

Answers

The sample answers and marks provided are for the exam-style questions at the end of each chapter and have been written by the author. The way marks are awarded in examination may be different.

Chapter 1 Data Representation

- 1 The stopwatch would show 02:38:59. (1 mark for correct hours)
(1 mark for correct minutes)
(1 mark for correct seconds)

Total 3 marks

- 2 A byte is:
• A unit of data. (1 mark)
• Normally 8 bits. (1 mark)

Total 2 marks

- 3 In hexadecimal notation it would be: C1E (1 mark for each correct hex value)

Total 3 marks

- 4 Two answers accepted from:
• It is easier for humans to read than binary. (1 mark)
• It is a much shorter way of representing a byte or bytes of data. (1 mark)
• It is easier to debug than binary. (1 mark)

Total 2 marks

- 5 Two answers accepted from:
• Change the resolution of the image to a lower resolution. (1 mark)
• Use lossy compression to remove the redundant data from the image. (1 mark)
• Use lossless compression that will look for repeating patterns in the image. (1 mark)

(1 mark for each method)

(1 mark for explanation)

Total 4 marks

- 6 The most suitable file extensions are:

	.jpg	.mp4	.mp3	.csv
Storing holiday photos	✓			
Storing holiday videos		✓		
Storing a favourite song			✓	
Storing data to be imported into other files				✓

(1 mark per correct tick)

Total 4 marks

- 7 Two answers accepted from:
• Each character will take up a byte of data. (1 mark)
• Each character has an individual code that can be represented in binary. (1 mark)
• Capital letters, lower case letters, numbers and punctuation all have their own binary code. (1 mark)
• Each binary code can also be presented in hexadecimal. (1 mark)
• The computer will process the binary code and reference it to the character set used (ASCII) to see what letter is pressed. (1 mark)

Total 2 marks

Exam-style questions

- 1 Explain what a database is. (1 mark)
- 2 Describe two advantages of using an electronic database over a paper-based system. (2 marks)
- 3 Match the correct term with its definition: (5 marks)

Field	A structure in which data is stored in a database
Query	A unique identifier for a record
Record	A collection of data about one single item in a database
Table	One piece of data about an item in a database
Primary Key	A method used to search a database

- 4 Explain why it is important to give the correct data type to a field. (2 marks)
- 5 Bosire has a simple flat file database. Its table has two fields: name and telephone number.
 - a Explain why neither field is suitable as a primary key. What field could be added to create a primary key? (2 marks)
 - b Why might a user choose to create a flat file database rather than a relational database? (1 mark)
- 6 A database stores data in a table called Cars. The table structure includes fields called Colour, Engine Size and Number of Doors. Write an SQL query-by-example which searches for red or blue cars, with 5 doors and an engine size of more than 1600cc. (5 marks)
- 7 Why can unreliable data be of concern to a database user? (1 mark)

8 Two answers accepted from:

- Increase the sampling rate of the recording. (1 mark)
- This means that each sample interval will be closer together. (1 mark)
- If the sample intervals are closer together the recording will be closer to the original track, improving the quality. (1 mark)

Total 2 marks

Chapter 2 Communication and Internet Technologies

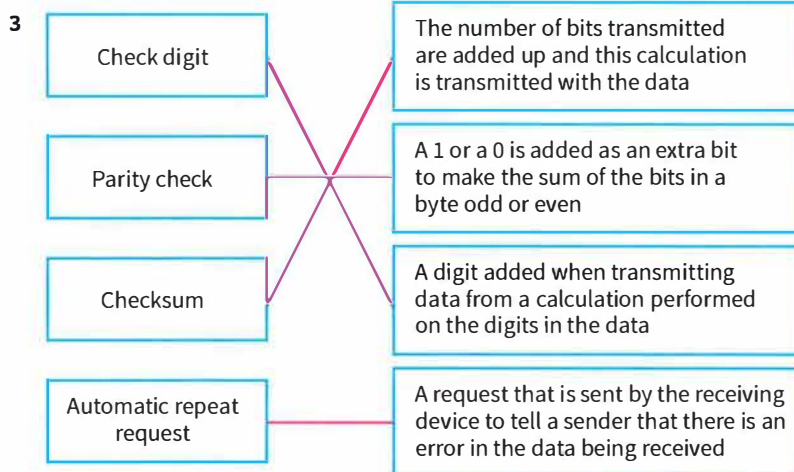
- 1
- the rate at which the transfer of data occurs (1 mark)
 - the number of bits that can be transmitted in a given period of time (1 mark)
 - measured in bits per second (bps) or megabits per second (Mbps). (1 mark)

Total 3 marks

2 Two answers accepted from:

- Safer transmission as it is easier to accurately collate the bits together as they are sent one at a time. (1 mark)
- Reduced costs as only single wire needed. (1 mark)
- It can transmit over long distances. (1 mark)
- Simpler to implement than parallel transmission. (1 mark)

Total 2 marks



(1 mark per correct line)

Total 4 marks

4 Two answers accepted from:

- It detects a virus attack on a computer by scanning the computer. (1 mark)
- If a virus is found the software will remove it. (1 mark)
- It cannot prevent an attack from happening, only detect it once it has happened. (1 mark)

Total 2 marks

5 Two answers accepted from:

- Use a web browser to display the website. (1 mark)
- He will put the address (URL) of the website into the address bar of the browser. (1 mark)
- The URL is translated into the website's unique address and the browser downloads the content from the web server at that address. (1 mark)

Total 2 marks

6 Advantages of CSS:

- All pages can be easily and quickly updated with one change. (1 mark)
- The CSS can be used again for another website if the same format is needed. (1 mark)

Total 2 marks

7 Describe the difference between a static IP and a dynamic IP.

- A static IP address is a fixed address. (1 mark)
- A device will retain the same address even if it is disconnected and reconnected to the network. (1 mark)
- A dynamic IP address is an address that changes. (1 mark)
- A device will have the address for a limited period before it changes. This often happens when the device is disconnected and reconnected to a network, but it can happen at any time. (1 mark)

(1 mark for each definition)

(1 mark for explanation)

Total 4 marks

8 Cookies raise concern because:

- They can be used to track an internet user's activity. (1 mark)
- This data can then be sold to marketing companies so that a user can have specific adverts targeted at them. (1 mark)
- This can raise concern as it is possible to build up patterns about a person's internet use and possibly part of their identity. (1 mark)
- They can also be used to store sensitive information such as passwords. (1 mark)
- This means that the password can be automatically entered by the system at a later date when needed. (1 mark)
- This can raise concern as data is being held about our account information that could be stolen. (1 mark)

(1 mark for each point)

(1 mark for explanation)

(1 mark for each concern)

Total 6 marks

Chapter 3 Computer Architecture, Languages and Operating Systems

1 Stages of the fetch-execute cycle:

Step 1 – The CPU fetches the necessary data and instructions and stores them in its own internal memory locations. To fetch the instruction the CPU uses the address bus. The data is then moved to a special register that will decode the instruction. (1 mark)

Step 2 – The CPU decodes the instruction using an instruction set. (1 mark)

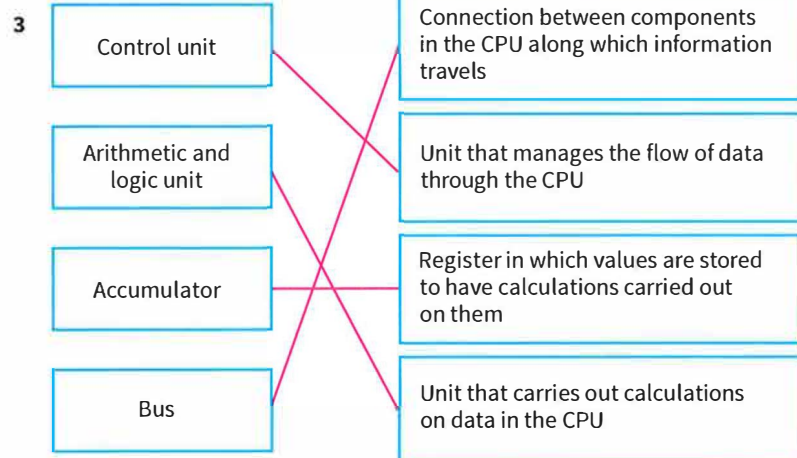
Step 3 – Once the CPU has decoded the instruction it executes the instruction. If any arithmetic calculations are needed, this will be carried out by the ALU. (1 mark)

Total 3 marks

- 2
- A register is an internal memory location within the CPU (1 mark)
 - It temporarily holds data and instructions whilst they are being processed. (1 mark)

(1 mark per correct point)

Total 2 marks



(1 mark per correct line)

Total 4 marks

- 4 Three answers accepted from:
- allows us to communicate with the hardware of a computer (1 mark)
 - controls the peripheral devices in a system (1 mark)
 - manages the transfer of programs into and out of memory (1 mark)
 - divides the processing time between current applications that are running (1 mark)
 - manages security software such as antivirus and firewalls (1 mark)
 - manages file handling (1 mark)
 - manages utility software. (1 mark)

Total 3 marks

- 5 Two answers accepted from:
- They are much easier to understand as they are closer to our native language. (1 mark)
 - One line of code can do several things. (1 mark)
 - Less knowledge is needed about the CPU to use a high-level language than a low-level language. (1 mark)
 - They are mostly independent of any hardware they are run on. (1 mark)

Total 2 marks

- 6 • A compiler is a computer program that takes code written in a high-level language and translates it into machine code all in one go. (1 mark)
- An interpreter translates code line by line. (1 mark)

(1 mark per correct definition)

Total 2 marks

- 7 An assembler is a computer program that will take the basic instructions (mnemonics) used in assembly language and convert them into machine code so they can be processed by the computer. (1 mark)

Statement	True	False
Low-level languages are a computer's native language	✓	
Low-level languages need to be compiled before they can be processed		✓
Low-level languages are much easier for humans to understand		✓
In a low-level language one line of code will perform one task only	✓	

(1 mark per correct tick)

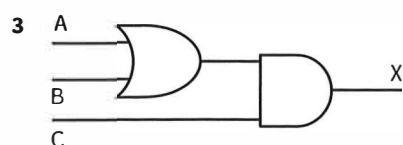
Total 4 marks

Chapter 4 Logic Gates

- 1 A logic gate controls the flow of electrical signals in a circuit. (1 mark)

Total 2 marks

- 2 a $X = (A \text{ AND } B) \text{ OR } (\text{NOT } C)$ (3 marks)
- b $X = 0$ (1 mark)
- c $X = 0$ (1 mark)

Total 2 marks

(1 mark per correct logic gate)

Total 2 marks

4

Input			Output
A	B	C	X
0	0	0	0
1	0	0	1
0	1	0	0
1	1	0	1
0	0	1	0
1	0	1	1
0	1	1	1
1	1	1	0

(1 mark for 2 correct values)

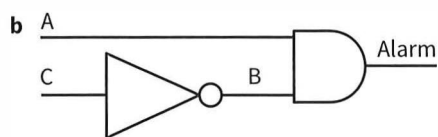
(2 marks for 4 correct values)

(3 marks for 7 correct values)

Total 3 marks

5 a Alarm = (A AND B) NOT C

(2 marks)



(1 mark per correct logic gate)

Total 2 marks

c

A	B	C	Alarm
0	1	0	0
1	1	0	1
0	0	1	0
1	0	1	0

1 mark for 2 correct values

2 marks for 4 correct values

Total 2 marks

Chapter 5 Input Devices

1 Two answers accepted from:

- touchscreen
- keyboard
- microphone.
- camera
- accelerometer

(1 mark)

(1 mark)

(1 mark)

(1 mark)

(1 mark)

Total 2 marks

2 One answer accepted from:

- input data into a computer
- give a computer instructions.

(1 mark)

(1 mark)

Total 1 mark

3 • Manual input devices (e.g. keyboard, mouse, button) require the user to enter data/instructions.

(1 mark)

- Automatic devices (e.g. sensors) input data without user interaction.

(1 mark)

(1 mark per correct point)

Total 2 marks

- 4 Two answers accepted from:
- provide further information about a product or an offer (1 mark)
 - provide a link to the business' website or a social media site (1 mark)
 - provide a link to a promotional video. (1 mark)
- Total 2 marks**
- 5
- Captive touch screens. (1 mark)
 - Use the natural electrical signals that we have in our bodies to detect when we are touching the screen. (1 mark)
 - Resistive touch screens (1 mark)
 - Have multiple layers with space in between. When slight pressure is applied to the screen the layers touch and the device recognises that we are touching the screen. (1 mark)
- (1 mark for identification of type of touch screen: (captive/resistive)
(1 mark for each correct explanation)
- Total 4 marks**
- 6 An analogue-to-digital converter is also needed when inputting data because:
- computers use digital data (1 mark)
 - microphones record analogue data (1 mark)
 - the analogue data must be converted to digital before the computer can use it. (1 mark)
- (1 mark per correct point)
- Total 3 marks**
- 7 Two answers accepted from:
- A photograph can be viewed immediately after it is taken, whereas with a film camera the film has to be processed. (1 mark)
 - A digital photograph can be easily copied, unlike a film photograph which needs another copy developed from a negative. (1 mark)
 - Digital photographs can be easily shared online, whereas a film photograph would need scanning first. (1 mark)
 - Digital photographs can be easily edited, or retouched, unlike film photographs. (1 mark)
- (1 mark for correct point)
(1 mark for explanation)
- Total 4 marks**
- 8 Two answers accepted from:
- Interactive whiteboards are large in size, which allows information displayed on them, such as text, images, graphs and charts. (1 mark)
 - They can be seen by many people at the same time. (1 mark)
 - The whiteboard also functions as an input device, which allows the trainer to annotate and add information, or draw diagrams to help illustrate points. (1 mark)
 - The trainer can also control the computer without having to move away from the whiteboard. (1 mark)
- Total 2 marks**
- 9 A barcode works as follows:
- Barcodes are a series of black vertical bars with spaces (white vertical bars) between them. (1 mark)
 - A barcode reader scans the barcode and translates it into a number. (1 mark)
 - This number is usually a product number or code. (1 mark)
 - The code can then be looked up in a database to find the rest of the product's data, such as its price or manufacturer. (1 mark)
- (1 mark per correct point)
- Total 4 marks**

- 10 • A 3D scanner uses a laser to detect an object's geometry and size. (1 mark)
 • This data is input into a computer and recorded. (1 mark)
 • For example, film studios use 3D scanners to model actors' sizes and physical characteristics when producing animation. (1 mark per correct point)
 (1 mark for an example)

Total 3 marks

Chapter 6 Sensors

- 1 A sensor is a type of input device that detects changes in the environment around it. (1 mark)
- 2 The following three sensors could be used:
- A temperature sensor could monitor the heat in the nuclear plant and detect if it gets too high or too low. (1 mark)
 - A gas sensor could be used to detect the presence of any gases that could be hazardous in the nuclear plant. (1 mark)
 - A pressure sensor could be used to measure the flow of any liquids around the plant. (1 mark)
- (1 mark per correct point)

Total 3 marks

- 3 Two drawbacks of using motion sensors in a security system could be:
- If an alarm is set to sound when one sensor is triggered then the alarm may sound too easily and unnecessarily (1 mark)
 This is because something small such as a falling object or a rodent could trigger the alarm, but they may not be an intruder. (1 mark)
 - In this case an alarm could be set to sound if two or more sensors are triggered. (1 mark)
 - If the system used motion sensors that work by detecting heat, an intruder could use a heat protection suit to stop their body radiating heat. (1 mark)
 This would mean that the motion detector could not detect them.
 - In this case, creating a system that had more than one type of motion sensor, such as heat and microwave detectors, would mean that motion could be detected in two ways. (1 mark)
- (1 mark per correct point)
 (1 mark for explanation)

Total 4 marks

- 4 Three answers accepted from:
- A farmer could use moisture sensors to monitor the level of moisture in the soil. (1 mark)
 - This means that he can water the crops when the level of moisture gets too low. (1 mark)
 - This will stop the crops getting too dry. (1 mark)
 - He can also stop watering them if the moisture level gets too high, to stop the ground becoming waterlogged. (1 mark)
 - This means that the farmer can get the best crop possible by monitoring the level of moisture in the soil and keeping it consistent. (1 mark)
- Total 3 marks**
- 5 • An infrared sensor detects infrared radiation that emits from a person or object. (1 mark)
 • These waves of radiation can trigger many different things such as a sensor in an alarm or change a channel on a television. (1 mark)
 (1 mark per correct point)

Total 2 marks

- 6 When using a barcode scanner:
- A light shines on the barcode from the device. (1 mark)
 - Light will then be reflected back to the device. (1 mark)
 - The white areas of the code will reflect more light than the black areas. (1 mark)
 - The scanner will then convert the light reflections and create a series of binary digits that can be read by a computer. (1 mark)
- (1 mark per correct point)

Total 4 marks

Chapter 7 Output Devices

- 1 Two answers accepted from:
- is a hardware device (peripheral) (1 mark)
 - enables a user to output information (1 mark)
 - allows a user to view the results of an input that has been processed. (1 mark)

Total 2 marks

- 2 LCD screens are more suited to portable devices because:
- LCD screens are much thinner in depth than CRTs, making them more portable. (1 mark)
 - LCD screens use less energy than CRTs, increasing the battery life of a device. (1 mark)

(1 mark per correct point)

Total 2 marks

- 3 Two answers accepted from:
- RGB colours are dark ink/toner colours. (1 mark)
 - Mixing dark ink/toner colours creates darker ink/toner colours, making it impossible to create light colours. (1 mark)
 - They use CMYK that are light ink/toner colours. (1 mark)
 - As they are light colours, they can be mixed to create other light colours and dark colours. (1 mark)

Total 2 marks

- 4 Two answers accepted from:
- It can produce high quality text outputs. (1 mark)
 - It can quickly print many pages, making it suitable for essays and reports. (1 mark)
 - They are cheap to run and can print double sided, making them suitable for students on a budget. (1 mark)

Total 2 marks

- 5 The resolution of a display:
- Is built up of thousands of tiny illuminated dots called pixels. (1 mark)
 - Is the amount of pixels the display contains. (1 mark)
 - The more pixels the display contains, the higher its resolution. (1 mark)

(1 mark per correct point)

Total 3 marks

- 6 Two answers accepted from:
- 3D printers allow quick production of small, individual items. (1 mark)
 - A user at home can draw an object and print it out. (1 mark)
 - This means that a user could create a replacement part for a broken item, a missing part for a model or a new protective case for a smartphone. (1 mark)
 - Designs for many common items are now available for free on the internet, making replacing a broken or lost item a much simpler matter. (1 mark)

- However, at the moment 3D printers are expensive to buy. (1 mark)
 - They also only print objects from certain materials such as plastic, making them unsuitable for producing items that require great strength. (1 mark)
 - Over time 3D printing may become more common as the price of printers may fall and more designs become freely available. (1 mark)
- Total 4 marks**

Chapter 8 Storage Devices

- 1
- Primary storage is a computer's internal storage, such as RAM and ROM. (1 mark)
 - Secondary storage is storage external to a computer, such as a hard disk drive or compact disk. (1 mark)
- (1 mark per correct definition)

Total 2 marks

- 2 Three answers accepted from:
- RAM is volatile; ROM is non-volatile. (1 mark)
 - RAM is temporary; ROM is (semi)permanent. (1 mark)
 - RAM tends to be much greater in capacity than ROM. (1 mark)
 - RAM holds data and programs for processing; ROM holds firmware and bootstraps. (1 mark)

Total 3 marks

- 3 How a hard disk drive reads and writes data:
- Hard disk drives use electromagnets attached to read/write heads and magnetic fields to manipulate tiny magnetic dots of data. (1 mark)
 - Data is stored in tracks on disks (platters) that are attached to a spindle. (1 mark)
 - As the spindle turns, the platters rotate. (1 mark)
 - Data is read/written as the dots in the tracks move under a read/write head. (1 mark)
- (1 mark per correct point)

Total 4 marks

- 4 Two answers accepted from:
- Optical disk drives use a laser to scan tracks on optical disks. (1 mark)
 - Blu-ray devices use higher frequency lasers than compact disk devices. (1 mark)
 - The higher the frequency of the laser, the more closely the data can be packed together on the tracks. (1 mark)
 - More data can be stored in an equivalent space. (1 mark)

Total 2 marks

- 5 Two answers accepted from:
- An optical medium such as CD ROM or DVD ROM would be ideal as they are high in capacity, read only, portable and cheap to buy and transport. (1 mark)
 - The catalogue may need a large file size so it is not suitable to email. (1 mark)
 - The catalogue needs to be read-only to avoid customers changing details. (1 mark)
 - The medium must be portable and cheap to produce for a large audience. (1 mark)

Total 2 marks

- 6 Calculation could show: (1 mark)

$$\begin{aligned}
 4 \text{ inches} \times 1 \text{ inch} &= 4 \text{ square inches} \\
 600 \text{ dpi} \times 4 \text{ square inches} &= 2400 \text{ pixels} \\
 2400 \text{ pixels} \times 16 \text{ bits} &= 38400 \text{ bits} \\
 38400 \text{ bits} \div 8 &= 4800 \text{ bytes} \\
 4800 \text{ bytes} \div 1024 &= 4.69 \text{ kilobytes}
 \end{aligned}$$

7 Two answers accepted from:

- Data is stored serially on magnetic tape. (1 mark)
- If the data required is near the point at which the tape starts being read, then the data will be quickly found and transferred. (1 mark)
- If the data is far away from that point, the tape has to loop around to the correct place first, slowing down the transfer. (1 mark)

Total 2 marks

8 Two answers accepted from:

- It is generally more expensive to buy. (1 mark)
- It is normally smaller in capacity than hard disk drives. (1 mark)

(1 mark per correct point)

Total 2 marks

Chapter 9 Security

- 1
- The more accurate and complete data is, the more valuable it is. (1 mark)
 - If data is lost, corrupted or accidentally changed, it becomes less accurate and complete and loses value. (1 mark)

(1 mark per correct point)

Total 2 marks

2 An automatic backup:

- is where a computer makes a backup made without user intervention (1 mark)
- is where the computer automatically creates a backup at a scheduled time and date. (1 mark)

(1 mark per correct point)

Total 2 marks

3 Four answers accepted from:

- Phishing uses email that pretends to come from a person or organisation the user is familiar with. (1 mark)
- The email asks the user to confirm account details by clicking on a link. (1 mark)
- If clicked, the link directs the user to a fake website that looks like the organisation's real site, where they can be tricked into giving up personal data. (1 mark)
- Pharming also uses fake websites to try to gain access to personal data. (1 mark)
- When a user tries to visit a genuine site they are instead directed to a fake site. (1 mark)
- If the user enters personal data on the fake site the data is stolen and passed to criminals. (1 mark)

Total 4 marks

4 Answers could include:

- Denial of service attacks occur when malware on a computer instructs the computer to send a high volume of requests to a server. (1 mark)
- Anti-virus software detects and removes malware from computers, removing the cause of the attack. (1 mark)

(1 mark per correct point)

Total 2 marks

5 Four answers accepted from:

- Malware is software that is designed to disrupt or modify a computer system. (1 mark)
- It is usually accidentally downloaded from email attachments, websites and USB sticks. (1 mark)
- Anti-virus software detects and removes malware from a computer, helping to keep the computer safe. (1 mark)

- Computers communicate by sending messages. Most messages a computer sends are authorised. (1 mark)
- Some messages are created by malware or hackers. These messages are unauthorised messages. (1 mark)
- Firewalls monitor communications to prevent unauthorised messages from being sent, helping to keep the computer safe. (1 mark)

Total 4 marks

6 Two answers accepted from:

- A proxy server is a computer that sits between a network server and the internet. (1 mark)
- The proxy server directs traffic away from the main server by examining the traffic. (1 mark)
- If the traffic is authorised it is forwarded to the network server; if not, the traffic is kept away from the network server, keeping it and the data on it safe. (1 mark)

Total 2 marks

7 Four answers accepted from:

- Encryption converts data into a form that cannot be understood by anyone other than an authorised user. (1 mark)
- Encryption works by using a key. (1 mark)
- Symmetric encryption uses the same key to encrypt and decrypt data. (1 mark)
- Asymmetric encryption uses two separate keys which work as a pair. (1 mark)
- The first key is used to encrypt the data. (1 mark)
- The second key is used to decrypt the data. (1 mark)

Total 4 marks

8 Two answers accepted from:

- A protocol is a set of rules that governs communications between computers. (1 mark)
- Some protocols, such as secure socket layer, use asymmetric encryption to create a secure link between one computer and another. (1 mark)
- This means that data can be safely transmitted between computers as anyone without the encryption keys cannot read the data. (1 mark)

Chapter 10 Ethics

1 Computer ethics refers to acts of using a computer in a rightful or wrongful manner. There is not an agreed set of ethics as what one person thinks is right another may think is wrong. (2 marks)

2 Two answers accepted from:

- because the use of computers needs to be governed to control how they are used for our safety (1 mark)
- to stop the misuse of computers when communicating (1 mark)
- to stop theft of other people's work or details using the internet. (1 mark)

Total 2 marks

3 It would be free software. (1 mark)

- 4
- Malware is often disguised as an email attachment, or as a link included within an email. (1 mark)
 - When a user downloads the email attachment, or clicks on a link, the malware is installed on the user's computer without their knowledge. (1 mark)
- (1 mark per correct point)

Total 2 marks

5 Answers could include:

- Images featured on a commercial website may well have been commissioned and paid for by the company. (1 mark)
 - The company will own the copyright to those images, which means we cannot use those images without the company's permission. (1 mark)
- (1 mark per correct point)

Total 2 marks

Chapter 11 Programming Concepts

- 1 • A variable is a named location in memory that holds data that may change during the running of a program, for example, the value of a running total. (1 mark)

- A constant is a named location in memory that holds data that does not change, for example, the value of pi. (1 mark)
(1 mark per correct point)

Total 2 marks

- 2 Suitable data types would be:

- a String (1 mark)
b Integer (1 mark)
c Character (1 mark)
d Integer/float (depending if the score will be a whole or a decimal number) (1 mark)

(1 mark per correct data type)

Total 4 marks

- 3 a Explanations could include the following steps:

- 1 Input a mark. (1 mark)
2 Add 1 to a count of the number of marks. (1 mark)
3 Add the mark to the total. (1 mark)
4 When there are no more marks, divide the total by the count of how many marks. (1 mark)
5 Output the answer. (1 mark)

or

- 1 Input the number of marks. (1 mark)
2 Until the number in Step 1 is reached (1 mark)
2 a Input a mark. (1 mark)
2 b Add it to a total. (1 mark)
3 Loop back to step 2. (1 mark)
4 Divide the total by the number of marks. (1 mark)
5 Output the answer. (1 mark)

(1 mark per correct step in the explanation)

Total 5 marks

- b • A condition loop would be used. (1 mark)
• A condition loop continues until a condition is met. In this example the condition to be met is 'no more marks to be entered'. The loop will continue until there are no more marks. (1 mark)

Total 2 marks

- 4 Sequence is important because if the sequence of instructions is incorrect the program will not function as intended. For example, if a program to calculate average scores works out the average before all scores have been input the average will be incorrect. (1 mark)

- 5 A programmer would use an array because:

- An array stores many data values under one name. (1 mark)
• Using an array means a programmer does not have to use many variables to hold data. (1 mark)

(1 mark per correct point)

Total 2 marks

6 A solution could be:

```

examscores ← [ ]
FOR count ← 0 TO 14:
    PRINT "Type in a score"
    examscores[count] ← USERINPUT
NEXT count

```

(1 mark for initialising array)
 (1 mark for correct loop start)
 (1 mark for correct input into array)
 (1 mark for correct loop end)

Total 4 marks

7 The two main things that we need to do are:

- state the array's name
- state the array's size.

(1 mark)

(1 mark)

(1 mark per correct point)

Total 2 marks

Chapter 12 Pseudocode and Flowcharts

1 Comments should be used because:

- They explain what a particular line or section of pseudocode is for or does.
- They help other programmers to understand our code.

(1 mark)

(1 mark)

(1 mark per correct point)

Total 2 marks

2 Flowcharts are a useful design tool because:

- They are a diagrammatical method of viewing an algorithm or program.
- They show a visual representation of a problem, which can help a programmer to more easily understand the logic of it.

(1 mark)

(1 mark)

(1 mark per correct point)

Total 2 marks

3 The symbol used to represent a decision in a flowchart is a diamond.

(1 mark)

4 Allow variations on:

```

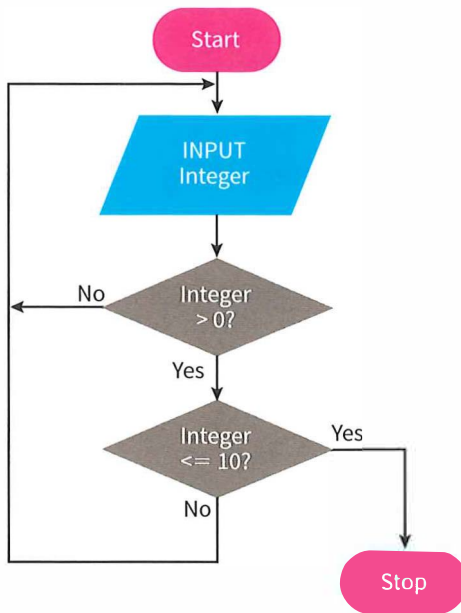
PRINT "Enter the length of side 1 of the triangle"
side1 ← USERINPUT
PRINT "Enter the length of side 2 of the triangle"
side2 ← USERINPUT
PRINT "Enter the length of side 3 of the triangle"
Side3 ← USERINPUT
PRINT "Do you want to know the area or the perimeter of the triangle?"
answer ← USERINPUT
IF answer = "area" THEN
    s = (side1 + side2 + side3)/2
    result = √(s*(s - side1)*(s - side2)*(s - side3))
    PRINT "Area is ", area
ELSE
    result = (side1 + side2 + side3)
    PRINT "Perimeter is ", perimeter
ENDIF

```

(1 mark for input of sides)
 (1 mark for correct use of selection)
 (1 mark for correct calculation of area)
 (1 mark for correct calculation of perimeter)
 (1 mark for output of each result)

Total 5 marks

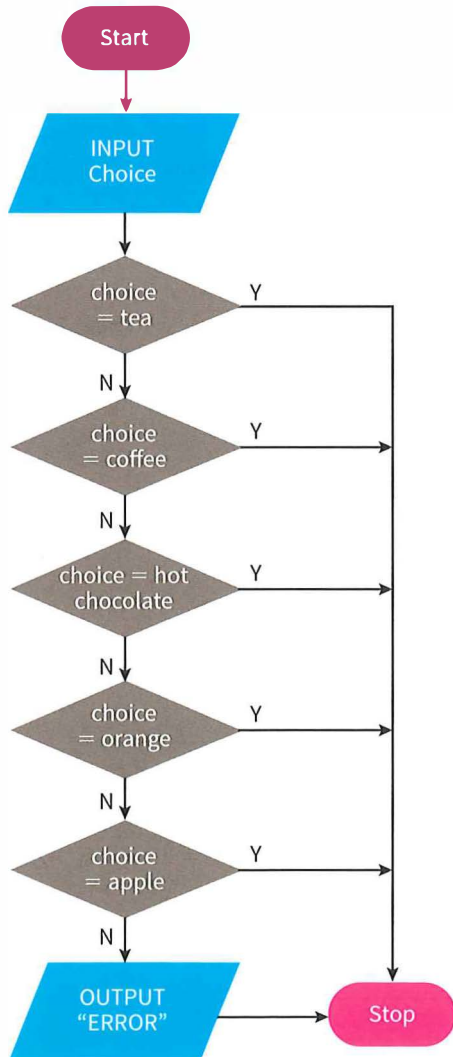
5 Allow variations on the following flowchart:



(1 mark for correct input)
 (1 mark for decision on >0)
 (1 mark for decision on <=10)
 (1 mark for correct loop(s))

Total 4 marks

6 Allow variations on the following flowchart:



(1 mark for correct input)
 (1 mark for correct case decisions (as a whole))
 (1 mark for error output)
 (1 mark for correct loop(s))

Total 4 marks

7 Three answers accepted from:

- Pseudocode and flowcharts are methods of describing how a program works. (1 mark)
- Pseudocode is a list of instructions, set out like a programming language, whereas a flowchart is a diagrammatical representation of the program. (1 mark)
- Both methods allow other programmers to easily understand how a program works. (1 mark)
- Flowcharts take a long time to produce and any changes to the algorithm will mean sections of the flowchart have to be redrawn. (1 mark)
- Pseudocode is quick to write and quick to amend. (1 mark)
- Amy is designing a very large program. She would be better off using pseudocode because creating a flowchart for such a large program would take her far longer to produce a design. (1 mark)

Total 3 marks

Chapter 13 Algorithm Design and Problem-solving

1 Two answers accepted from:

- A library routine is a small, commonly used program or subroutine that can be used in another program, for example a routine to generate random numbers. (1 mark)
- Library routines simplify a program because the code for them does not have to be written by the programmer, seeing as it already exists. ((1 mark)
- The programmer knows the code works, because it has already tested and used by other programmers. (1 mark)

Total 2 marks

2 Two answers accepted from:

- In a flowchart the sequence of steps in the algorithm can easily be seen and paths through it can easily be traced. (1 mark)
- Using diagrams often makes it easier for other programmers to understand the logic of the program. (1 mark)
- However, flowcharts can take a long time to produce and changes to an algorithm will mean sections of the flowchart will have to be redrawn, which can take a long time. (1 mark)
- Long flowcharts can be complicated and hard to follow. (1 mark)

Total 2 marks

3 Completed trace table:

value	nextValue	WHILE nextValue ≤ 0	IF nextValue > value	OUTPUT value
0				
	0			
4				
	3			
		TRUE		
			FALSE	
	10			
		TRUE		
			TRUE	
10				
	1			
		TRUE		
			FALSE	
	0			
		FALSE		
				10

(1 mark per correct column in the table)

Total 5 marks

- 4
- A logic error is a coding error that causes a program to do something it should not, such as incorrectly calculating a result. (1 mark)
 - A syntax error is an error that occurs when the written code does not follow the rules of the programming language, for example not using quotation marks to assign a value to a string. (1 mark per correct definition)

Total 2 marks

- 5
- Validation is a check made on entered data to attempt to reduce errors. Validation checks make sure data entered is both sensible and possible. (1 mark)
 - Verification is a check made on entered data to attempt to reduce errors. Verification checks try to make sure the data entered is accurate. (1 mark per correct definition)

Total 2 marks

6 Four answers accepted from:

- Test data is important to ensure that a program works correctly. Test data is used to test that a program works and does what it is supposed to do. (1 mark)
- Test data can be normal data, extreme data or invalid data. (1 mark)
- Normal data is data that the program is expected to use. (1 mark)
- Extreme data is normal data at the boundaries of what is expected to be used. (1 mark)
- Invalid data is data that should not be accepted. (1 mark)
- For example, a teacher enters test scores into a program. The scores are out of 100. Normal data would be any score in the range 0 to 100. Extreme data would be data at the boundaries of the range, for example, 0, 1, 99 and 100. Invalid data would be any number below 0 or above 100. (1 mark)

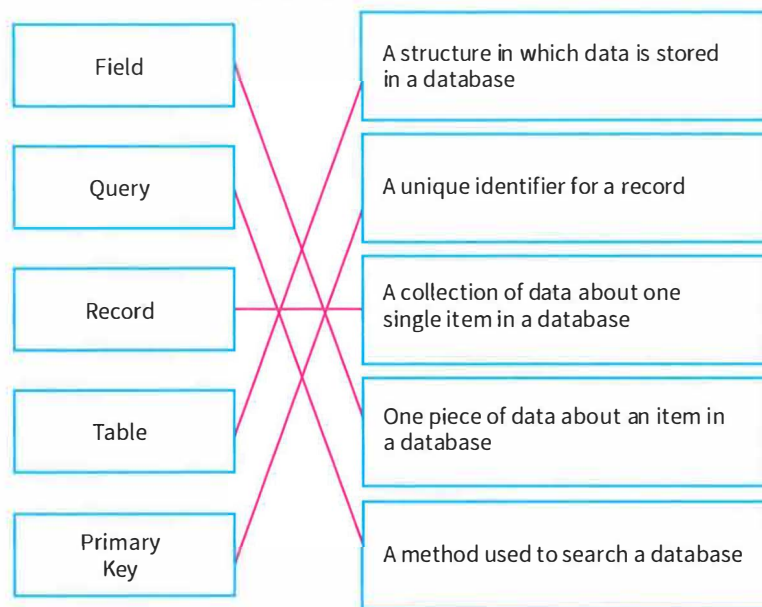
Total 4 marks

Chapter 14 Databases

- 1 A database is a collection of logically organised data. (1 mark)
- 2 Two answers accepted from:
- Data can be sorted, for example students' marks could be sorted from highest to lowest. (1 mark)
 - Data can be found much quicker as a computer can rapidly process data. (1 mark)
 - Data can easily be filtered, as the computer can quickly remove non-matching data from a search. (1 mark)
 - Data can easily be shared. (1 mark)
 - Data can be backed-up as digital files. (1 mark)
 - Data can be validated to help make sure it is sensible. (1 mark)
 - Electronic databases on computers use less space than paper-based systems using filing cabinets. (1 mark)

Total 2 marks

3 The correct terms and definitions are:



(1 mark per correct line)

Total 5 marks

4 It is important to give the correct data type to a field because, if the wrong data type is chosen, data could be stored incorrectly. For example, if real number data is stored as integers the data would be rounded up or down and the data would be incorrect. (2 marks)

5 a Two answers accepted from:

- ☐ Data in a primary key must be unique for each record. (1 mark)
- ☐ More than one record could have the same data in the name field, as some people might have the same name. (1 mark)
- ☐ More than one record could have the same data in the telephone number field, as some people might share a telephone number. (1 mark)
- ☐ A field with a unique number for each record, such as Person ID, could be added for use as a primary key. (1 mark)

Total 2 marks

b A user might create a flat file database rather than a relational database if the database has only a small number of fields and very little (if any) duplicated data. (1 mark)

6 `SELECT * FROM Cars WHERE Colour = 'red'`
`OR Colour = 'blue' AND doors = 5`
`AND engine size > 1600`

(1 mark for correct select from statement) (1 mark for WHERE)

(1 mark for OR on correct colours)

(1 mark for AND on correct doors)

(1 mark for AND on correct engine size)

Total 5 marks

7 Unreliable data may be of concern to a database user because it means a user will get incorrect data when performing a search. (1 mark)