c   Stock Number, Description and Supplier from a Stock Record.

....

We have looked at the **FOR** command that selects which of the records are selected and the **LIST** that selects which fields are printed. A complete instruction would put these two commands together. We could tell the database which fields and which records we want to see. The following example would print a list giving the Payroll Number, Name and Hours Worked for all employees who have worked more than 40 hours this week:

LIST Payroll Number, Name, Hours Worked FOR Hours Worked GREATER THAN 40

3   Write down complete instructions, using **LIST** and **FOR**, together with the condition words **EQUALS**, **GREATER THAN** and **LESS THAN**, to produce the following printouts from a database:

a   A list giving the model, make and year of all red cars.

....

b   A list giving the titles of all the videos due back tomorrow.

....

c   A list giving the description of all the items of stock supplied by Xerox.

....

d   A list giving the stock number, description, and number in stock for all items where there are fewer than 100 in stock.

....

e   A list giving stock numbers and descriptions for all under-stocked items.

....

f   A list giving the names of all employees who are 65 or older on January 1st next year.

....

Joining conditions

Sometimes we need more than one condition to be true to select the records we want. For example, we might want to select records from the Employee file to find the names of those employees who are paid more than £5.20 an hour who have also worked more than 40 hours this week. This would be done with the following instruction:

LIST Name FOR Pay Rate GREATER THAN 5.20 AND Hours Worked GREATER THAN 40

Here there are two conditions after the **FOR**. The conditions are joined by **AND**. Records will only be selected for printing if both the conditions are met.

OR is another joining word that can be used to link two conditions. If **OR** is used, then records will be selected if either one of the conditions is true. The following instruction would list all the videos that were either in the shop now or were due back today:

LIST Title FOR On Loan EQUALS NO OR Date Due Back EQUALS TODAY

Note that if **AND** or **OR** is used then you need to repeat the field name, even if it is the same field involved in the second condition. To print a list of red or blue car registration numbers you would need the following instructions:

LIST Registration number FOR Colour EQUALS "Red" OR Colour EQUALS "Blue"

Write out the instructions needed to select the required fields and records for each of the following cases. All these questions use the files, fields and records listed on the information sheet (page 44).

1   A customer wants a list of models for all red cars that cost less than £4000.

....

....

2   You want a list of the titles of all PG videos that are in the shop at the moment.

....

....

3   A customer wants to know the make and model of any blue car with an engine capacity of at least 1300 cc.

....

....

4   We need a list giving the description and price of all items in the stock file that are described as 'laser printer' or 'ink-jet printer'.

....

....

5   We need to know the stock number, description and number in stock for all Hewlett Packard products that need reordering.

....

....

Wildcard searches

Sometimes we do not know exactly what we are looking for when selecting the records we want from a database. For example, the police may need to find a car but only know the start or end of its registration number. In this situation, we can do a wildcard search. We put an asterisk (*****) in the place where the missing or unknown characters are.

The following command will print the registration number, make and model of all cars that have a registration that starts V46:

LIST Registration Number, Make, Model FOR Registration LIKE "V46*"

Notice that the wildcard ***** has been put on the end of the V46, and that instead of **EQUALS**, a new word, **LIKE**, has been used.

If we knew that the registration number ended with the letter 'R' then the command would have been:

LIST Registration Number, Make, Model FOR Registration LIKE "*R"

We just put the wildcard in the place where the unknown letters are.

Write out the database instructions needed in the following situations. All these questions use the files, fields and records listed on the information sheet (page 44).

1   A list is required of the payroll numbers and names of employees whose name begins with the letter B.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

2   A printed list of video titles and date due back for any videos that are on loan and have a title that starts with the letter D.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

3   A list of stock number descriptions and numbers in stock of items that have the word 'printer' anywhere in their description.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

4   A list of stock number descriptions and numbers in stock for all printers that need reordering.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

Using a query to select records

You have been learning how to write instructions in a database language. These instructions have told the database which fields to print (**LIST**) and which records you want to see (**FOR**). This method of interacting with a computer is called a command line interface.

You are probably much more used to interacting with the computer using a graphical user interface (GUI). This uses icons and pictures to let you tell the computer what to do. You can use a GUI to tell a database which fields and records you would like to see.

Click this button to see the result
of the query (shown below)

This box shows the list
of fieldnames

Fieldnames can be
dragged from the
box onto the
grid below

If the box is ticked then the
field will be printed

The condition is put on
this line

This query does the same job as the command:

LIST StockNumber, Description, NumberInStock FOR Supplier EQUALS "Hewlett Packard"

The result of the query is shown on the right. The fields that were ticked on the query grid have been printed. The records that are shown all have "Hewlett Packard" in the Supplier field. Notice that, since the Supplier field did not have the Show box ticked, it has not been printed.

All the questions on this worksheet are about the stock file. The list of filenames is given below. Notice that, since in a real database field names do not usually have spaces in them, the spaces have been removed from the field names that we have been using up to now.

- StockNumber
- Price
- NumberInStock
- ReorderQuantity

- Description
- Supplier
- MinimumQuantity

For each question, complete the grid to produce the query requested. Underneath the grid, write down the command language instruction that would do the same job as the query.

1 The StockNumber, Description and NumberInStock for all items supplied by Philips.

Field				
Sort				
Show				
Criteria				

....

....

2 The Description, MinimumQuantity and price of all items that cost more than £250.

Field			
Sort			
Show			
Criteria			

....

....

3 The StockNumber, Description, NumberInStock and MinimumQuantity for all items that need reordering.

Field				
Sort				
Show				
Criteria				

....

....

4 The Description and ReorderQuantity for all items supplied by Hewlett Packard that need reordering.

Field				
Sort				
Show				
Criteria				

....

....

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Validation

Validation is the process of checking data to make sure that it is sensible and reasonable. If data is not sensible and reasonable then it is probably incorrect. The purpose of validation is to try to spot the incorrect data – but a validation check will only spot the incorrect data if it stands out by being impossible. So it is wrong to say that validation checks that data is correct. It only checks that the data is sensible.

A validation check can be done at any stage of processing. Validation takes place at input, during the processing and when the final information is output.

Data		Computer		Information
is	$\longrightarrow$	*does the*	$\longrightarrow$	*is*
Input		Processing		Output
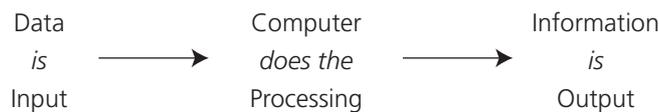
Validation can take place at any of these stages

1   The text below describes five different methods of validation. Complete the following sentences using the correct words from the list below:

> *range check   parity check   check digit   list check   presence check*

Sometimes, when numeric data is input, we know that correct data values must lie between two particular values. In this situation, we can use a .... to validate the data. If the data has to be one of a set of values, then we can use a .... to check that the data entered is one of the allowed values in the list. In some cases, a particular data value has to be present or processing cannot continue. In this situation, a .... would be used to make sure that the essential data was present. Errors often occur when long strings of digits are entered. An example might be when a customer account number is entered. In this situation, the final digit in the number would be a .... This digit is put at the end of the account number and its value is based on the other digits in the number and their position. You cannot use this method of validation on numbers that will be needed for calculations, since the extra digit means that the number has changed. A final method of validation can be used when data is transmitted or moved about within a computer system. The data moves as patterns of ones and zeros. There are eight ones and zeros (binary digits or bits) in each pattern, but only seven are needed to carry the data. The eighth bit is used to make the number of ones in the pattern an even number. Only a pattern with an even number of ones is valid. This is called a ....

2   Text is made up of characters. These characters are stored as patterns of ones and zeros. The ones and zeros are called bits. Some of the patterns that are used are shown on the next page. Only seven bits are needed to give enough patterns for all possible characters. The eighth bit is used for a parity validation check. The parity bit has been missed off the diagram. Put a one or zero in the empty parity bit place so that each pattern has an even number of ones.

A		1	0	0	0	0	0	1		D		1	0	0	0	1	0	0
B		1	0	0	0	0	1	0		E		1	0	0	0	1	0	1
C		1	0	0	0	0	1	1		F		1	0	0	0	1	1	0

3   The table below shows the structure of a record in the car file. There are eight fields in a single record. The second-hand car saleroom only deals in cars that are less than five years old and that cost between £3000 and £10 000. They also deal in a limited number of makes of car, namely Toyota, Ford, Rover and Renault. Although all the cars that they deal in are second-hand, none of them has had more than two previous owners. It is important that car details are entered into the database correctly so data is validated when it is input.

Cars file	
Car record	Colour Engine Capacity Make Model Number of Previous Owners Price Registration Number Year

Complete the table below to show which three fields could be validated using a range check when the data is input. In each case, say what the range of possible values is.

Field	Range of possible values for valid data

4   Which field could be validated using a list check? ....

5   What are the valid data values for this list? ....

6   One of the sales people has suggested that a check digit could be used to validate the price. Explain why this is not a sensible idea.

....

....

7   The saleroom manager has complained that even with all the validation checks built into the system, some records still have incorrect data. Explain how valid data can still be incorrect. Use examples from the fields and validation checks above to help explain your answer.

....

....

....

....

Vocabulary test 2

Match each of the words in the list below to its definition:

Bootstrap loader   **Computer system**   **Data compression**

Direct access   **Dot-matrix printer**   **Field**

Floppy disk   **Generic software**   **Graphics digitiser**

Information   **Ink-jet printer**   **Key field**

Laser printer   **Query**   **Range check**

Validation   **Volatile storage**   **ROM**

1   Storage where the data is lost when the power is turned off.   ....

2   A small magnetic disk which can store about one megabyte
    of data.   ....

3   A combination of hardware and software designed to
    process data.   ....

4   Stores one piece of data such as the colour of a stock item or
    a customer's surname.   ....

5   Processed data that is output from a computer system.   ....

6   A small computer program that loads the operating system
    program into the computer's memory when it is first
    switched on.   ....

7   Software written to solve a wide variety of jobs.   ....

8   An input device that consists of a tablet and stylus and that is
    used for inputting drawings.   ....

9   Checking data values to make sure that they are reasonable
    and possible.   ....

10 A field that uniquely identifies a record.   ....

11 A method of storing data so that it takes up less space.   ....

12 A method of validation that checks a data value lies between
    two known extreme values.   ....

13 A non-impact printer that prints by fusing small particles of
    toner onto the paper.   ....

14 Accessing a record without the need to process or access any
    other records in the file by calculating its position and going
    directly to the required record.   ....

15 An instruction to a database program to select certain records
    according to the criteria defined either by words or by a
    screen representation.   ....

16 An impact printer that prints by firing pins at an inked ribbon to
    make dots on the page.   ....

17 A non-impact printer that prints by firing droplets of ink at
    the paper.   ....

18 Read Only Memory – stores the bootstrap loader.   ....

Data capture forms

A data capture form is used to collect data that will be entered into a computer system. It is important that the form is designed in a way that helps the user to fill in the correct data and reduces the chance of error when the data is copied onto the computer.

1   A computer shop has details of its stock stored on computer. Recently, the manager has introduced an on-site warranty scheme. To apply for a warranty, customers can fill in a form and pay an additional amount when they buy something from the shop. The warranty starts from the date the item was bought. If the item breaks down, an engineer will visit the customer's home or business to repair it. Customers can take out a one-, three- or five-year warranty. Customers have to complete the form and return it to the shop within 14 days of buying the item. The manager is setting up a database to store details of each warranty that has been taken out. Some of the items of data that the form will need to collect are listed below. For each of these, say what type of data it is and explain why this data is needed.

	Data type	Reason why the data is needed
a Customer address	....	....
b Customer name	....	....
c Customer telephone number	....	....
d Date of purchase	....	....
e Item bought	....	....
f Period of warranty	....	....
g Serial number	....	....
h Supplier	....	....

i   The data above (ie a to h) could be put into three different groups, depending on what it relates to. Use the table below to group the data:

This is the data about the customer	This is the data about	This is the data about ....

There are a number of different methods that can be used to collect data on a form. Three of these are explained below:

a   **Entry boxes with a separate box for each character.** This method is useful if you need to limit the number of characters that the person completing the form can use, for example:

Name																							

b **Tick boxes** can be used where there is a small number of possible data values, for example:

SEX   Male   ☐   Female   ☐

A variation on this method is to ask the person completing the form to circle or underline one of the choices.

c **Memo** or **free form entry** can be used when there are several lines of text to be entered, particularly if the person designing the form does not know exactly how much or how many lines of text will be needed to enter the data.

Address

2 Put a letter to show which method (a, b or c) described above would be most suitable to collect the data item listed.

Data	Letter	Data	Letter
Customer name		Customer address	
Period of warranty		Date of purchase	
Customer telephone number		Item bought	
Serial number		Supplier	

3 Sometimes the person filling in a data capture form may not understand what they are supposed to put on the form. The form designer will often include an example so that the person completing the form can see the sort of data that is required. If an example is not appropriate then a brief explanation or prompt may be given. Say which of the eight data items might need a prompt or some explanation. Give a reason for your answer.

....

....

4 When the shop gets the form back, a secretary will enter the details into the computer. To save storage space on the computer, the description and supplier will not be entered. Instead, the secretary enters the stock number for the item. The secretary does not know details of the stock, so when the form is first received, a member of the sales staff will need to write the stock number on it. This must be done in a section of the form reserved for office use. On a separate piece of paper, design a suitable layout for the form. Remember to:

• group data sensibly

• use prompts and examples where appropriate

• use borders, lines and shading where appropriate

• indicate the number of characters available by using entry boxes

• use a mixture of the three data collection methods listed above (entry boxes, tick boxes and free form entry).

Computer-readable forms

A computer-readable form is one that the computer can read directly. There is no need for someone to enter the data or to prepare it by copying it to a medium that the computer can read.

1 The text below describes the different methods of creating a computer-readable form where the computer reads characters or marks on the form. Complete the sentences using the correct words from the following list:

OCR   MICR   OMR   Post Office   accurate   I   A to E   banks

Optical mark recognition or .... is used for multiple-choice examinations. The student is given a question and five possible answers marked .... The student answers the question by underlining one of the letters.

An **optical character recognition** or .... scanner scans ordinary printed text and recognises each of the characters by its shape. It can make mistakes, for example, by confusing the letter .... with the number 1. This method is used by the .... for the computerised sorting of letters. The only part of the address that needs to be scanned is the post code.

Magnetic ink character recognition or .... is used only by .... Although it is expensive, the data input is very fast and ....

2 When choosing a type of computer-readable form, a number of factors will need to be considered, depending on the situation. The cost of producing the forms might be important in one situation, while accuracy with which they can be read might be more important in another. To show the strengths and weaknesses of the three methods described above, put a tick for a strength and a cross for a weakness:

	OMR	OCR	MICR
• Forms can still be read even if dirty or written over.	☐	☐	☐
• Forms can be understood by humans.	☐	☐	☐
• Forms are cheap to produce.	☐	☐	☐
• Very few errors when the computer reads the data from the form.	☐	☐	☐
• A wide range of data can be collected.	☐	☐	☐
• Data input is very fast.	☐	☐	☐

Magnetic swipe cards are often used for credit and cheque cards (Switch or Debit). These allow people to obtain money from automatic teller machines (ATMs) or to pay for goods in shops. Swipe cards are also used for customer loyalty or bonus schemes in supermarkets and other shops. In all cases, data is stored on the magnetic strip on the back of the card. Because this data could be read or changed by criminals if the card were lost, sensitive information, such as a PIN number or a bank balance, is not stored on the card.

3   The flow chart below shows the initial stages of a customer using a cash machine (ATM) to obtain a banking service. Use the words listed below to fill in the boxes on the flow chart.

Error message   Swipe data read   PIN number checked   Customer file
PIN number entered   Service required entered
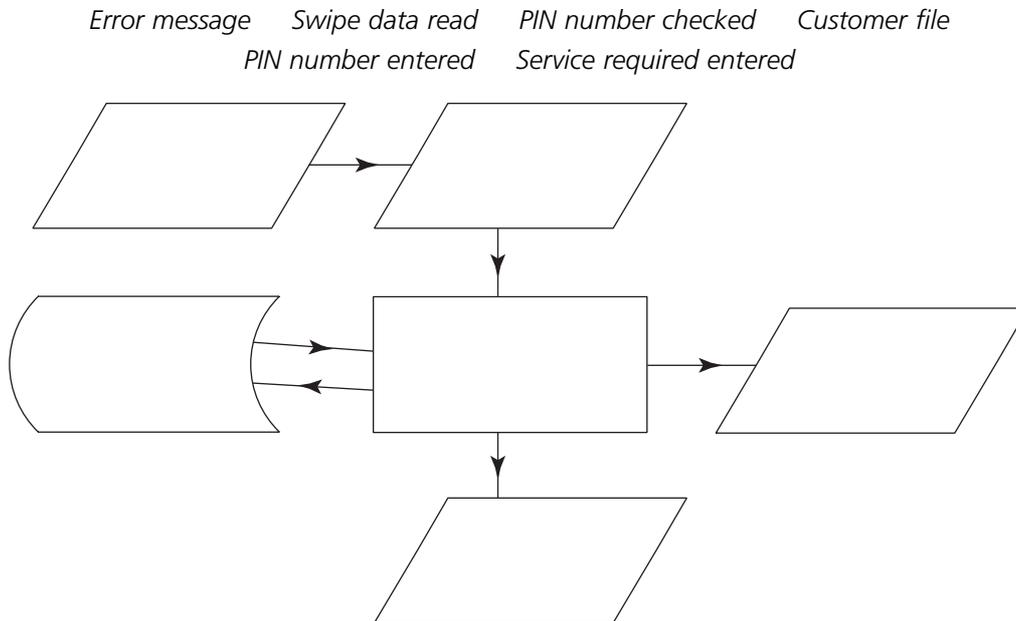
4   Name three items of data that are stored on the magnetic strip on the back of the swipe card.

a   ....

b   ....

c   ....

5   The customer file is stored at the bank's central computer. Which data do you think the ATM transmits to this computer?

....

6   The diagram above ends at the point where the customer enters the service required. One possible service is to withdraw cash. Describe one other possible service.

....

7   If the customer chooses to withdraw cash, the ATM will send data to the bank's central computer to update the customer's file. Which data will be sent at this stage?

....

8   In this application, the customer account number and the amount of money required are two data items that have been entered at the ATM. What would be the best validation method for the account number?

....

9   What would be the best validation method for the amount of money required?

....

10 Why is there less chance of the account number being entered incorrectly compared with the PIN number or amount of money required?

....

Bar codes

1   Bar codes are used in many shops to identify goods at the point of sale. This has advantages for the shop management and for the customer. Complete the following passage that describes the use of bar code systems in shops.

<div align="center">

file   itemised receipt   manufacturer   printer   bar codes
price   product   description

</div>

Manufacturers print .... as part of the product packaging so that products can be scanned at the point of sale. This pre-printed bar code is a number that identifies the country of origin, the .... and the actual .... When the bar code is scanned, the product's .... and .... are found in the products .... on the shop's computer system and are transmitted to the point of sales terminal. They are printed to provide the customer with an ....

Not all goods are pre-packed. A delicatessen counter within a supermarket will weigh out goods, putting them in a bag for the customer. The electronic scales used will also contain a .... that will produce a label with a bar code on. This is stuck on the bag.

2   There are benefits for the customer and for the shop management when a bar code system is used. In the space below, list four advantages for each.

For the customer: ....

....

....

....

For the shop management:..

....

....

....

3   Libraries often use bar code systems. When someone joins the library, the librarian prints off a bar code label with their membership number. Three of the files used by the library system are given below. Complete the tables to show which fields belong in each file. Note that the book ID is made up of the ISBN (International Standard Book Number) and an acquisition number. The ISBN identifies the book. Some fields appear in two of the tables and these field names are repeated in the list.

<div align="center">

Book ID   Name   Date of Loan   Author   Title   Book ID   Membership Number
Date of Birth   Category   Address   Membership Number   Expiry Date

</div>

Members file	Loans file	Book file

4   Read the following passage and then answer the questions:

Mary Smith has just joined the library. She filled in an application form and gave it to the librarian. The librarian entered Mary's details onto the library computer. The computer made up a unique membership number for Mary and printed out a membership card, which had Mary's name on it. The membership card also showed Mary's library membership number. The membership number was presented as a bar code with the numbers underneath. Mary chose three books and took them to the librarian. The librarian used a wand bar code reader to scan Mary's membership card. She then opened each book in turn and scanned the bar code that was printed on a label stuck inside the front cover of the book.

a   Which of the library files would be updated when Mary's application form
was processed?...

b   Why did the computer need to make up a unique membership number for Mary?

    ....

    ....

c   Which file was accessed when Mary's membership card was scanned as she took her
three books out and why was this necessary? ....

d   Which file was updated when the librarian scanned the bar codes in each of
the books? ....

e   Complete the flow chart below which shows the book issuing system. Use the words
from the following list:

Membership number read   Check digit validates input   Loans file   Loan processed
Double beep if book ID is invalid   Members file   Check digit validates input
Card expiry date checked   Book ID read   Double beep indicates membership expired
Beep indicates valid membership number   Beep indicates loan processed
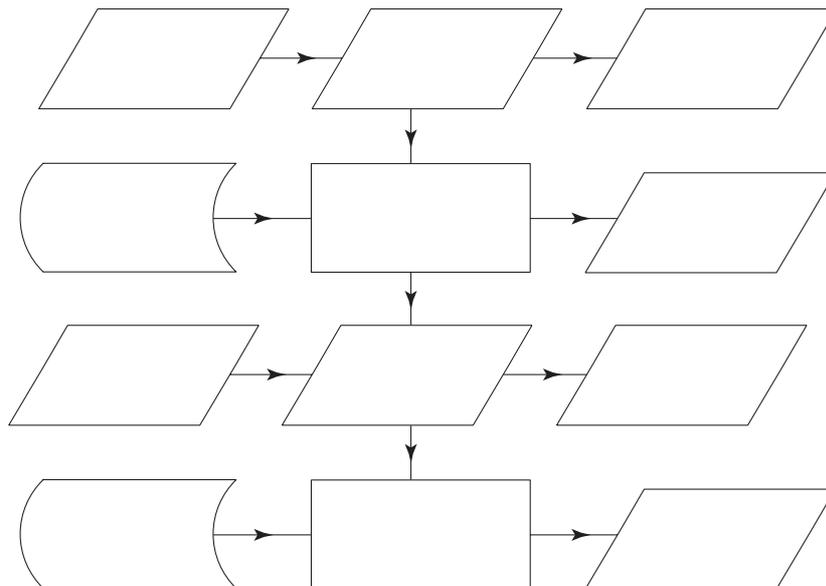
File processing

A large company uses a computer payroll system to produce payslips for its employees. Each employee's details are stored in a master file with payroll number as the key field. Employees clock on at the start of each day by passing a magnetic swipe card through a swipe card reader placed near the entrance to the works. When they leave the works, they pass the card through the reader again.

The front of the card has a picture of the employee, together with their name and payroll number. Only one piece of data is stored on the magnetic strip on the back of the card. The card is also used to unlock electronically locked doors inside the works. Only some employees are allowed through some doors into certain areas.

1   What data is stored on the magnetic strip?

    ....

2   Why is the employee's name printed on the card?

    ....

3   Why is the employee's picture printed on the card?

    ....

4   What data is stored by the company's computer when an employee clocks on?

    ....

5   When an employee uses the card to unlock a door they have to enter a PIN number.
    Explain why this is necessary when unlocking a door but not when clocking on or off.

    ....

    ....

6   Each employee receives a payslip like the one below.

Name	John Brown			Payroll number	0156958	Date		06/11/2002
NI number	YL462477B			Tax code	0536H	Hourly rate		£8.20
		Mon	8					
		Tue	8	Gross pay		Deductions		
		Wed	8	Basic	£287.00	Tax	£57.40	
		Thu	8	Overtime	£000.00	NI	£18.10	
		Fri	5	Total gross	£287.00	Total deductions	£75.50	
	Total hours worked		35	Net pay	£211.50			
	Total gross pay to date		£9184.00		Total tax to date		£1636.80	

Which items on this payslip are also fields in the employee master file?

    ....

    ....

    ....

7 Which two of these master file items have values that change each week?

a ....

b ....

8 Which items are only calculated during the payroll processing and are not stored in any file?

....

....

....

9 At the end of each week, all the data that has been collected from the magnetic card reader is processed to produce the payslips. What is this type of processing called?

....

10 Complete the flow chart below to show the movement of data through the system. Use the following words:

Sorted clock file   Swipe card input (time + payroll number)   Updated employee file
Sort   Unsorted clock file   Merge and calculate   Employee file
Payslip   Error report
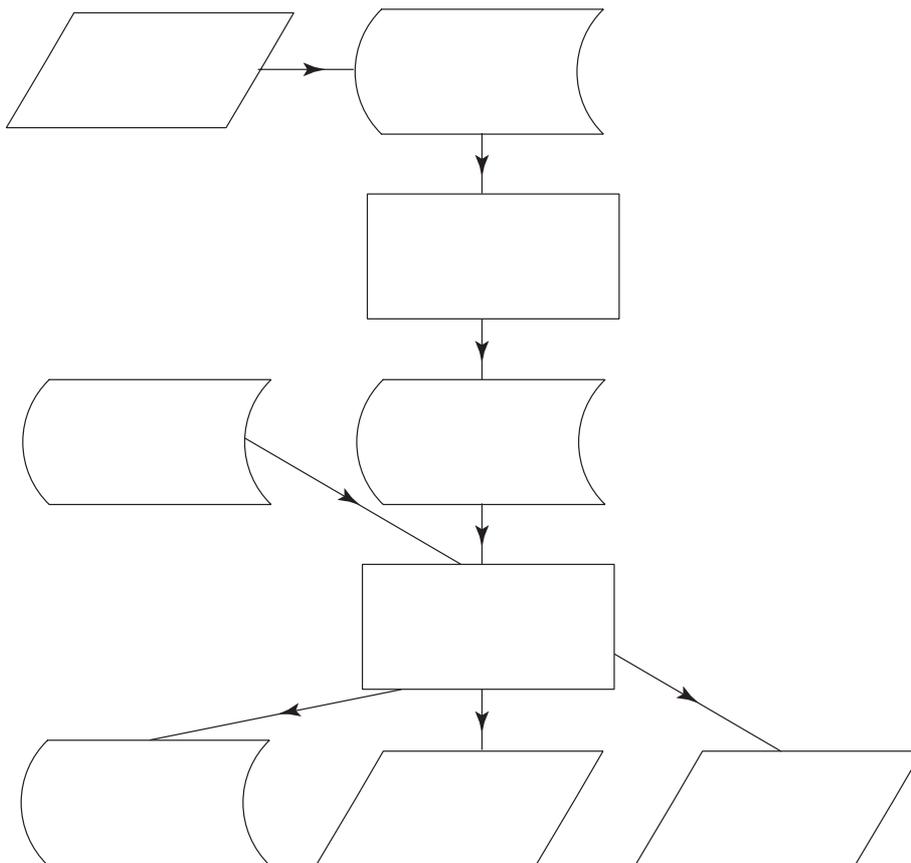
There are two **father generation** files in this chart. Label them with an **F**.

There is one **son generation** file in this chart. Label it with an **S**.

Label the transaction file with a **T**.

Label the original master file with an **M**.

Data security

Data stored on a floppy disk can be lost if the disk is not properly looked after. Disk packets and labels often have pictures which tell the user of the conditions under which the disk must be stored and also warn against certain hazards to the disk. *Figure 1* might be found on a floppy disk packet.

1   What is *Figure 1* saying about the conditions that the disk must be stored in?

....

....

Figure 1

2   If the disk were left in a situation where this condition was not met, then the data on it might be lost. Give two ways that this might happen in a normal office where the room temperature never goes above 25°C or below 16°C.

a   ....

b   ....

3   What is *Figure 2* warning against?

....

....

Figure 2

4   Give two ways in which a floppy disk in normal use could be affected by this hazard.

a   ....

b   ....

5   *Figure 3* shows a floppy disk without the shutter that normally protects the disk surface. Shade in the part where the magnetic disk surface can be seen.

6   Copy the shutter, which is shown below, onto the diagram (*Figure 3*) to show its position when the disk is inserted into the disk drive.
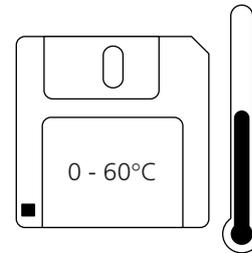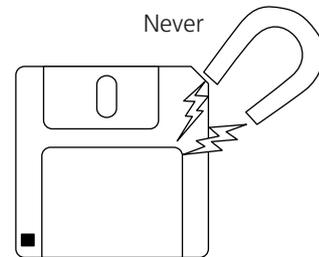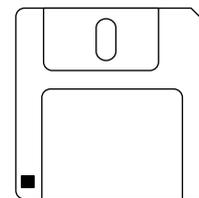
Figure 3

7   What is the purpose of the hole in the bottom left-hand corner of the the disk case in *Figure 3*?

....

....

Human–computer interface

A long distance bus company runs services from Newcastle to London, Manchester, Edinburgh and Glasgow. There are up to three buses a day to each of the destinations and customers can book a seat on a bus up to three months in advance by telephoning or visiting the Newcastle office. The booking office uses a computer system to store data about customers, bookings and buses.

When a customer books a seat, the booking clerk will ask which destination the customer wants a ticket for, which month they wish to travel, which day and which bus they wish to catch. Finally, the clerk will tell the customer if there are any available seats on the bus the customer wants and, if there are, the customer details will be taken and the seat booked.

The booking system uses a menu-based interface. The initial menu screen is shown in *Figure 1* below.

1 While this screen is visible, the booking clerk will be asking the customer, "Which city do you want to travel to?". The option to exit the system is used to shut the system down at the end of the day. It appears only on this menu. Why is a menu-based human–computer interface suited to this application?

....

....

....

....

....

....

```
Phoenix Travel Booking System

        Main Booking Screen

        A    Edinburgh
        B    Glasgow
        C    London
        D    Manchester


        Select a destination or
        press X to exit the system
```
Figure 1

2 When a destination is chosen on this first screen, the menu changes, as shown in *Figure 2*. Only the selected destination is shown and an input box appears asking for the date of travel. In the example in *Figure 2*, the customer wants to travel to Glasgow. In what way has the designer of this system tried to provide a consistent user interface?

....

....

....

....
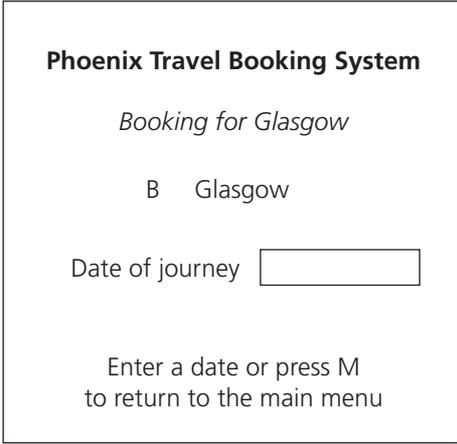
```
Phoenix Travel Booking System

        Booking for Glasgow

        B    Glasgow

Date of journey   [          ]


        Enter a date or press M
        to return to the main menu
```
Figure 2

3 All other menus offer the clerk the opportunity to return to the previous menu. How should this option be presented on the screen to maintain a consistent interface?

....

....

4   Give two ways that the date could be validated when it is input.

   a   ....

   b   ....

5   The date of travel could be selected using two menus, one to select the month and one to select the day. Why has the designer decided to use an input box rather than two more menus?

   ....

   ....

6   A customer wants to travel to Glasgow on 24th May any time after midday. There are three buses to Edinburgh on this date. They leave at 0800, 1100 and 1400 hours. The first bus is full and the menu system must indicate this on the screen. On a separate piece of paper, draw a design for the next menu screen that will appear after the clerk has entered the date. Make sure that your design keeps the consistent user interface.

7   Apart from the text used to describe options and the way it is positioned on the screen, describe two other ways in which this user interface could be made consistent.

   a   ....

   b   ....

8   The system designer has suggested that a more powerful interface could be developed using a command language. Describe a situation where the menu-based system would not allow the clerk to answer a customer's enquiry easily.

   ....

   ....

9   How might a command-based language solve this problem?

   ....

   ....

10 The booking system uses transaction processing. What does this mean?

   ....

   ....

11 Why is this type of processing necessary for the booking system?

   ....

   ....

12 If the data in the booking file is lost or destroyed, the bus company will have no record of customer bookings. It is therefore important that they keep a backup of the data. Explain how this could be done.

   ....

   ....

13 The owner of the bus company has decided that a graphical user interface is more up-to-date and would be easier to use. The clerk would use one screen to enter the destination, date and bus required. On a separate piece of paper, design a screen layout for this interface.

The Internet and networks

1   The text below describes some of the developing uses of the Internet. Complete the
    following sentences using the correct words from the list below:

banking   shopping   encryption   virus checker   credit card

Internet access is becoming an important way to communicate and to share information.
One developing use of the Internet is Internet .... If the Internet is used
to buy goods or services, then the purchase has to be paid by ....
Many people are afraid that giving account details over the Internet might lead to
criminals intercepting the data and using it fraudulently. Most organisations that provide
Internet shopping provide a secure site that protects the data using ....

Another developing use of the Internet is for .... services. Customers can
view their accounts, transfer money from one account to another, set up standing orders
and pay bills online. Again, security is an important consideration and so data transfers
are encrypted.

Use of the Internet can lead to viruses being downloaded and infecting the user's
computer. This threat can be countered by running a .... program
to protect the computer from attack.

2   The list below gives four different activities that the Internet could be used for. Think
    about how the activity would be done without the Internet. Give an advantage and a
    disadvantage of using the Internet for this activity:

	Advantages	**Disadvantages**
a Downloading software	....	....
b Buying a car	....	....
c Running a bank account	....	....
d Searching for information	....	....

3   The diagram below shows a local area network (LAN). Use these words to add labels
    showing the different components that make up the LAN:

File server   Network printer   Network station   Printer server   Terminator
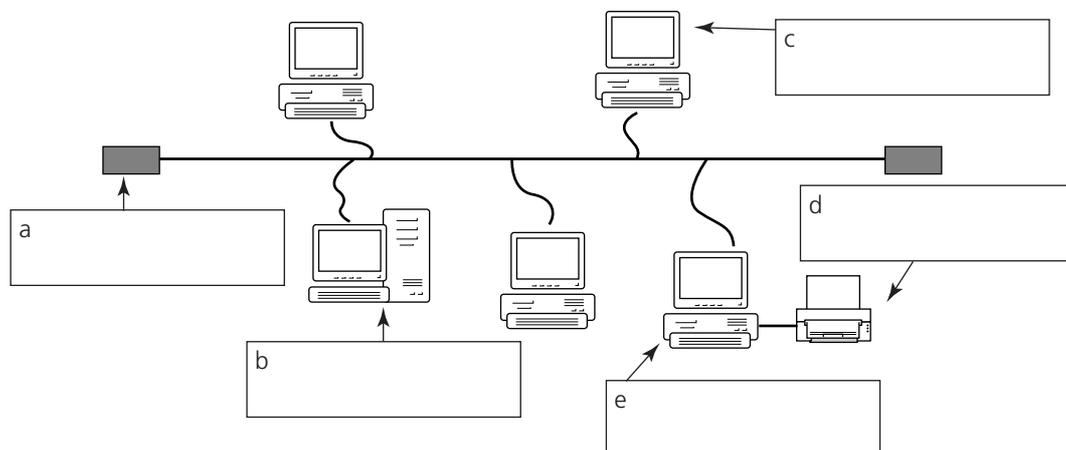
4   A doctor's surgery might have a LAN like the one shown in question 3. There would be a workstation in each doctor's office and one in the reception area. What advantages would this system have over stand-alone machines?

....

....

5   What problems might there be with using a system like this?

....

....

....

6   The doctor might want to communicate with a specialist in a hospital about a patient's treatment. What additional hardware would be needed if the doctor wanted to use email to communicate with the specialist?

....

7   Where would a patient's record be stored in this computer system?

....

8   Give six fields that would be found in a patient record.

a   ....

b   ....

c   ....

d   ....

e   ....

f   ....

9   The diagram below shows another type of network. What is this type of network called?

....
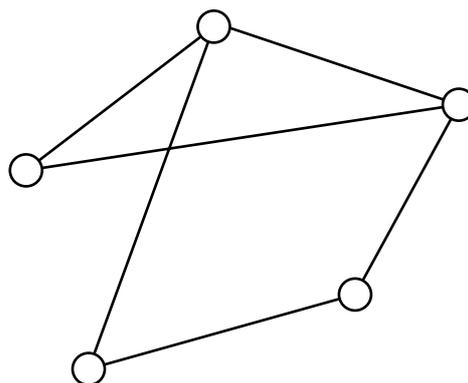
10 Give two ways that this network differs from a local area network.

a   ....

b   ....

Sensors – 1

Sensors are used to detect and measure physical events and data. Different sensors will be used in different situations.

1   Choose the correct sensor from the following list for the activities below:

Strain gauge   Pressure switch   Thermistor   Light sensor   Infra-red source and detector
Reed switch and magnet

Activity	Sensor required
a Detecting someone climbing the stairs.	....
b Weight measurement in digital scales.	....
c Counting the number of drinks cans coming off a production line.	....
d Detecting a door opening.	....
e Automatically switching an outside light off during the day.	....
f Turning a boiler off when the hot water in the tank is at 80°C.	....

2   Mr Jones' security light is automatically turned on when movement is detected outside his house. The neighbours have complained that cats and dogs trigger the light so that it goes on and off all night. This is a nuisance. How can this problem be solved?

....

....

3   In a science experiment, a steel ball-bearing is rolled down a board. The board has a groove in it so that the ball rolls straight. The purpose of the experiment is to measure how long it takes the ball to move the one metre distance from A to B, starting at rest at A. This is done with the board at different angles. A data-logger is used to measure the time the ball takes to move from A to B.

Steel ball-bearing

A

B
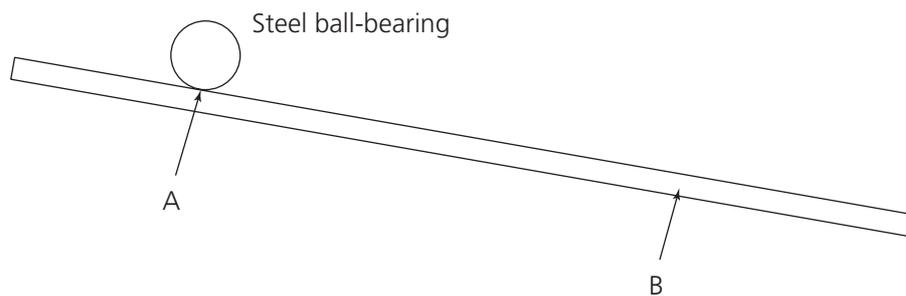
a   What advantage does data-logging have in this situation compared to using a stopwatch?

....

....

b   Describe the sensors that could be used to detect when the ball moves from A and arrives at B.

....

....

Sensors – 2

The Met Office has a network of automatic weather stations placed around the UK, often beside main roads. These record data such as wind speed and direction, atmospheric pressure, humidity, hours of sunshine, temperature and the amount of rainfall. The automatic weather station can store data from the sensors, calculate average values and transmit the data to the Met Office through a telephone link. Readings may be taken as often as once per second, although average values may be calculated over an hour or day. For example, the air temperature is sampled 12 times per minute. The sensitivity of the temperature sensor is 0.1°C while its accuracy is 0.2°C.

1   Give two reasons why data logging is used in this application.

   a   ....

   b   ....

2   The automatic weather station consists of sensors and a data logger. What other piece of hardware is needed to allow the station to send data to the Met Office using a telephone line?

   ....

3   The air temperature is measured to a sensitivity of 0.1°C. What does this mean?

   ....

4   The air temperature is measured to an accuracy of 0.2°C. What does this mean?

   ....

A wallpaper factory produces paper that must be a certain thickness. The thickness of the paper is controlled by the speed of two rollers. Increasing the roller speed makes the paper thinner and decreasing it makes it thicker. About three metres of paper is produced each second. Data from the thickness sensor is passed as input to a microprocessor.
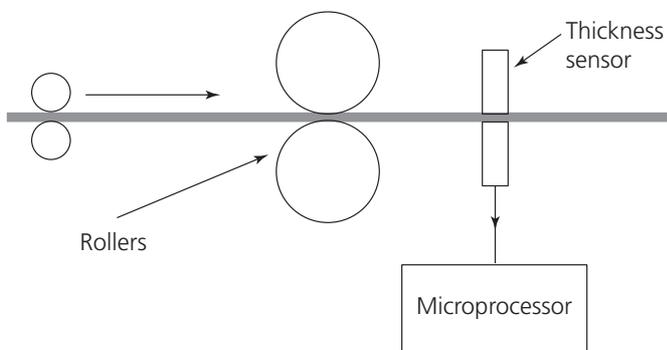
5   Explain why the program that the microprocessor is running is stored in ROM rather than RAM.

   ....

6   What would a reasonable sampling rate be for this system?...

7   What will the output of the system control? ....

8   What effect will the output have on roller speed if the paper is too thick?

   ....

9   What will the effect of this be on the thickness of the paper that is produced?

   ....

The system life cycle

1   Put the following stages of the system life cycle into the correct order:

    Design   Testing   Analysis   Implementation   Evaluation   Changeover

    ....

2   Different activities take place at each of these six stages. Write the name of the
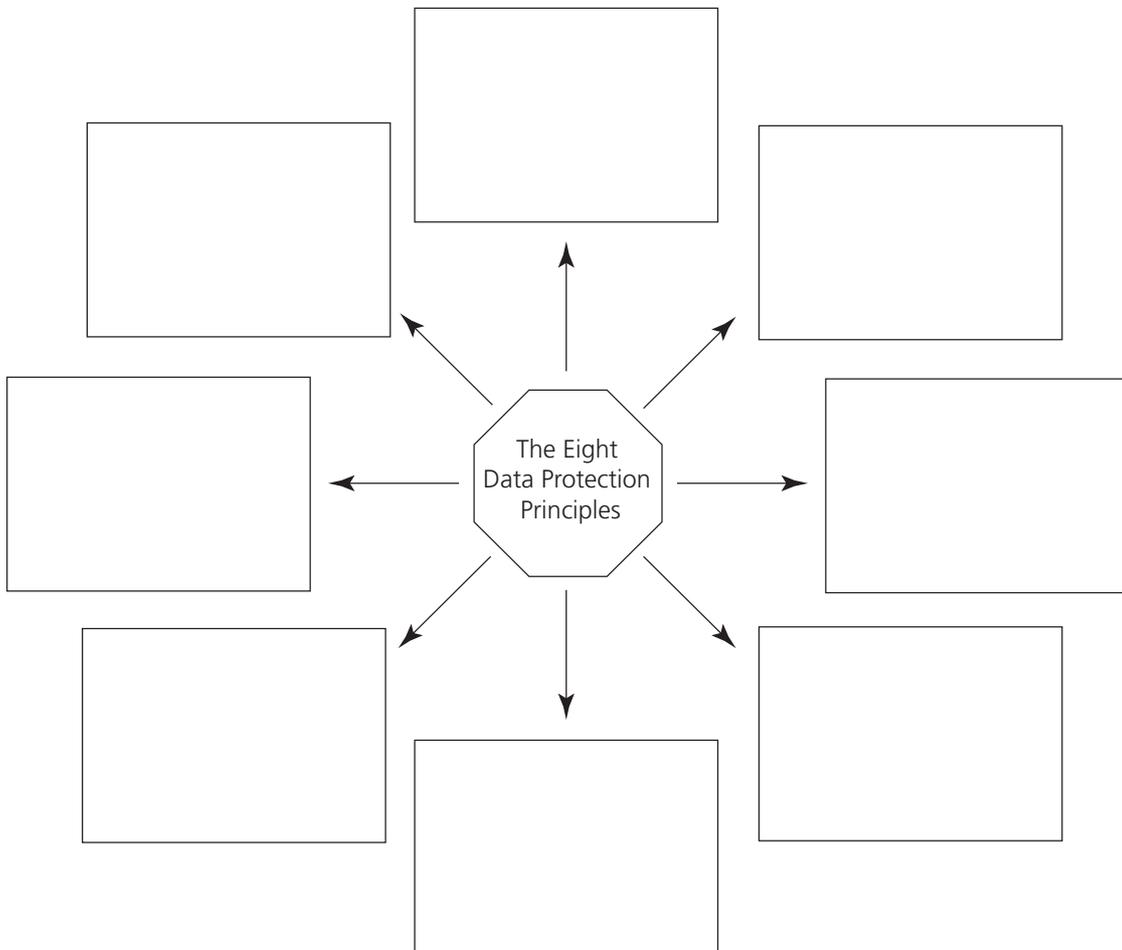   appropriate stage beside each of the activities listed below:

                                                                                        Stage

    a   Deciding on the layout of input and output documents.   ....

    b   Collecting and looking at documents used by the system.   ....

    c   Interviewing people who work with the system.   ....

    d   Making up file structures.   ....

    e   Measuring the success of the new system.   ....

    f   Observing the existing system.   ....

    g   Setting up the files on the computer.   ....

    h   Using actual data to see if the system works.   ....

    i   Using the new system in place of the old.   ....

    j   Using the test data.   ....

    k   Writing down a test plan.   ....

    l   Writing the computer program.   ....

    m   Converting data from the old system to work on the new. ....

3   When a test plan is designed, the test data is chosen to ensure that the system produces
    the correct result with normal and extreme values, and that it recognises and recovers
    from invalid data. An electricity billing system accepts the latest meter reading as data
    and calculates the amount of electric power used by subtracting it from the previous
    reading, which is stored. All customer accounts are to be processed. As part of a test
    plan, a test record has been set up for Mrs Brown with a previous meter reading of
    4056. Give four test inputs that could be used to test this part of the system and say
    what the purpose of each of your tests is:

    Test data   **Purpose of test**

    a   ....

                                           ....

    b   ....

                                           ....

    c   ....

                                           ....

    d   ....

                                           ....

Computers and the law

1   The *Data Protection Act* (1998) has eight principles that must be followed by a data
    controller when personal data is collected, processed and stored. Complete the diagram
    below to show what the eight principles are:

```
        ┌──────────┐
        │          │
        │          │
        └──────────┘
┌──────────┐            ┌──────────┐
│          │   ↑        │          │
│          │  ↗    ↖    │          │
└──────────┘            └──────────┘
┌──────────┐  ┌──────────────┐  ┌──────────┐
│          │← │ The Eight     │→│          │
│          │  │ Data Protection│  │          │
└──────────┘  │ Principles    │  └──────────┘
              └──────────────┘
┌──────────┐            ┌──────────┐
│          │  ↙    ↘    │          │
│          │   ↓        │          │
└──────────┘            └──────────┘
        ┌──────────┐
        │          │
        │          │
        └──────────┘
```

2   Say which principles have been breached in each of the following cases:

a   A company sends out an official-looking questionnaire to Allison saying that it must
    be returned within 14 days. In fact, they are just doing consumer research, the
    questionnaire is not official and the personal details supplied will be used to target
    mail shots for direct marketing. Allison thought she had to fill the questionnaire in,
    and now she is receiving junk mail that she does not want.

    ....

    ....

b   John receives some junk mail that says he has won a £500 prize. When he contacts
    the company, they say that their computer system has crashed, data has been lost
    and they have no record of the prize-winners.

    ....

    ....

c Alex left school two years ago and has just applied for a new job. He finds that a reference provided by his school mentions that his attendance was poor. He knows he only missed three days in his last four years at school. When he contacts the school he is told that his records show only 60% attendance.

....

....

3 In each of the cases in question 2 the data subject has rights that he or she could use to remedy the situation. Which of the seven subject rights would be most useful to:

a Allison?..

....

b John? ....

....

c Alex?...

....

4 *The Computer Misuse Act*, 1990 created three new criminal offences. What are they?

a ....

b ....

c ....

5 a Daniel has a CD writer. He uses it to copy software, which he then sells to his friends. Which law is he breaking?

....

b Daniel claims that although this might be illegal, his actions are not hurting anyone. Is he right? Explain your answer.

....

....

....

....

6 Mary has just started a new job as a Web site designer. She finds that using the computer for long periods every day is causing her headaches, which she thinks may be due to eye strain. What action should her employer take when Mary reports this problem?

....

....

....

....

Computers and society

1 Many different organisations keep personal data about you. Choose two of these and complete the tables below to show what data they store, what purpose(s) they keep the data for and one item of information they will obtain from the data they store.

Organisation	**Organisation**
Data stored	**Data stored**
Purpose(s)	**Purpose(s)**
Information obtained	**Information obtained**

2 Many people believe that the development of information and communication technology has improved the quality of life for most people. Describe, from your own experiences, what evidence there is for believing this.

....

....

....

....

....

....

3 There are some concerns over the development of ICT. Briefly describe three areas of concern.

....

....

....

....

....

....

Vocabulary test 3

Match each of the words in the list below to its definition:

|		
Command language	**Data controller**	**Data logging**
E-commerce	**Encryption**	**Feedback**
File server	**Information Commissioner**	**Modem**
Network	**Offline**	**Search engine**
Source document	**Thermistor**	**Transaction file**
Transaction processing	**Update**	

1   Not connected to the computer.   ....

2   A file containing data waiting to be processed in a batch
    processing system.   ....

3   The original document on which data was captured.   ....

4   A system of file-processing where records are updated as
    soon as a transaction relating to them occurs.   ....

5   A special language which the user learns to communicate
    instructions to the computer system.   ....

6   Changing data in an apparently random way, based on
    a key so that the data appears meaningless.   ....

7   The use of the Internet to buy and sell goods.   ....

8   A number of computers connected together so that they
    can exchange data and share other resources.   ....

9   A Web site that finds other Web sites that match a key
    word or phrase that you have entered.   ....

10 The process of using a computer system to collect
    physical data.   ....

11 A temperature sensor.   ....

12 A device that converts the on/off pulses used by
    computer systems into a form that will travel
    efficiently over the telephone network.   ....

13 Someone who stores and processes personal data.   ....

14 Where the output from a system affects the
    subsequent input.   ....

15 A central computer on a LAN that stores data and
    software for all network users to access.   ....

16 The process of merging a master file with a transaction
    file so that the data in the master file represents the
    latest situation.   ....

17 The person responsible for overseeing the working of
    the 1998 *Data Protection Act*.   ....

Put it together

This worksheet can be used with each of the vocabulary tests on *Worksheets 9*, *16*, *29* and *31*.

Work with a partner to group the words in the vocabulary test. Try to arrange them into between six and eight groups. You can base your groups on anything the words have in common. Write down below each group what it is that they have in common. Finally, add in any other words you can think of that belong in each group but were not in the test.
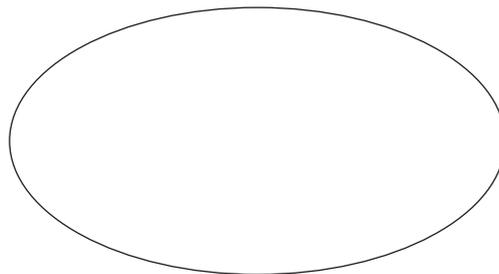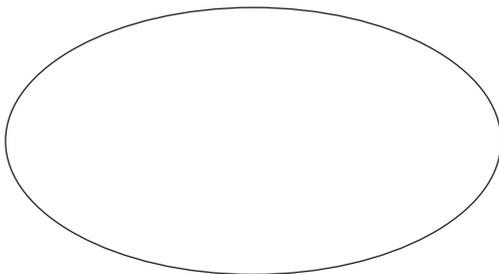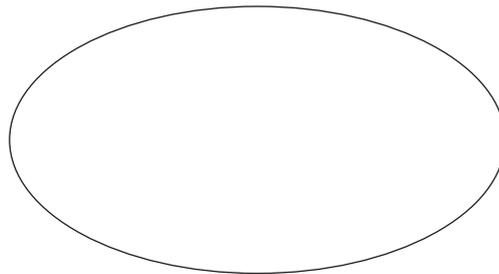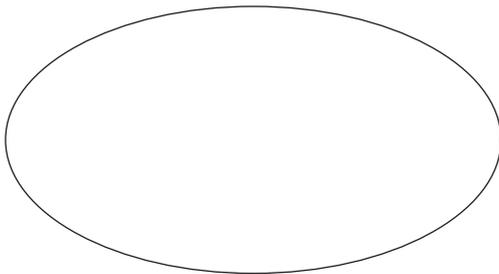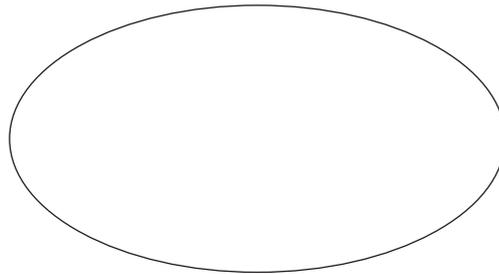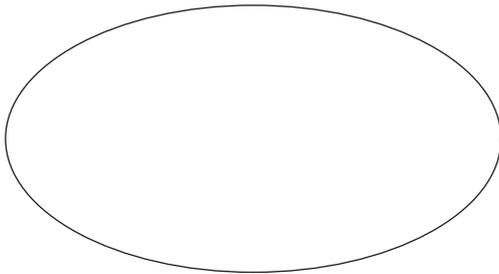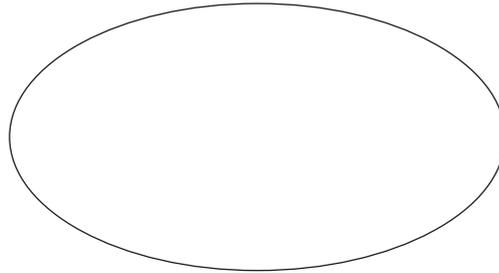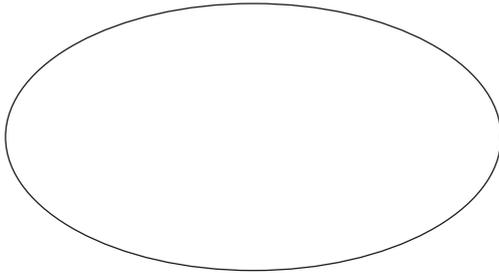
Vocabulary revision test

Match each of the words in the list below to its definition:

Application	**Input device**	**Record**
ATM	**LED**	**Touchpad**
Bar chart	**Menu**	**Trackerball**
CSV	**MICR**	**Validation**
Email	**Mouse**	**VDU**
Hardware	**Pie chart**	

1   Visual display unit.   ....

2   It is used to enter data into a computer system.   ....

3   The physical components of a computer system,
    eg printer, VDU, keyboard, etc.   ....

4   A program written to perform a task for the user.   ....

5   A small device that converts electrical energy
    directly to red, green or orange light.   ....

6   An input device that can be used to input position
    accurately, but unlike a mouse, it is not particularly
    good for inputting movement.   ....

7   A handheld input device used to input position with
    speed. Often used to point to or select items in a graphic
    user interface.   ....

8   A way of presenting numerical information to show the
    relative proportions of each value.   ....

9   A way of presenting numerical information to highlight
    the differences between one value and the next.   ....

10 Stores data about one occurrence of the thing that the
    file holds data on (one stock item, one customer, etc).   ....

11 A file extension that indicates the data is made up of
    values separated by commas.   ....

12 An input device with no moving parts used in place
    of a mouse on laptop computers.   ....

13 Checking data to make sure that its value is reasonable
    or possible.   ....

14 Automatic teller machine (cash point).   ....

15 An electronic message sent to an address which can
    be downloaded and read by the recipient.   ....

16 Characters are recognised by their effect on a magnetic
    field – used on cheques.   ....

17 A list of options that are available to the user.   ....

Information sheet

The files, fields and records listed here are needed for *Worksheets 11*, *12* and *13* (pages 13 to 16.)

Employee file – Employee Record

Payroll number

Name

Date of birth

Pay rate

Tax code

Hours worked

Total pay this year

Total tax this year

Stock file – Stock Record

Stock number

Description

Price

Supplier

Number in stock

Minimum quantity

Reorder quantity

Car file – Car Record

Registration number

Model

Make

Year

Engine capacity

Price

Colour

Number of previous owners

Video file – Video Record

Stock number

Bar code

Title

Category

On loan

Date due back

Review

Hagley R C High School