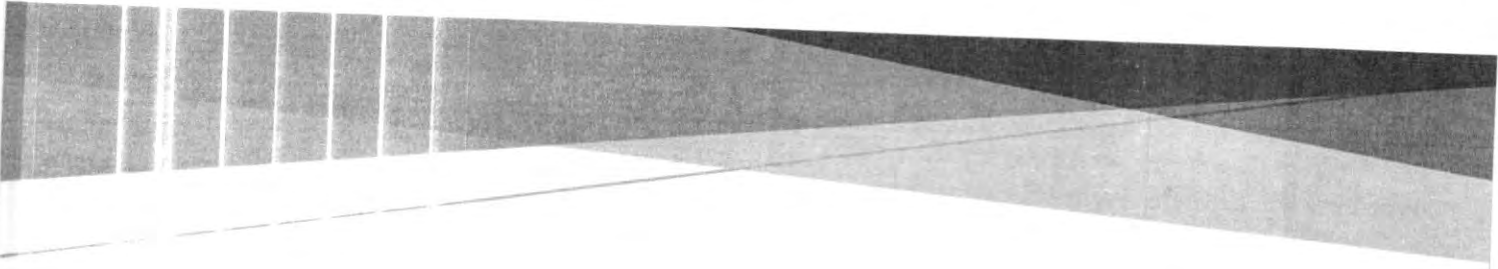


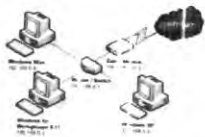
Computer Science



OCR GCSE Computer Science: Networks

Name:

Class:



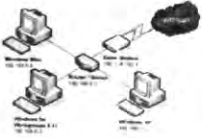
Activity 32 – LANs and WANs

Define the term network:

List the key features of a Local Area Network (LAN)

Explain why LANs are used.

Create a diagram of a LAN

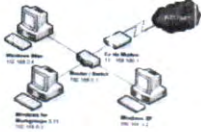


Activity 33 – LANs and WANs

List the key features of a Wide Area Network (WAN).

List the factors that affect the performance of a network.

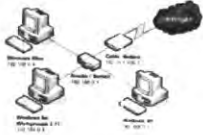
Create a diagram of a WAN.



Activity 34 – Network hardware

Networks need certain pieces of hardware to connect devices together. Explain what these main components are,





Activity 35 – Wireless

Wireless uses radio waves to transmit data.

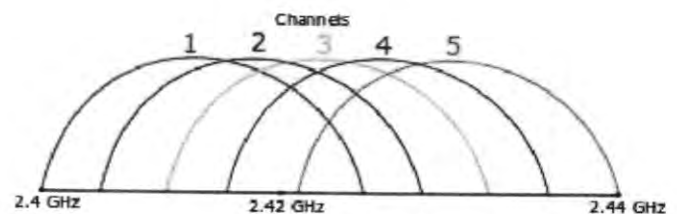


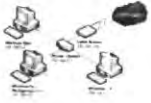
A Wireless Access Point (WAP) is basically a switch that allows devices to connect wirelessly.

List the key points about wireless here.

Wi-Fi is the standard for wireless networks.

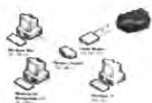
Put some key notes here.





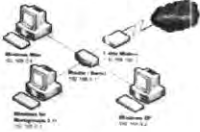
Activity 36 – Client server & Peer-to-Peer Networks

Client server networks are made up of a server and clients. List the key features, pros and cons and draw a diagram of a typical client server network.



Activity 37 – Client server & Peer-to-Peer Networks

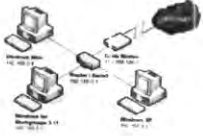
Peer to peer networks don't use servers. List the key features, pros and cons and draw a diagram of a typical peer to peer network.



Activity 38 – Network Topologies

A topology is essentially the layout of the network. Networks can be arranged in lots of different topologies, but Star and Mesh are the most widely used.

List the key features of a star network, the pros and cons and draw a diagram of a typical star network.



Activity 39 – Network Topologies

List the key features of a mesh network, the pros and cons and draw a diagram of a typical mesh network.



Activity 49 – Malware

Malware (malicious software) is software that can harm your devices. It is installed on a person's device without their knowledge or consent.

Write a description of each type of malware.

A black rectangular box with the word "Scareware" in white, bold, sans-serif font. The background of the box is dark with faint, blurry binary code (0s and 1s) visible.

Scareware

A black rectangular box with the word "Rootkit" in white, bold, sans-serif font. The background features a grid of white padlocks, with the word "Rootkit" overlaid in a large, bold, black font.

Rootkit

A black rectangular box with the word "Spyware" in white, bold, sans-serif font. The background is dark with a magnifying glass icon in the upper right corner, focusing on a small area of binary code.

Spyware

A black rectangular box with the word "Ransomware" in white, bold, sans-serif font. The background is dark with a large, stylized eye icon on the left side and binary code on the right.

Ransomware



Activity 50 – Malware

Malware (malicious software) can access your device in different ways.

Explain each of the following.

Virus



Worm



Trojan





Activity 51 – Preventing attacks

There are steps you can take to prevent network attacks. State the type of attack and a prevention method.

Form of attack	Description	Prevention
	Someone monitors data travelling on a network and intercepts sensitive information they find. They often use network monitoring hardware or software called packet sniffers.	
	Someone attacks a network with malware e.g. Viruses, Worms and Trojans.	
	Someone tries to get information by cracking passwords through trial and error. They can use software to do this.	
	Someone from inside the organisation uses their network access to steal information.	
	The hacker tries to stop users from accessing a part of a network or website by flooding it with useless traffic.	



Activity 52 – Social engineering

A lot of the time threats arise because organisations fail to properly secure their network. Other instances are a result of hackers manipulating employees.

Think of a scenario where a hacker is trying to get sensitive information out of an employee. Write the dialogue that might occur.



Activity 53 – SQL injection

SQL injections give criminals easy access to insecure data. Make key notes below and give an example of an SQL injection.



Activity 54 – Security threats

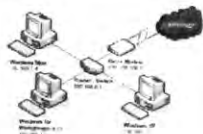
Organisations use a network policy to prevent vulnerabilities. A network policy is a set of rules and procedures the organisation will follow to ensure their network is protected against attacks and unauthorised access. Explain each of the following.

A good network policy
Penetration testing
Network forensics
Passwords
User access levels
Anti-malware
Encryption



Worksheet 12 – LANs and WANs

- c) Explain **three** factors that affect the performance of a network. [6]



Worksheet 13 – Network hardware

- 1) Jane works from home. She connects her laptop and television to her home Local Area Networks (LAN). Jane uses a home router to connect her LAN together.
- a) State the name of the hardware device inside the laptop that connects it to the LAN. [1]
- b) Jane can connect her devices to the router using either Ethernet or Wi-Fi.
- i) State how an Ethernet connection is different to a Wi-Fi connection. [1]
- ii) Jane's television lacks any wireless capability. State the name of the hardware Jane can use to allow her television to connect to the LAN wirelessly. [1]
- c) Jane's home router functions as a switch, router and Wireless Access point (WAP) all in one. Outline the function of each of these devices. [6]
- Switch
 - Router
 - Wireless Access point (WAP)



Worksheet 14 – Client server & Peer-to-Peer Networks

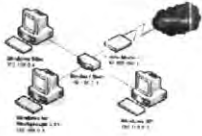
- 1) Bill's graphic design business has ten members of staff, each with their own computer. The staff work together by sharing files between their computers.
- a) The staff's computers are connected together in a Peer-to-Peer (P2P) network.
- i) Describe what is meant by a Peer-to-Peer (P2P) network. [2]

- ii) Identify **two** benefits and two drawbacks of using a Peer-to-Peer (P2P) network. [4]

- b) An IT consultant suggests the company should adopt a Client-Server setup.

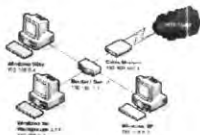
- i) Describe what is meant by a Client-Server network. [2]

Identify **two** benefits and two drawbacks of changing from a Peer-to-Peer (P2P) network to a Client-Server network. [4]



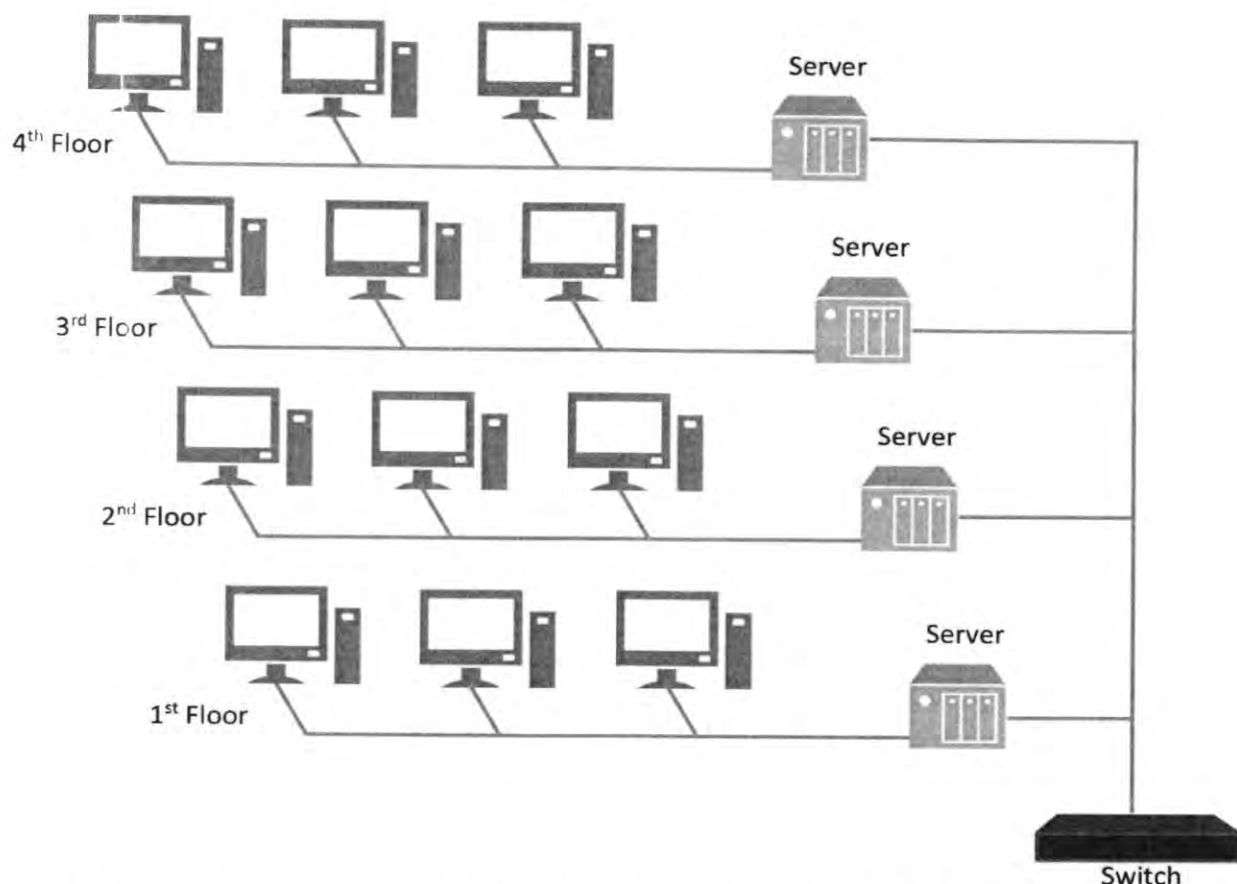
Worksheet 15 – Network Topologies

- 1) A leisure centre has a Local Area Network (LAN) consisting of five computers and a central server connected in a star topology.
 - a) Draw a diagram of the leisure centre's star network. [2]
 - b) Identify **three** advantages of a star topology. [3]
 - c) Draw a diagram of the leisure centre's network as a full mesh topology. [2]
 - d) Explain **one** advantage and **one** disadvantage of mesh topologies compared to star topologies. [4]

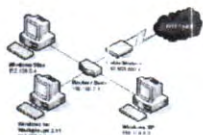


Worksheet 16 – Network Topologies

- 1) A company has its employees' computers spread across four floors. The computers on each floor are connected to that floor's server in a star network. Employees need to access files on all of the servers, so each of the four servers are connected in another star network, with a central switch located on the ground floor.

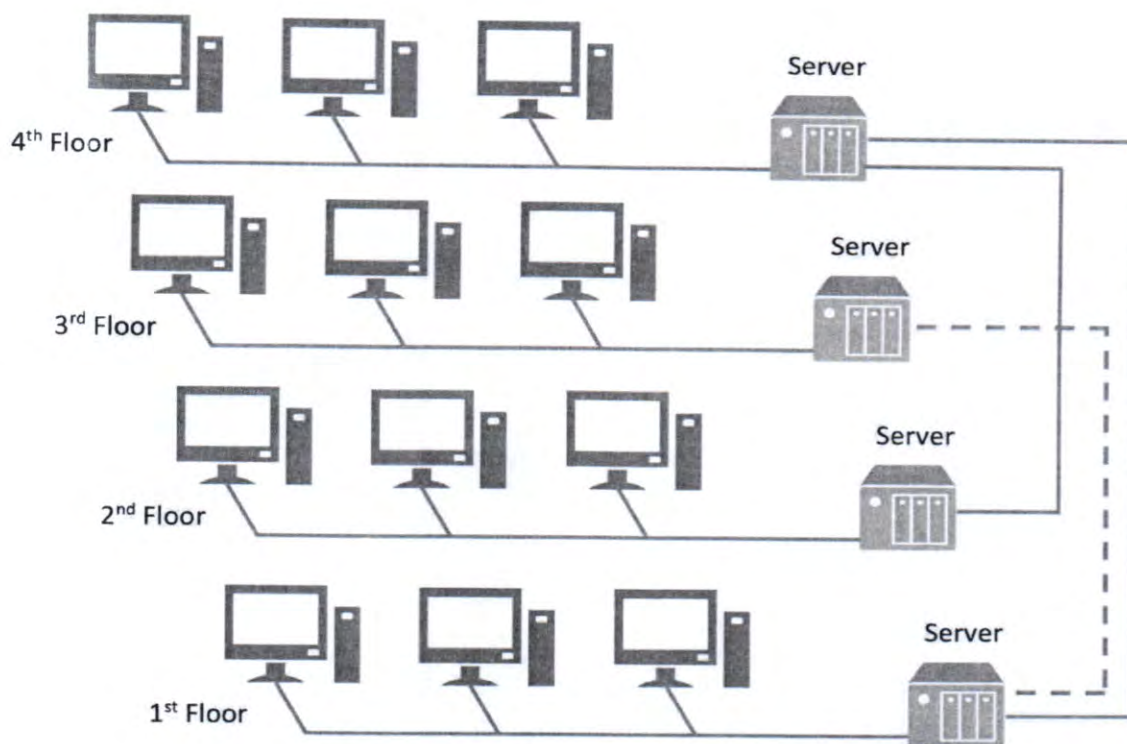


- a) Describe the effect of the failure of the central switch on the rest of the network. [2]



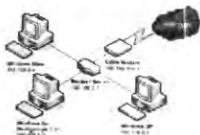
Worksheet 17 – Network Topologies

- 1) The company decides to remove the switch from the network and instead connects the four servers in a full mesh network, as shown in the diagram.



- a) Explain the advantages and disadvantages to the company of connecting the servers together in a full mesh network instead of a star topology. [4]

[2 marks]



Worksheet 18 – Network Protocols

1) Data is sent over the Internet using packet switching, which follows a certain network protocol.

a) Define the term network protocol. [1]

b) The sentences below describe the packet switching sequence. Fill in the missing words. [5]

- 1) The sending device splits the data up into smaller units called
- 2) Each packet is given a to show the order of the data.
- 3) The direction each packet takes to reach its destination is decided by pieces of hardware called using the protocol.
- 4) Packets sometime arrive at the receiving device in the wrong order. The receiving device uses the to put them in the right order.

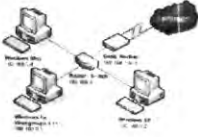
2) Mahindar sends an email to Johnathon over the Internet using his smartphone. Johnathon receives the email on his laptop.

a) Explain why Mahindar and Johnathon's devices need IP addresses to connect to the Internet. [2]

b) Mahindar's email is split into packets and sent over the network using packet switching. Outline the possible actions of Johnathon's laptop and Mahindar's smartphone when: [4]

i) One of the packets is lost in transit:

ii) One of the packets is corrupted in transit:



Worksheet 19 – Network Protocols

- 1) The table below shows the names and functions of different network protocols.
a) Complete the missing spaces in the table. [8]

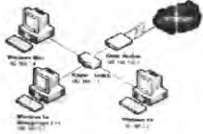
Protocol	Function
TCP	
	Responsible for packet switching.
HTTP	
	A more secure version of HTTP.
FTP	
SMTP	
	Used to retrieve emails from a server. The user downloads a copy of the email and the server holds the original email until the user deletes it.
	Used to retrieve emails from a server. The server holds the email until the user downloads it, at which point the server deletes it.

- 1) Sally works in an office. Her computer has a MAC address, which helps Sally to access files from the company's server. [2]
a) Describe what is meant by a MAC address.
- b) The network managers at Sally's company work with layers of network protocols.
i) Describe what is meant by a layer of network protocol. [2]
- ii) State the name of **one** layer of network protocols and outline its function. [2]

Layer name:

Layer function:

Identify **three** benefits of using layers when working with network protocols. [3]



Worksheet 20 – The Internet

- 1) The internet offers access to a variety of services, including the World Wide Web.
 - a) Explain the difference between the Internet and the World Wide Web. [2]

 - b) State the function of a Domain name Server (DNS). [1]

- 2) A marketing company's employees regularly travel between sites in London and Doha. The managers want to establish a Virtual Private Network (VPN) for the company.
 - a) Describe what is meant by a virtual network.

 - b) Explain how the company could make use of a Virtual Private Network (VPN). [2]

A magazine publishing company based in rural Scotland connect their computers in a LAN using a Client-Server setup. Their writers live elsewhere in the UK and either email or post their articles to the company, where they are edited in time for the weekly deadline.

Discuss the advantages and disadvantages to the company of changing from their current system to one which uses the cloud. [6]



Worksheet 21 – Network Security Threats

- 1) National Lending Bank stores the banking data of thousands of customers. The bank has recently suffered a passive attack, where customer data was stolen, and a denial-of-service-attack.
- a) Define the term passive attack. [1]

 - b) State **one** way of preventing a passive attack. [1]

 - c) Explain what is meant by a denial-of-service-attack. [2]

 - d) As a result of recent attacks, the bank is planning to carry out a pentest on the network. Explain how pentesting is used to improve network security. [2]



Worksheet 22 – Network Security Threats



- 1) Hannah regularly receives fake emails claiming to be from well-known banks and other organisations.
 - a) State the name given to the practice of sending fake or spoof emails. [1]
 - b) Explain the purpose of these fake emails. [2]
 - c) Hannah also receives suspicious emails that contain attachments, sometimes from names in her own contacts list. Explain the dangers of opening untrusted email attachments
- 2) Kate is a network administrator at a secondary school. She has put in place measures to prevent attacks on the school's network, including firewalls and different user access levels.
 - a) Explain how a firewall can prevent attacks on the school's network. [2]
 - b) Explain why the school's network needs to have different user access levels. [3]
 - c) A hacker recently broke through the school's network security using a brute force attack.
 - i) Explain what is meant by a brute force attack. [2]
 - ii) Identify **two** steps the school can take to protect against a brute force attack. [2]



Worksheet 23 – Network Security Threats

- 1) A supermarket sells its products online. It stores user account information in a database which is accessed when the customer places an order. The supermarket recently suffered a security breach in which the data of thousands of customers was stolen.
 - a) A common way for databases to be breached is through SQL injection.
 - i) Explain how SQL injection works. [2]

 - ii) Explain how SQL injection attacks can be prevented. [2]

 - b) The supermarket believes the data was stolen through social engineering. Describe an example of how thieves could have used social engineering to steal the data. [2]

- 2) A law firm has 100 members of staff in an office building in London. The firm stores confidential data about its clients on a server. The firm currently has no network policy. Discuss how a network policy could benefit the law firm [8]

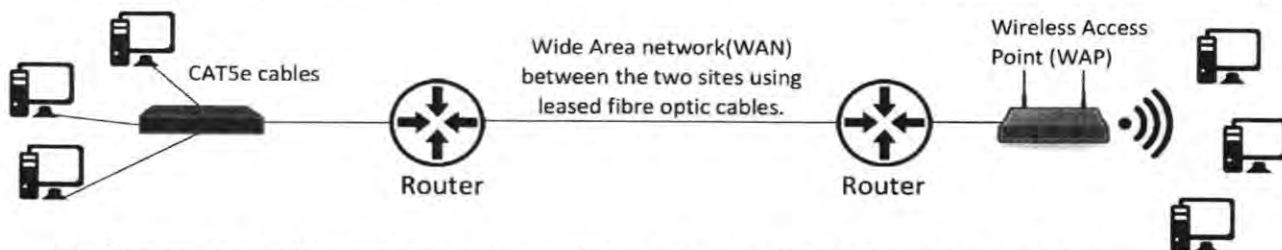


Section 2 – Networks

- 1) A Yorkshire based television company has two studios, one based in Leeds and the other based in York. The company's computer network is shown in the diagram.

Leeds – Local Area Network (LAN)

York – Local Area Network (LAN)



- a) The Leeds studio uses wired connections, whereas the York studio uses wireless connections.
i) Select the words from the following list to complete the sentences below: [2]

Ethernet	WPA2	WAP	Coaxial	SQL	Frame
-----------------	-------------	------------	----------------	------------	--------------

_____ is a network protocol used on wired networks.

_____ is a security protocol used on wireless LANs.

- ii) Describe **one** difference between a CAT5e twisted pair cable and a coaxial cable. [2]
- iii) Outline the advantages and disadvantages of each LAN setup (Leeds and then York). [4]
- b) The studios are connected in a Wide Area Network (WAN) using fibre optic cables.
i) State **one** advantage of using fibre optic cables rather than copper cables in a WAN. [1]
- ii) Identify **one** reason why the company uses leased lines for its WAN? [1]



- 2) Karen stores her holiday pictures in the cloud. She decides to download an image from the cloud to her laptop.
- a) Define what is meant by the cloud. [1]
 - b) Karen's laptop and the cloud server have a client-server relationship. Describe the communication that takes place between the cloud server and Karen's laptop when she downloads the image. [2]
 - c) The image is transferred from the cloud server to Karen's laptop using packets.
 - i) Explain how packets are used to transfer the image over the Internet to Karen's laptop. [6]
 - ii) Explain why packet switching is an efficient way to send data over large networks. [2]
 - d) The cloud hosting company uses a system of network forensics as part of its network policy.
 - i) Define the term network policy. [1]
 - ii) Explain what is meant by network forensics and how they are used. [3]



OCR GCSE Computer Science

Systems Software

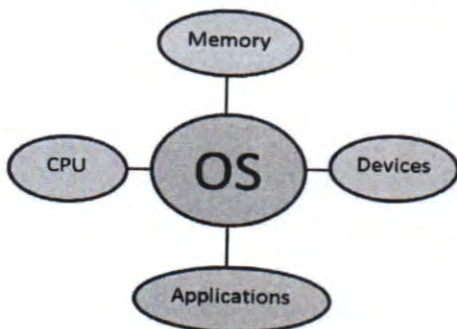
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Activity 17 – Operating systems

This diagram shows how an operating system is central to a computer system. An OS is a complex piece of software found on most computer systems.



List some well-known Operating Systems

Operating systems manage Hardware and run Software.

List the main functions of an OS:

Device drivers let the OS and Hardware Talk to Each other. List some key notes here.

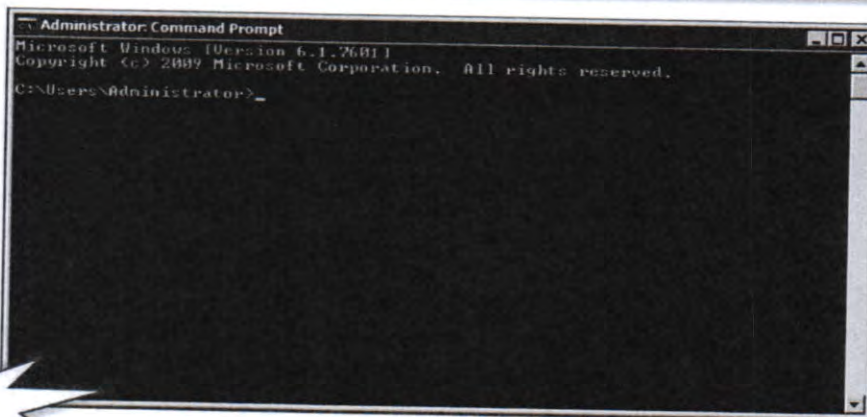


Activity 18 – User interfaces

Operating systems provide a User Interface that allows you to interact with a computer system. A user interface is either a Graphical user Interface (GUI) or a Command line Interface. List the key features of both.



GUI



Command
line



Activity 19 – Multi tasking

Operating systems provide a platform to run applications (apps). Most operating systems can run multiple applications at the same time. This is called multitasking. The OS helps the CPU carry out multi-tasking by efficiently managing memory and CPU processing time. List the four key steps below:

Memory

Memory
manager

CPU

Virtual
memory



Activity 20 – Multi tasking

The OS handles File and Disk Management. Computers store data as file. List four common files type you might find on a computer, include an image of them and their file extension.

The OS is responsible for file management – the organisation of data into a usable hierarchical structure (have a look at your work area). It also deals with the things you can do with your data. List five things that OS allows you to do with your data?

1.	
2.	
3.	
4.	
5.	



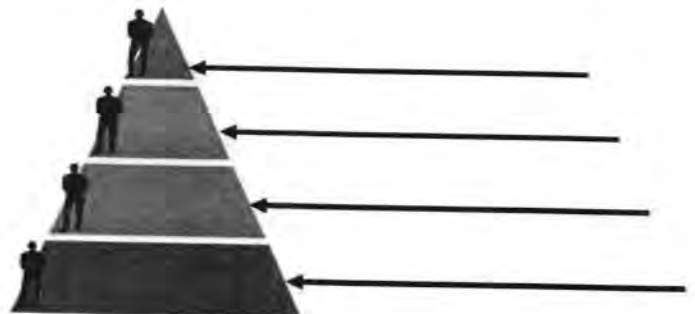
Activity 21 – User accounts

Operating systems can be single-user or multi-user. Define single-user and multi-user Operating Systems with examples.

Explain what user account control is and why it is used.

Give examples of anti-theft measures some Operating systems may have.

Create User Access levels for an organisation.





Activity 21.1 - File and disk management

The OS handles file and disk management. Computers store data as files. List some examples of files that you might typically find on a computer.

Files are just collections of data. File extensions tell the computer which software should be used to open the file. List some examples of typical file extensions.

List some of the actions that an OS allows you to perform on files and folders.





Activity 22 – OS key functions

State whether you think each of the statements is true or false.

A command line interface is useful for expert users.

True

False

Operating systems are a type of computer hardware.

True

False

Operating systems often provide a graphical user interface.

True

False

You often control a GUI using your finger or a mouse.

True

False

Operating systems allow you to install and use apps.

True

False

Smart phones do not use an Operating systems.

True

False

Windows is the only Operating system available.

True

False

An Operating system is considered to be software.

True

False

An Operating system contains utility software that allows you to keep your computer healthy.

True

False

A GUI uses commands to control the computer system.

True

False

Activity 23 – Defragmentation utilities

hard disk	small gaps	disk	fragmented	read/write	magnetic
-----------	------------	------	------------	------------	----------

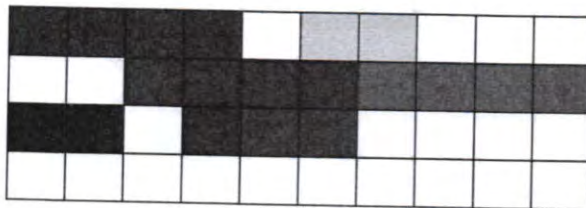
Fill in the gaps:



Files are stored on a _____ in available spaces. Ideally entire files would be stored together. However, as files are deleted and changed lots of _____ begin to appear on the disk. The OS splits up files to fill the gaps. Over time the _____ becomes more and more _____. This makes reading and writing slower as the _____ head has to move across the disk. This only happens with _____ disks as solid state drives don't have any moving parts.



The data is store on a HDD.
Each colour is a file.



When files are deleted gaps appear.



A new file is added and split up into blocks.



After defragmentation all of the blocks are put back together.

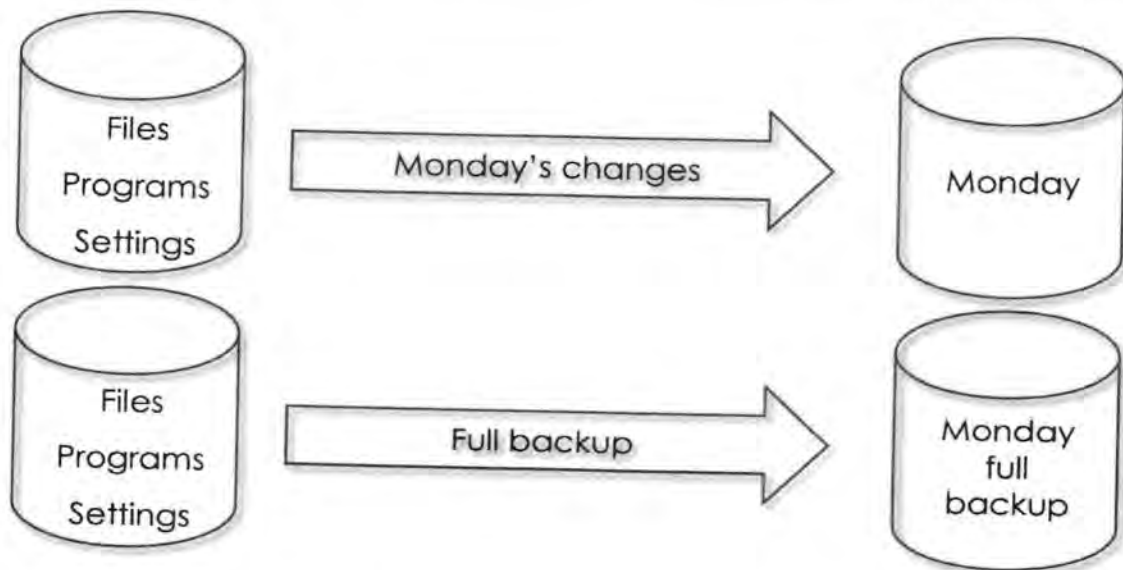
Why do SSDs not need to be defragmented?

Activity 24 – Backup utilities

A backup is a copy of a computer system's files and settings. This means that data can be recovered if there is a problem with the computer system that leads to data loss.

1. List three potential causes of data loss:

- a.
- b.
- c.



Backup utility software schedules regular backups. Backups can be full or incremental.

Define what is meant by a 'full backup and 'incremental backup'.

Activity 25 – Compression



Data compression is when we make file sizes smaller, while trying to make the compressed file as true to the original as possible.

Find two popular types of compression software.

Compressing data files has many uses. Fill in the blanks.

1. Smaller files take up less
2. files from the internet is quicker as they take up less bandwidth.
3. It allows webpages to
4.services normally have restrictions on the size of an attachment you can send so compressing the file will allow you to send it.

Email

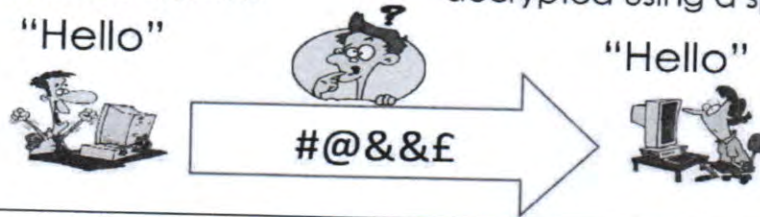
Streaming and
downloading

Load more quickly

Less storage space

Activity 26 – Encryption software

Encryption software scrambles (encrypts) data to stop people from accessing it. Encrypted data can be decrypted using a special key.



Decryption key									
A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z				

Create your own decryption key.

Write your own encrypted message.

Selina's operating system includes an encryption utility that can be used to encrypt folders and files. Explain one reason why Selina may use the encryption utility.

Activity 27 – Utility software

Match up the utility software with the description

Defragmentation

Firewall

Anti-virus

Encryption

Disk clean-up

Backup

Compression

Reduces the size of a file.

Puts fragmented data back together

Scrambles data to stop people
accessing it.

Takes a copy of a computer
systems files and settings in case
they are lost.

Scans your computer to check for
viruses.

Stops unauthorised access to a
computer system.

Makes space on the HDD by
getting rid of any unused data.



Activity 28 – Application software

Apps are software that we use to do various tasks like writing letters, editing pictures and playing games. Match the descriptions to the software.

Word processor

Used to edit digital images.

Photo editing

Used to create specialist documents e.g. newspapers, leaflets etc.

Web browser

Used to write documents e.g. letters.

Spreadsheet

Used to make mathematical model e.g. budgets.

Desktop Publishing

Used to send, receive and manage emails.

E-mail software

Used to browse the World Wide Web.



Activity 29 – Open source software

Make key notes about open source software and list the advantages and disadvantages:



Activity 30 – Proprietary software

Make key notes about proprietary software and list the advantages and disadvantages:



Activity 31 – Open source & proprietary software

State whether each statement is an advantage or disadvantage of open source or proprietary software.

	Open source or proprietary
May not fit user's needs.	
Might not get regular updates so can be buggy.	
No warranties/customer support if something goes wrong.	
Expensive.	
Made for the greater good and not for profit.	
Made to get people to work together to make good software for free.	
Usually free	
Well tested and reliable. Updates will regularly be issued.	
Customer support.	
Comes with a warranty and user manual.	



Worksheet 8 – System software

- 1) David has just installed a new operating system.
 - a) State **three** functions of an operating system. [3]

 - b) After the new OS was installed, it automatically downloaded and installed the device drivers. Describe what is meant by device drivers. [2]

 - c) Identify **two** features the operating system may provide to help protect David's personal data. [2]

- 2) Josephine's computer has a multitasking operating system. Explain how the operating system manages memory and CPU time to allow the computer to multi task. [6]



- 3) Selina has customised the graphical user interface (GUI) on her computer's operating system.
- a) Describe the purpose of a graphical user interface. [2]
 - b) Selina's operating system also has an optional command line interface.
 - i) Define what is meant by a command line interface. [1]
 - ii) Identify **two** benefits of using a command line interface instead of a GUI. [2]
 - c) The operating system includes an encryption utility that can be used to encrypt folders and files. Explain **one** reason why Selina may use the encryption utility. [2]
- 4) An accounting firm plans to introduce a new scheme for regularly backing up its data.
- a) Define what is meant by the following types of backup. [2]
 - Full backup
 - Incremental backup
 - b) Describe a possible backup scheme for the firm that includes: full backups, incremental backups, data compression and security measures. [4]



Worksheet 10 – System software

- 5) Annie has a three-year-old laptop. She is giving the laptop a full service before selling it on.
- a) Annie runs some "Disk Health" software to check for any problems with her HDD.
 - i) Define what is meant by utility software. [1]
 - ii) Give **two** other examples of utility software. [2]
 - b) The "Disk Health" utility recommends performing a disk clean-up to remove unnecessary files. Suggest **two** types of files that might be removed during the clean-up process. [2]
 - c) The utility also reports that Annie's hard disk is 25% fragmented.
 - i) Describe how a disk can become fragmented over time. [3]
 - ii) Explain **one** problem caused by a fragmented hard disk. [2]
 - iii) Briefly describe the defragmentation process. [3]
 - iv) Suggest why it could be better to do a disk clean up before defragmentation rather than afterwards. [1]



Worksheet 11 – Open Source & Proprietary software

- 1) A marketing company has the same, paid-for, proprietary software on all of its computers. The software provides facilities for word processing, presentations, spreadsheets and databases.
 - a) Describe what is meant by proprietary software. [2]
 - b) Identify **two** advantages and **two** disadvantages to the company of using proprietary software. [4]

- 2) Iteck has created TV-PCs. TV-PCs plug into any USB-compatible TV, and come packaged with a selection of open source software.
 - a) Describe what is meant by open-source software. [2]

TV-PC only £39.99!

Turn your TV into a PC for word processing, spreadsheets, slideshows, databases and photos!

Includes portable projector keyboard – type on any surface!

- b) Explain **one** advantage and **one** disadvantage to Iteck of using open source software on the TV-PCs. [4]

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Classroom discussion activity

This mood board has been produced as part of a new project to create a poster about local nature and wildlife.

Discuss what parts of this you would take forward into a design for the poster.



Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Research activity

Search the internet for: 'where are mood boards used'.

Find at least three examples.

Summarise these examples and make sure the context is correct (ask your teacher).

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Introduction activity

Let's say you will be creating a new poster for your school.

Collect some images, text and examples of existing school posters – try searching the school website as a start.

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Research activity

Search the internet for: 'where are mind maps used'.

Find at least three examples.

Summarise these examples and make sure the context is correct (ask your teacher).

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Classroom discussion activity

Homework from Lesson 1 was to bring in some content for a mood board. You can now place these on a physical mood board.

- Discuss how you could use a mind map for the next stage of the project.
- Keep in mind that one purpose of a mood board is to stimulate the generation of ideas.
- What ideas can you think of for a product?
- Show these on a mind map.

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Introduction activity

Let's say you will be creating a new poster for your school.

Create a mind map with your school name as the central node and add sub-nodes for different departments, subjects and activities.

Expand these out further if you can.

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Classroom discussion activity

Homework from last week was to create a mind map.

Keep in mind that one purpose of a mind map is to identify the content of a media product.

Discuss how a mind map and a visualisation diagram can be used together as planning for a still image or digital graphic.

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Homework activity

Create a visualisation diagram on one of the following themes:

- print poster on school sports options
- website page on recycling
- an alternative theme set by your teacher.

Bring this to your next class.

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Research activity

Search the internet for: 'where are visualisation diagrams used'.

Find at least three examples.

Make sure these are for media products that you could create as a digital graphic, not data charts, graphs or CAD drawings of vehicles and buildings.

Summarise these examples and make sure the context is correct (ask your teacher).

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Extension activity

Create a storyboard for an animation that advertises a new type of folding smartphone. The intended use would be for a website advert and last between 12 and 20 seconds.

Include information for:

- scene number
- scene content (draw this yourself)
- scene duration
- action/dialogue
- total duration.

Check with your teacher that your storyboard is suitable.

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Research activity

Search the internet for: 'where are storyboards used'.

Find at least three examples.

Make sure these are for media products that have a timeline.

Summarise these examples and make sure the context is correct (ask your teacher).

Unit R081 Pre-production skills

LO1: Understanding the purpose and content of pre-production

Classroom discussion activity

Homework from last week was to create a visualisation diagram.

Keep in mind that one purpose of a visualisation diagram is to identify the content and layout of an intended media product.

Discuss how a visualisation diagram and a storyboard can be used together as planning for a digital graphic or website page.

OCR

Oxford Cambridge and RSA

Wednesday 7 June 2017 – Morning

LEVEL 1/2 CAMBRIDGE NATIONALS IN CREATIVE iMEDIA

R081/01 Pre-production skills

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

None

Duration: 1 hour 15 minutes



Candidate forename		Candidate surname	
Centre number			
		Candidate number	

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- Do **not** write in the barcodes.

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- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- Your Quality of Written Communication will be assessed in the question marked with an asterisk (*).
- This document consists of **12** pages. Any blank pages are indicated.

Answer **all** the questions.

SECTION A

Progressive Park is a theme park which has a new ride opening next summer. The new rollercoaster ride will allow riders to wear virtual reality goggles as they speed through different parts of the United Kingdom (UK) at various times in its history.

- 1 You have been asked to create a visualisation diagram for a poster that will be used to promote the new ride.

- (a) Identify **three** items, other than annotations, which could be included on the visualisation diagram for the poster.

1.....

2.....

3.....

[3]

- (b) Explain **one** reason why annotations would be added to the visualisation diagram for the poster.

.....

.....

.....

.....

[2]

- (c) Explain **one** purpose of the visualisation diagram for the poster.

.....

.....

.....

.....

[2]

- 2 During the first project meeting about the new ride, ideas were expressed by different members of the design team.

(a) Identify the **most** appropriate pre-production document to capture these ideas.

.....
..... [1]

(b) Identify **two** items that would be included on this document.

1.....
2..... [2]

- 3 Below is a section of the client brief from Progressive Park for the new ride project.

The new ride is due to open in 12 months' time, which is how long it will take to build the rollercoaster ride.

There will be four multimedia sections for the virtual reality aspect covering different periods in the history of the UK:

- Victorian era;
- World War II;
- The 1970's;
- Modern times.

Each of the multimedia sections will include video, a soundtrack (music, noises, etc.) and a narration guiding the rider through the history of the UK.

The pre-production planning for these four multimedia sections needs to be completed with 10 months remaining on the project. This will then allow the creation of these multimedia sections to be carried out, each within a 2-month period. There can only be a small production team to keep costs down, so the construction of each section will need to be completed before the next one is started.

- (a) (i) From the client brief identify **two** time restrictions on the production.

1

2 [2]

- (ii) From the client brief identify **one** design requirement.

..... [1]

- (iii) Using the information provided in the client brief, create a work plan for the production of the multimedia sections of the ride together with the overall timescale for the project. Add the relevant information to the chart below (Fig. 1). [5]

TASKS	Months											
	1	2	3	4	5	6	7	8	9	10	11	12
New Ride Project												
• Planning												

Fig. 1

- 4 Identify **one** piece of legislation for the production workers that needs to be considered during the production of the multimedia virtual reality sections.

..... [1]

- 5 The target audience for the ride needs to be analysed during pre-production.

- (a) Explain why accessibility will need to be considered during the pre-production of the multimedia virtual reality sections.

.....

 [2]

- (b) Identify **one** piece of hardware, other than a monitor and computer, that could be used to create a digital pre-production document for the new ride and describe how it could be used.

.....

 [3]

- (c) Identify the **most** suitable type of software for creating a Visualisation Diagram.

..... [1]

- (d) During the planning of the multimedia sections of the ride, research is carried out using secondary sources.

Describe what is meant by a 'secondary source'.

.....

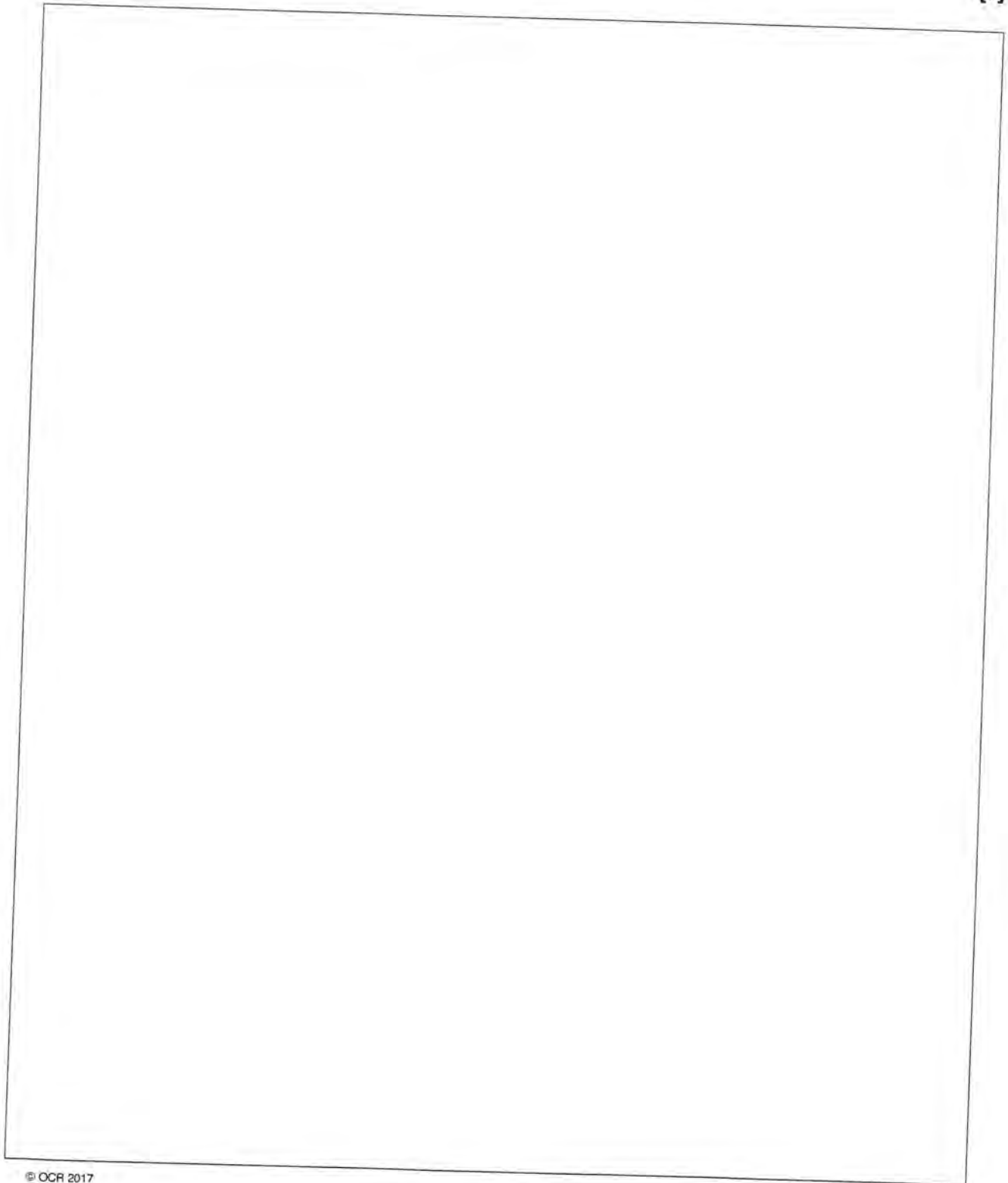
 [2]

SECTION B

- 6 Publicity for the ride will require the capturing of images of the ride and park to use in various leaflets and posters.

Create a mind map that can be used by the production team to help plan the capturing and editing of these images.

[7]



- 7 (a) Create a 30 second storyboard for the fourth multimedia virtual reality section 'Modern Times' in the UK. This will appear in the virtual reality goggles that the rider will wear whilst they are on the ride.

Marks will be awarded for:

- content;
- layout;
- fitness for purpose;
- scene information.

[10]

.....
.....
.....
.....
.....
.....
.....
.....

- (b) Identify a suitable file format for the final storyboard.

..... [1]

- 8 The multimedia virtual reality sections will be played as videos in the goggles of the riders as they move along the ride.

Identify a suitable file format for the video.

..... [1]

- 9 During the production of these multimedia sections a virtual camera will be used as well as a digital video camera.

Explain how a virtual camera is different to a digital video camera.

.....
.....
.....
..... [2]

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Question 10 starts on page 10.

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END OF QUESTION PAPER

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Oxford Cambridge and RSA

Wednesday 6 June 2018 – Morning

LEVEL 1/2 CAMBRIDGE NATIONALS IN CREATIVE iMEDIA

R081/01 Pre-production skills

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

None

Duration: 1 hour 15 minutes



Candidate forename		Candidate surname	
Centre number			
		Candidate number	

INSTRUCTIONS TO CANDIDATES

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- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

SECTION A

'Words from the Planet' is a new conservation campaign with the purpose of increasing the awareness of the environmental issues that are faced by our planet. The campaign is targeted at a wide target audience between the ages of 12 and 50. 'Words from the Planet' will use a variety of media to raise awareness of the issues faced.

- 1 You have been asked to create a number of pre-production documents to take to the first campaign meeting.

- (a) Identify **three** items, other than annotations, which could be included on a visualisation diagram for a flyer to publicise the 'Words from the Planet' campaign.

1

2

3

[3]

- (b) Explain the purpose of a digital mood board for the 'Words from the Planet' campaign.

.....

.....

.....

..... [2]

- 2 Several short 30 second films will be made to explain each of the environmental issues facing the Planet.

- (a) A storyboard will be created for each of these films. Explain **one** reason why this is the **most** suitable document for planning these films.

.....

.....

.....

..... [2]

- (b) Explain how the following aspects of the storyboard help the production team.

Camera angles

.....

.....

.....

.....

Scene numbers

.....

.....

.....

.....

Camera movements

.....

.....

.....

.....

[6]

3 The films will be shown on various websites as well as on screens in amusement parks.

(a) Explain how the wide age range of the 'Words from the Planet' target audience will affect the content of the films.

.....

.....

.....

.....

.....

..... [3]

(b) Identify **two** aspects, other than age, of target audiences that could be considered when planning these films.

1

2

[2]

4 The name of 'Words from the Planet' will be trademarked with the TM symbol.

(a) Explain what the Trade Mark TM symbol means when it is used with the campaign's name.

.....

.....

.....

..... [2]

The 'Words from the Planet' campaign will use images taken from space showing the world's oceans. The copyright of these images is held by the space organisations who took the images.

(b) Describe what steps must be taken so that these images can be used.

.....

.....

.....

..... [2]

SECTION B

Consider the images in Fig. 1 below:





















				
1. Mountain	2. Globe in hand	3. Cars	4. Young girl	5. Spade in earth
				
6. Indonesian man climbing tree	7. Polar ice	8. Mask with tear	9. Smoke	10. Fonts
				
11. Seaside	12. Globe with pins in	13. Toilet seat	14. Boy in hoody	15. Road in rainforest
				
16. Boots	17. Woman smiling	18. Earth day	19. Man with hands on face	20. Drought word

Fig. 1

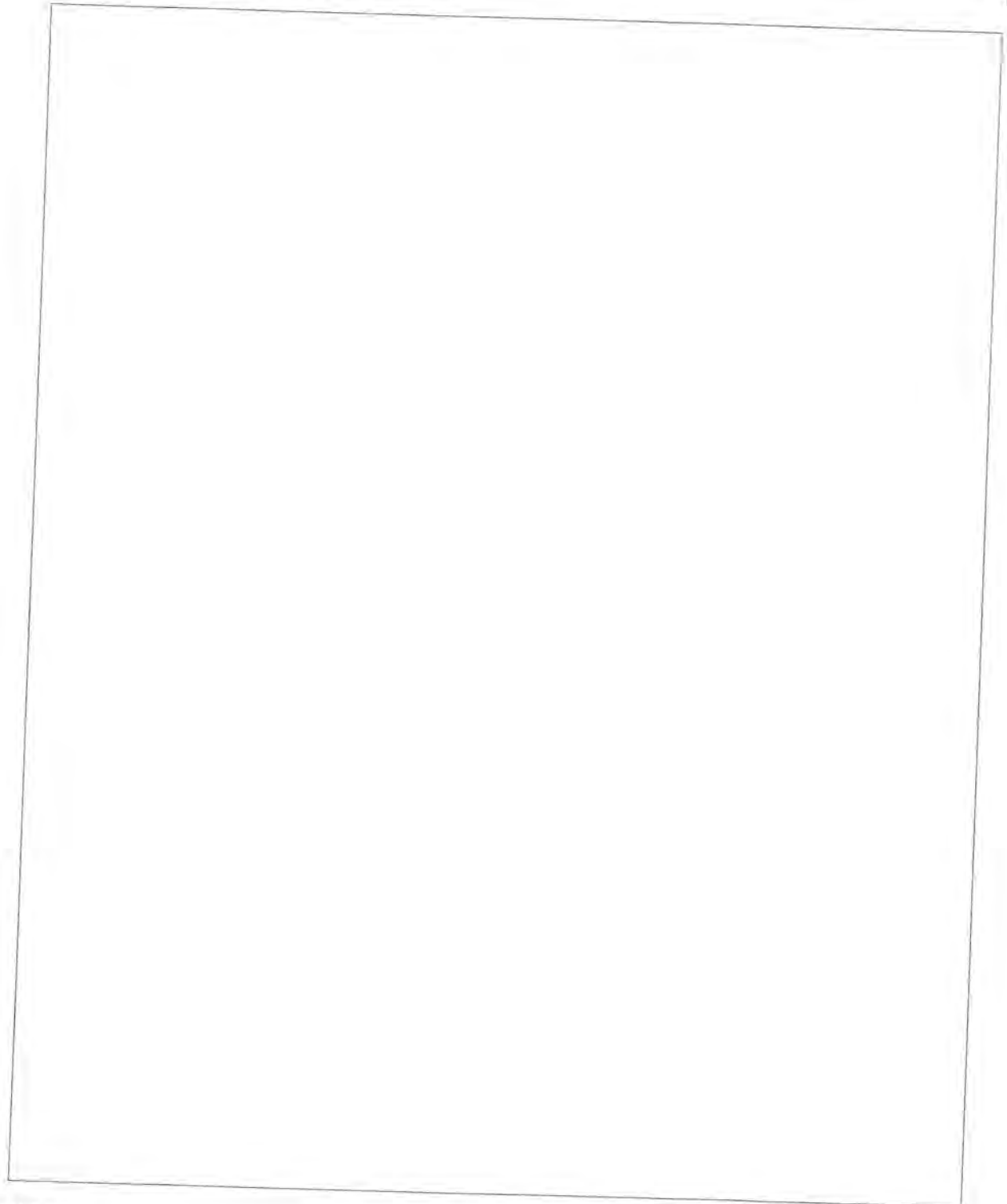
- 5 Choose six images from **Fig. 1** to create a mood board for the 'Words from the Planet' campaign.

You do not need to draw the images. You must show which images you have chosen and where you would position them on the mood board.

Marks will be awarded for:

- fitness for purpose;
- annotations to justify your choices.

[9]



Consider the script in Fig. 2 below:

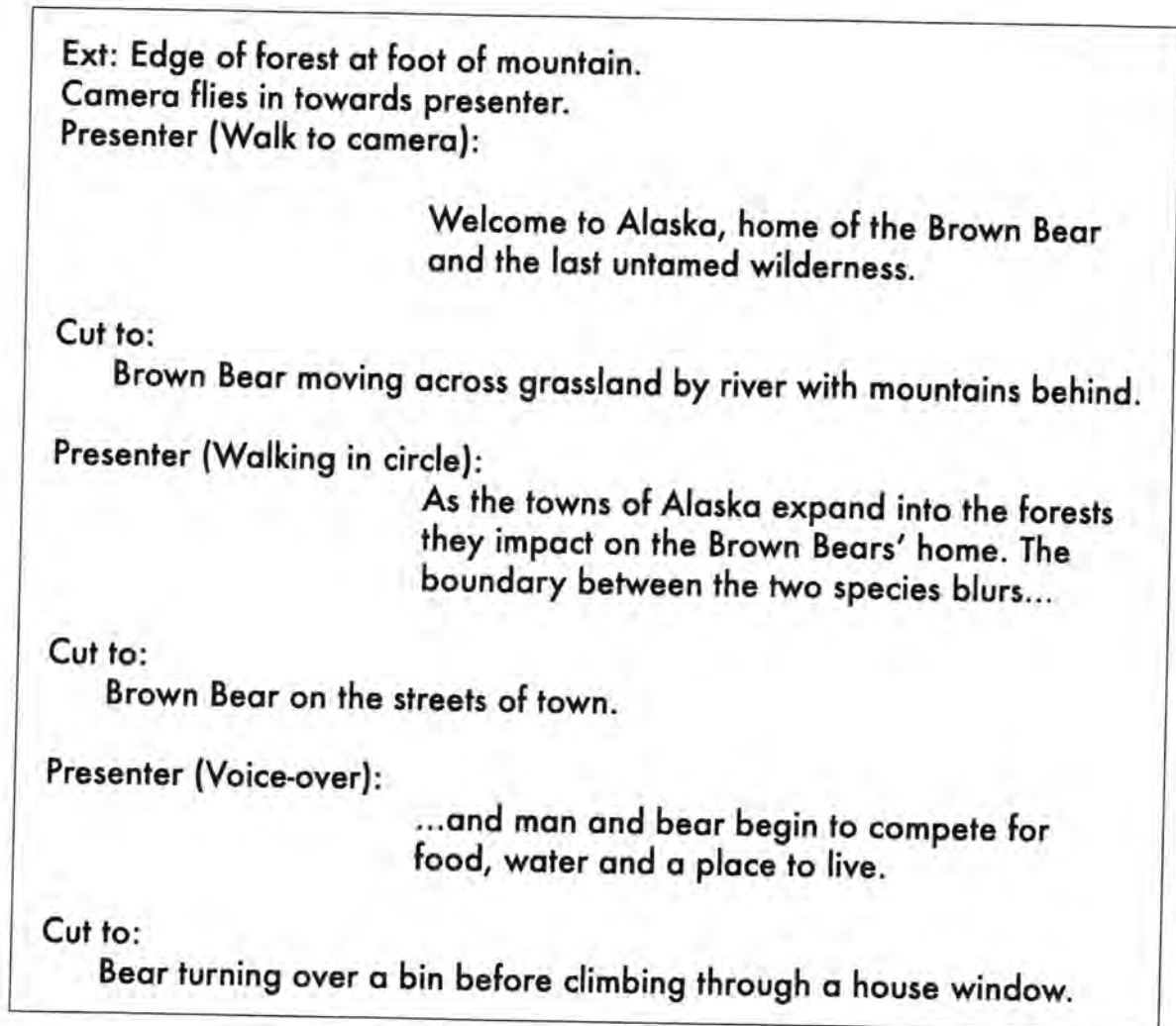


Fig. 2

- 6 Create a mind map from the script in **Fig. 2** showing the various aspects that will need to be considered when planning the filming of one of the short films.

Marks will be awarded for:

- layout;
- fitness for purpose.

[7]



- 7 (a) Using the script in **Fig. 2** identify the following:

- (i) location:
- (ii) character:
- (iii) stage direction:

[3]

As the script is created it is edited by different members of the pre-production team.

- (b) State **one** way that the script could be named to keep track of its different edits.

..... [1]

- 8 A series of digital graphics will be created to promote the campaign.

Identify the **most** suitable file format for each of the digital graphics listed, explaining why it is the **most** suitable file format.

Printed Poster

File format:

Justification:

.....

.....

.....

Web Graphic

File format:

Justification:

.....

.....

.....

[6]

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Question 9 starts on page 12.

Question 9 is based on **Fig. 3**.

Fig. 3 is a draft of a storyboard for a section of one of the 30 second films. The storyboard will be given to the camera crew who will create the film.


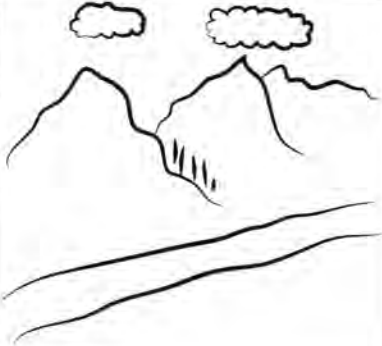
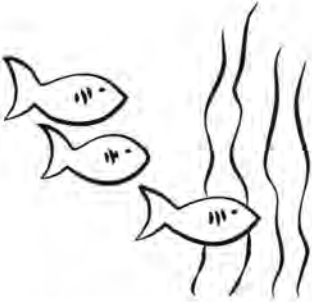


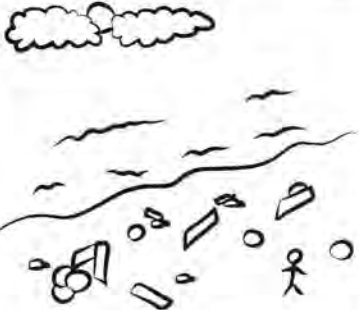
		
<p>Clouds Camera flies through them</p>	<p>Mountains Camera flies past mountains along line of river</p>	<p>Under the sea</p>
		
<p>Rainforest Camera rises from ground up over trees</p>	<p>Tree Wide shot of tree Close in on tree falling</p>	<p>Beach Camera moves along beach Zoom in on boy and rubbish</p>

Fig. 3

- 9* Discuss the suitability of the content of the storyboard in **Fig. 3** for the camera crew. You should include strengths, weaknesses and any areas for improvement.

*The quality of written communication will be assessed in your answer to this question. [12]

[illegible]

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END OF QUESTION PAPER

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Oxford Cambridge and RSA

Monday 3 June 2019 – Afternoon

**LEVEL 1/2 CAMBRIDGE NATIONALS IN CREATIVE
iMEDIA**

R081/01 Pre-production skills

Time allowed: 1 hour 15 minutes

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

None



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number

--	--	--	--	--

Candidate number

--	--	--	--

First name(s)

--

Last name

--

INSTRUCTIONS

- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

INFORMATION

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- The total number of marks for this paper is **60**.
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- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

SECTION A

Progressive Museums take mobile museums into primary schools around the country to bring the history curriculum to life, using buses and lorries. Progressive Museums are developing a new product called 'Life in Roman Britain'. You have been employed to develop the interactive presentations for the museum. You have also been asked to provide ideas about how the new 'Life in Roman Britain' museum can be promoted.

- 1 At the first pre-production development meeting with Progressive Museums a mind map is produced.

- (a) Explain why a mind map could be produced at the first meeting.

.....

.....

.....

..... [2]

- (b) Identify **two** possible audiences for the mind map.

1

2 [2]

- 2 At the pre-production meeting, it was decided that large banner posters would be displayed at the sides of the buses and lorries when they are parked and open for the primary school children.

You have been asked to create a visualisation diagram for these banners.

Identify **four** items that could be included in the visualisation diagram.

- 1
- 2
- 3
- 4

[4]

- 3 Below is a section from the client brief provided by Progressive Museums for the new 'Life in Roman Britain' project.

The 'Life in Roman Britain' project is a travelling exhibit that will visit primary schools using a lorry and a bus. At each school the lorry and bus will set up with big banners outside the doors welcoming the school children in. The exhibit will include mannequins and staff dressed in a range of Roman costumes.

Inside the back of the lorry there will be two rooms:

- Roman villa – stone coloured room with plates of food, cushions and couches, sounds of talking and music
- Roman barracks – wooden style building with a bed and weapon rack, include sounds and smells of battle.

The bus will contain two floors with interactive presentations and exhibits:

- Top floor – presentation showing how life was in the Roman Empire including sounds of everyday life
- Bottom floor – video and presentation about life in Rome with senators voting and includes sound of debates and people shouting over each other.

The exhibit needs to start visiting schools in October but needs to be tested before it starts visiting the schools, which will take a month. Each floor of the bus and room of the lorry will take 2 months to develop.

We can only allocate a small team of people to developing the exhibit so each of the floors and rooms must be completed before the next one can be started.

- (a) From the client brief identify **two** design requirements.

1

2 [2]

- (b) From the client brief identify **one** time restriction placed on the production.

..... [1]

- (c) Using the information provided in the client brief, create a work plan for the production of the interactive presentations. Add the relevant information to the chart below (Fig. 1).

Tasks	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct

Fig. 1













5

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SECTION B starts on page 6.

6
SECTION B

		
1. Howling White Hudson Bay Wolf	2. Roman warrior helmet	3. Lipstick alphabet
		
4. Misty beech forest	5. Roman numerals engraved in textured stone	6. Baked tomatoes with rice and sliced potatoes
		
7. Viking with a horn	8. Black and green olives with soft cheese	9. Old road
		
10. Reconstruction of a Roman amphitheatre	11. Viking longship	12. American Black Bear

		
13. Roman mosaic portraying the autumn season, or 'Fall Character'	14. French croissants	15. Antique photograph of Queen Victoria

Fig. 2

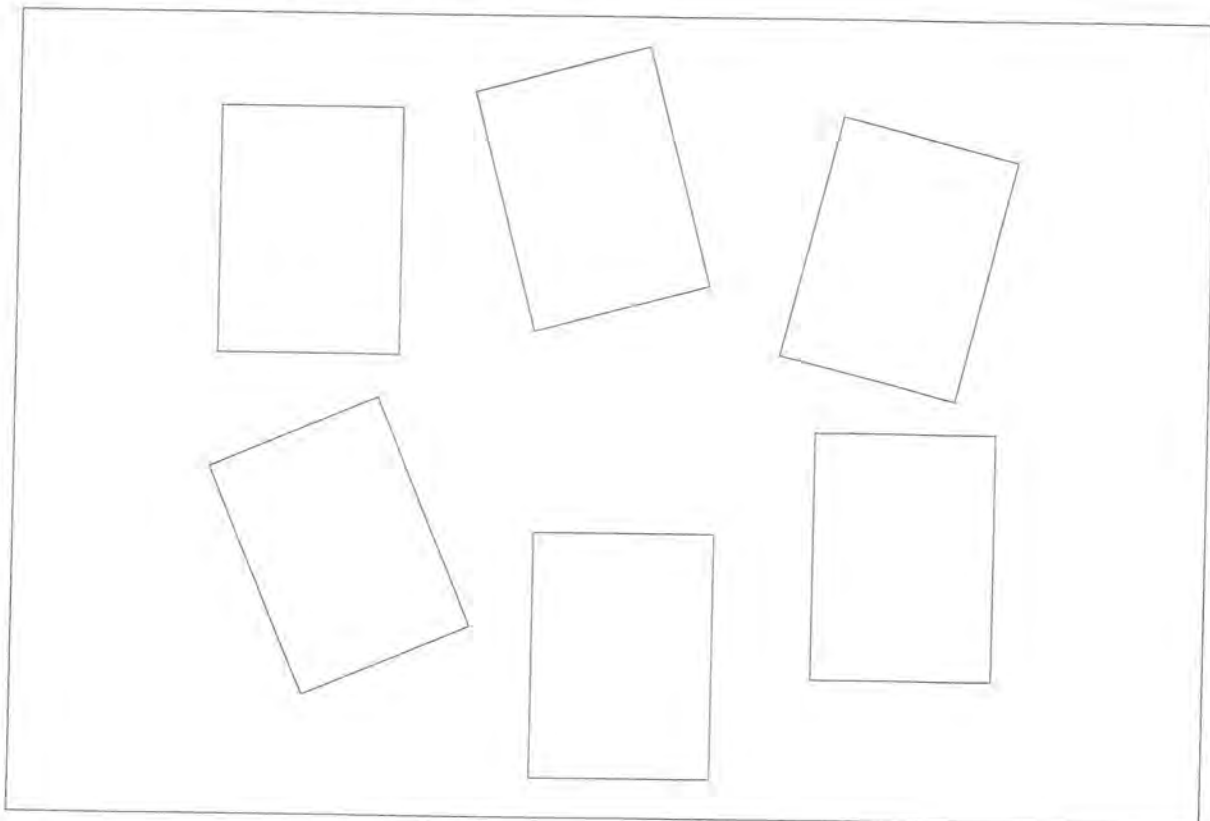
- 4 Choose 6 images from **Fig. 2** to create a mood board for the 'Life in Roman Britain' museum project.

You do not need to draw the images. You must show which images you have chosen in the boxes provided and justify your choices.

Marks will be awarded for:

- fitness for purpose
- annotations to justify your choices.

[8]



EXT: Front of a Roman Villa

Roman Commander walks out of front door towards viewer
CLOSE UP of Roman Commander

Commander Vespasian:

Welcome young Briton, I am Commander Vespasian, Commander of the Roman garrison in Britannia.

(Pause)

So you want to become a member of the Roman Empire?

Good choice, life is so much better in Rome.

Come and let me teach you my young friend about life as a member of the Roman Empire.

Commander Vespasian turns and walks back to the villa
CAMERA FLY BEHIND

INT: Large room with cushions on floors and a couch
Commander Vespasian sits on couch
Servant pours wine into a goblet

Buttons appear on screen, so the user can choose what they want to look at to make their decision.

(VOICE OVER) Commander Vespasian:

Your first decision is to choose what role you want to have in our great empire.
Touch one of the buttons on the screen to choose one of the options.

BUTTONS have images and text for:

- **Centurion**
- **Gladiator**
- **Senator**
- **Priest**
- **Maiden of the Gods**

Fig. 3 Script for Interactive Presentation

5 (a) Using the script in **Fig. 3** identify the following:

- (i) **One** location:
- (ii) **One** camera movement:
- (iii) **One** non-speaking character:
- (iv) **One** user interaction:

[4]

(b) Create a storyboard from the script in **Fig. 3** for the interactive presentations that will be used on the buses and lorries.

Marks will be awarded for:

- content
- layout
- fitness for purpose
- scene information.

[9]

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.....

- 6 Progressive Museums will be visiting primary schools around the country.

Explain why the ability of the target audience to access the content must be considered when designing and creating the interactive presentations.

.....

.....

.....

.....

.....

.....

[3]

- 7 The school pupils will be guided around the mobile museum using a static map and audio recording on tablet computers supplied by the museum.

Identify the most suitable file types for the final versions of the:

- (a) audio recording:
- (b) static map:

[2]

- 8 Describe **two** health concerns that should be considered for the staff creating the interactive presentations.

1

.....

.....

.....

.....

2

.....

.....

.....

[4]

11
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PLEASE DO NOT WRITE ON THIS PAGE

Question 9 starts on page 12.

Question 9 is based on Fig. 4

Fig. 4 is a draft visualisation of the mini cards that pupils can collect when going around the museum. There will be several different cards for different people in the Roman Empire. The visualisation will be given to a freelance graphic designer to create the different mini cards.

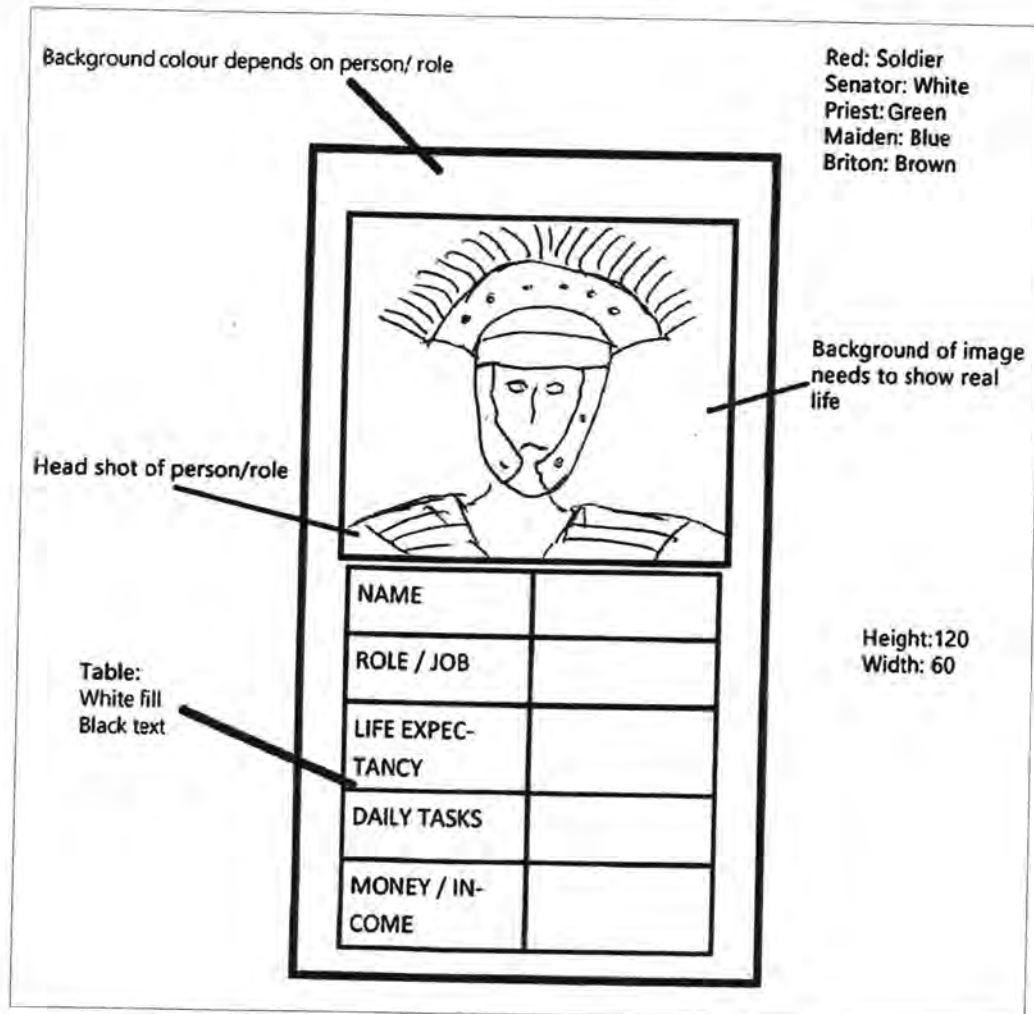


Fig. 4

- 9* Discuss the suitability of the content of the visualisation in **Fig. 4** for the freelance graphic artist. You should include strengths, weaknesses and suggest possible improvements. [12]

**The quality of written communication will be assessed in your answer to this question.*

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

A large rectangular area for writing, featuring horizontal dotted lines. A vertical solid line runs down the left side of the area, creating a margin. The area is intended for providing additional answer space for a question.

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GCSE Computer Science

System Architecture

Working from home workbook



Your Name:

Class:

Due to school closures, self-isolations etc. it is necessary for you to stay away from school and complete work at home. We have tried to make this as easy as possible for you and have provided you with this workbook.

This workbook is designed to be used to help you continue to revise and prepare for your GCSE Computer Science exams.



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Instructions:

Work through as many sections as you can. We understand that some of you may be ill during this time or helping to look after others who may be ill, so we ask that you do as much as you can. Obviously the more you can complete, the better you will be prepared for your exams so it is in your own interest to work through as much as you can.

Watch the videos where prompted and complete the tasks that are asked. We have tried to cut down on the printing and wasted paper by only including the links to the videos and the tasks and not taken up valuable space with information you can find elsewhere. If you do not have access to YouTube please feel free to use whatever other source of information you have such as textbooks, your own notes etc. to enable you to complete the tasks.

If you have any problems with completing any of the tasks or need any extra help then please contact your teacher however please understand that if they are ill or are looking after somebody else who is ill, they will not be able to give you immediate feedback and you may have to wait for a response.

When you return to school, please bring this workbook with you so your teacher can provide feedback.

We understand this is a difficult time for many but please remain patient and contact your school or teacher if you have any questions or need any additional help.



What is the CPU?



<https://youtu.be/3hoizyuPt54>



If you don't have access to YouTube, feel free to look up the information in a textbook or other source.

Now answer these questions:

1. What do busses do on the motherboard?

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2. What is Moore's Law?

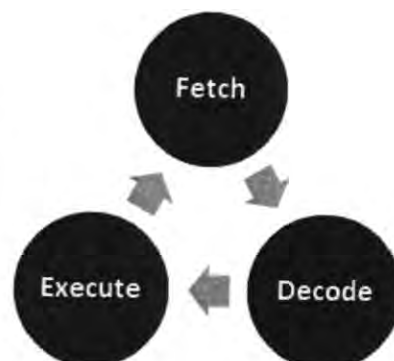
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3. What is cache memory used for?

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4. What happens at each stage of the Fetch – Decode – Execute cycle?

Fetch
Decode
Execute



The Von Neumann Architecture



<https://youtu.be/PYdHib45nu8>



If you don't have access to YouTube, feel free to look up the information in a textbook or other source.

1. What made Von Neumann's architecture different from previous computers?

2. Which type of memory is fastest and closest to the CPU, but is also the most expensive? (Tick one)

☐ Secondary

☐ Cache

☐ RAM

3. Draw a diagram that shows how the CPU works and is connected to input, output and cache memory. Include and clearly identify the individual registers, the part of the CPU that performs calculations and the part of the CPU that controls how data is transferred around the processor. Make sure your diagram is clearly labelled.

The performance of the CPU



<https://youtu.be/5uTxaKqg2h4>



If you don't have access to YouTube, feel free to look up the information in a textbook or other source.

1. How many instructions can a 4GHz computer process in 3 seconds? (show your workings out and please note: 1 million is written as 1,000,000 and 1 billion is written as 1,000,000,000)

2. Why would the size of the cache memory affect the speed of a computer?

3. Why can the number of cores a CPU has, affect the speed of the computer?

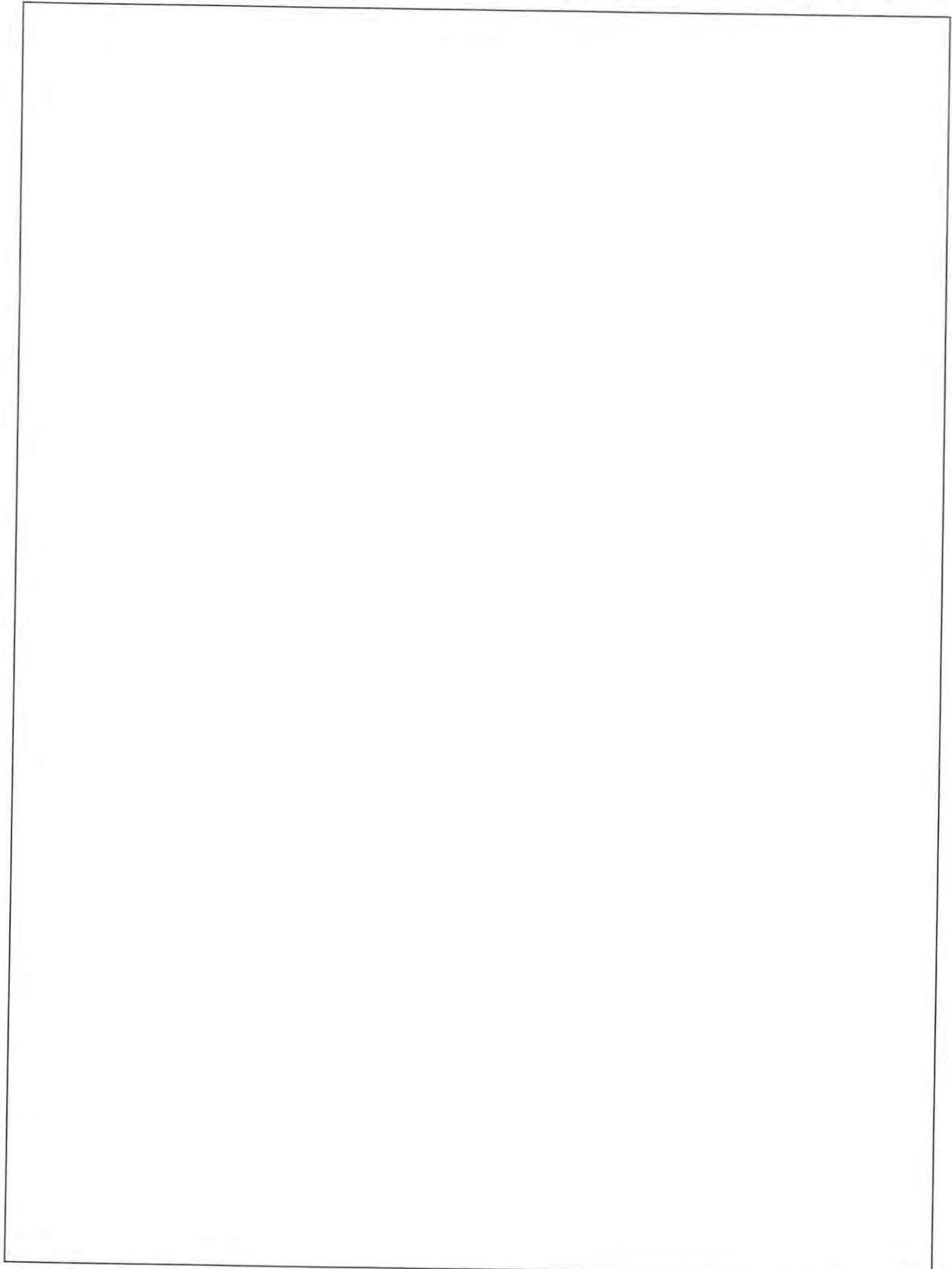
Please note: It takes 1 man, 8 hours to build a brick wall that measures 2 meters x 2 meters. If 2 men were building the same wall, they can build it in half the time, meaning the same size wall can be built in only 4 hours. However, not all jobs can be sped up just by having more people working on it. For instance, it takes 1 woman, approximately 40 weeks (just over 9 months) to have a baby (from conception to birth), but 2 women would not speed up the time to 20 weeks it will still take 40 weeks.



Using the same logic having 2 cores in a processor will not always double the processing speed as some jobs can not be split up and run simultaneously, however having more cores will certainly make the computer much faster because there will be some instructions that can be shared between the cores and run simultaneously.

Recap Systems Architecture

Use the space below to draw a mind map of important points you have learnt about the CPU, the Von Neumann architecture and the performance of the CPU. Include as much colour, relevant doodles and important information as you can.

A large, empty rectangular box with a thin black border, intended for a student to draw a mind map. The box occupies most of the page below the instructions.

Practise Exam Questions

1) Describe the purpose of the Control Unit. [2 marks]

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2) Describe the function of the following registers. [2 marks]

MAR

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MDR

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3) What happens at each stage of the fetch-execute cycle? [3 marks]

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4) Elinor says, "*a quad-core processor is twice as fast as a dual-core processor*". Explain why she is mistaken in believing this. [4 marks]

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Mark Your Exam Questions

Look back on your answers and mark them using the following criteria.

1) Describe the purpose of the Control Unit.

1 mark for any of the following bullet points (max 2 marks)

- The control unit controls the flow of data within the CPU
- The control unit controls the flow of data to other parts of the computer system such as input/out devices and memory
- The control unit carries out the instructions, such as save data to memory, retrieve data to memory etc.

2) Describe the function of the following registers.

1 mark for any of the following bullet points, no marks for simply giving the full name of the register (max 2 marks)

- MAR – Holds the memory address that is going to be used by the CPU
- MDR – Holds the data or instruction that is going to be used by the CPU

3) What happens at each stage of the fetch-execute cycle?

1 mark for any of the following bullet points (max 3 marks)

- During the fetch part of the cycle the data or instructions to be retrieved from memory.
- During the decode part of the cycle the CPU decides if it is data or an instruction and which part of the CPU needs to execute it (ALU or CU).
- During the execute part of the cycle the instruction is carried out or the data is sent to the correct part of the memory.

4) Elinor says, "*a quad-core processor is twice as fast as a dual-core processor*". Explain why she is mistaken in believing this.

1 mark for any of the following bullet points (max 4 marks)

- A quad-core processor contains 4 cores and a dual-core processor contains 2 cores
- Some programs contain instructions which can be run simultaneously (at the same time) and do not need to wait for others before being processed.
- Many tasks cannot be run simultaneously and so the instructions need to wait until another is completed before it can run.
- This would mean that having more cores makes it faster but not double the speed as not all sets of instructions can be split evenly between two cores.



Section 1 – Components of a Computer System

- 1) Hardeep wants to try a new operating system on his computer. The new operating system is optimised for use with a touchscreen.

	<u>Hardeep's PC</u>	<u>OS Minimum requirements</u>
Processor:	2.1 GHz, 4 cores	1.0 GHz, 4 cores
RAM:	2 GB	2 GB
Storage:	256 GB, 125 MB free	19 GB free space
GPU:	Integrated 256 MB	Dedicated 512 MB

- a) Hardeep needs to upgrade some of the components in his computer before the new operating system can be installed. State which components must be upgraded. [2]
- b) Would you recommend that Hardeep upgrades any other components in his computer? Explain your answer. [2]
- c) Explain why an operating system requires a certain amount of RAM. [2]
- d) The new operating system's GUI is optimised for touchscreen use. Describe **two** features that a GUI may include to take advantage of touchscreen technology. [4]
- e) Various applications on Hardeep's computer need to be updated to run with the new OS. After the update, Hardeep notices that one application saves files with a different file extension to the older version. Explain the purpose of a file extension. [2]



- 2) Three computers are on sale in a computer store. Their specifications are shown below.

	CGPC3000	XZ Monochrome	CGPC-Pro
CPU	loteck S44: Quad-core, 2.4 GHz, 4 MB cache	loteck X3: Octa-core, 3.3 GHz, 6 MB cache	loteck S30: Dual-core, 2.4 GHz, 2 MB chache
RAM	4 GB	8 GB	4 GB
Storage	1 TB HDD (5400 rpm)	500 GB SSD	128 GB HDD (7200 rom)
Graphics	Integrated 512 MB	loteck UltraBurst 2 GB	Integrated 512 MB
OS	Legacy 3	Legacy 3	Legacy 3
Price	£300	£650	£200

- a) Kirstie and Liam go shopping for computers. They each have different requirements but don't want to spend more money than is necessary.
- i) Kirstie needs a computer for word processing, emailing, downloading high definition TV series from an online store and basic video editing. Which computer would you recommend for Kirstie? Give reasons for your answer. [4]
- ii) Liam wants to replace his old video games console with a new gaming PC. He wants to be able to play the latest games releases, but will also need his computer for browsing the Internet, and editing databases. Which computer would you recommend for him? Give reasons for your answer. [4]
- b) Liam decides to overclock the CPU on his new computer. Explain **one** positive and **one** negative effect that overclocking the CPU may have. [4]



Worksheet 1 – Computer systems

- 1) Computer systems consist of hardware and software that work together.
a) Define what is meant by hardware. Give **one** example. [2]

b) Define what is meant by software. Give **one** example. [2]

- 2) A microwave contains an embedded system which controls its cooking modes.
a) What is an embedded system? [1]

b) Give **two** other examples of devices that may contain an embedded system. [2]

c) Explain **two** benefits of using an embedded system in a microwave instead of using a general purpose computer. [4]



Worksheet 2 – The CPU

Draw a diagram to represent how Von Neumann architecture works. Include all of the registers you have learnt about. [7]

- 1) Tick **one** box for each statement to show whether it is true or false. [4]

CPU stands for Computer Processing Unit.	True	False
The CPU processes all of the data and instructions that make a computer system work.	True	False
The CPU carries out the decode-fetch-execute cycle.	True	False
The clock speed, number of processor cores and cache size all effect CPU performance.	True	False

- 2) The control unit, arithmetic logic unit and cache are all parts of the CPU.
a) State **two** functions of the Control Unit. [2]

b) Describe the function of the Arithmetic Logic Unit. [2]

c) Explain how cache is used by the CPU. [3]



Worksheet 3 – CPU

- 3) A tech firm have started producing their own CPUs. They are currently testing the registers in some prototype CPUs.

a) Explain the purpose of CPU registers. [2]

b) Outline the function of each of the following CPU registers: [3]

Accumulator:

MAR:

MDR:

c) A fault is identified in the prototype CPUs where the program counter is not incrementing with each cycle. Explain what will happen in the CPU in this case. [2]

- 4) CPUs process data according to the fetch-decode-execute cycle.

a) Describe what happens during each stage of the fetch-decode-execute cycle. [6]



Worksheet 4 – Memory

- 1) Describe the difference between volatile and non-volatile memory. [2]

 - 2) Nigel runs a piece of software to analyse the performance of his computer. It recommends that he should install more RAM in his computer.
 - a) Explain the purpose of RAM in a computer system. [2]

 - b) Give **two** reasons why Nigel may need to install more RAM in his computer. [2]

 - 3) When a computer is switched on the BIOS runs. The BIOS is stored in the computer's ROM.
 - a) State **two** functions of the BIOS. [2]

 - b) Explain why the BIOS is stored in ROM instead of RAM. [2]
- When many programs are running at once a computer may have to use virtual memory.
- c) Explain how virtual memory works. [2]

 - d) Explain **one** disadvantage of using virtual memory. [2]



Worksheet 5 – CPU and system performance

- 1) Mary works as a graphic designer. For her latest project, she plans to upgrade her computer in order to run design software more smoothly.
- a) Identify **three** components that could be upgraded to improve the performance of her computer. [3]
- 2) Jackson is considering upgrading his PC. Will offers to sell his old CPU to Jackson. Will's CPU is the same type as Jackson's CPU but has a different specification.

Will's CPU

8 cores

6 MB cache

2.8 Ghz clock speed

Jackson's CPU

4 cores

3 MB cache

1.6 Ghz clock speed

- b) Define the term clock speed. [1]
- c) Explain why using a CPU with a large cache capacity may increase CPU performance. [2]
- d) Do you think Jackson should buy Will's CPU? Give reasons to justify your decision. [4]
- e) Jackson decides to increase the RAM in his PC from 4GB to 8GB. He was disappointed to find no noticeable increase in his computer's performance. Explain why this may be the case. [2]



Worksheet 6 – Secondary storage

- 1) Shaun is going on a two week skiing trip. Each night, he will copy photos and videos to his laptop's secondary storage.
 - a) Give **three** characteristics to consider when choosing a suitable type of secondary storage for a computer system. [3]
 - b) Shaun will be using a helmet mounted action camera to record videos whilst skiing. The camera records video onto a flash memory card.
 - i) Give **two** reasons why flash memory is a suitable storage type for an action camera. [2]
 - ii) Explain why a magnetic hard disk would be an unsuitable storage type for an action camera. [2]
- 2) Carley is getting a custom built computer. She has a choice of two options for secondary storage: A 500 GB HDD (10,000 rpm) or a 128 GB SSD. For each storage option, give reasons why Carley may choose it over the other option. [4]



Worksheet 7 – Secondary storage

- 3) Every night a large law firm backs up roughly 600GB of data. At the end of each month, one final backup is taken and stored permanently, and the daily backups are deleted.
- a) After three weeks how much data will they have from daily backups? Give your answer in 'TB'. [1]

- b) Circle a suitable storage type to store daily backups from the choices below. [1]

Hard Disk Drive	Magnetic Tape	Solid State Drive	Optical Disk
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- c) Outline the advantages and disadvantages of using your choice in part b) for data backups. [4]
- 4) Jason has bought a new laptop. The laptop contains 3 GB RAM and 500 GB secondary storage.
- a) Explain why secondary storage is needed in addition to RAM. [3]

Jason wants to back up the data on his laptop twice a week.

- b) Give **two** advantages and **two** disadvantages of storing his backup data on optical discs. [4]