OCR
Oxford Cambridge and RSA

Practice Paper 1

GCE COMPUTER SCIENCE

H446/01   Computer Systems

Duration: 2 hours 30 minutes

MAXIMUM MARK   140

MARKING INSTRUCTIONS

PREPARATION FOR MARKING

SCORIS

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris assessor Online Training*; *OCR Essential Guide to Marking*.

2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to scoris and mark the **required number** of practice responses ("scripts") and the **required number** of standardisation responses.

YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

TRADITIONAL
Before the Standardisation meeting you must mark at least 10 scripts from several centres. For this preliminary marking you should use **pencil** and follow the **mark scheme**. Bring these **marked scripts** to the meeting.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the scoris 50% and 100% (traditional 50% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the scoris messaging system.

5. Work crossed out:
    a. where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks
    b. if a candidate crosses out an answer to a whole question and makes no second attempt, and if the inclusion of the answer does not cause a rubric infringement, the assessor should attempt to mark the crossed out answer and award marks appropriately.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.

7. There is a NR (No Response) option. Award NR (No Response)
    - if there is nothing written at all in the answer space
    - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
    - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the question.
    Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).

8. The scoris **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
If you have any questions or comments for your Team Leader, use telephone, email or the scoris messaging system.

9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:
a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
b. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

11**. Annotations**

12. **Subject-specific Marking Instructions**

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:
- the specification, especially the assessment objectives
- the question paper and its rubrics
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

USING THE MARK SCHEME

Please study this Mark Scheme carefully. The Mark Scheme is an integral part of the process that begins with the setting of the question paper and ends with the awarding of grades. Question papers and Mark Schemes are developed in association with each other so that issues of differentiation and positive achievement can be addressed from the very start.

This Mark Scheme is a working document; it is not exhaustive; it does not provide 'correct' answers. The Mark Scheme can only provide 'best guesses' about how the question will work out, and it is subject to revision after we have looked at a wide range of scripts.

The Examiners' Standardisation Meeting will ensure that the Mark Scheme covers the range of candidates' responses to the questions, and that all Examiners understand and apply the Mark Scheme in the same way. The Mark Scheme will be discussed and amended at the meeting, and administrative procedures will be confirmed. Co-ordination scripts will be issued at the meeting to exemplify aspects of candidates' responses and achievements; the co-ordination scripts then become part of this Mark Scheme.

Before the Standardisation Meeting, you should read and mark in pencil a number of scripts, in order to gain an impression of the range of responses and achievement that may be expected.

In your marking, you will encounter valid responses which are not covered by the Mark Scheme: these responses must be credited. You will encounter answers which fall outside the 'target range' of Bands for the paper which you are marking. Please mark these answers according to the marking criteria.

Please read carefully all the scripts in your allocation and make every effort to look positively for achievement throughout the ability range. Always be prepared to use the full range of marks.

LEVELS OF RESPONSE QUESTIONS:

The indicative content indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance.

Using 'best-fit', decide first which set of BAND DESCRIPTORS best describes the overall quality of the answer. Once the band is located, adjust the mark concentrating on features of the answer which make it stronger or weaker following the guidelines for refinement.

- **Highest mark:** If clear evidence of all the qualities in the band descriptors is shown, the HIGHEST Mark should be awarded.
- **Lowest mark:** If the answer shows the candidate to be borderline (i.e. they have achieved all the qualities of the bands below and show limited evidence of meeting the criteria of the band in question) the LOWEST mark should be awarded.
- **Middle mark:** This mark should be used for candidates who are secure in the band. They are not 'borderline' but they have only achieved some of the qualities in the band descriptors.

Be prepared to use the full range of marks. Do not reserve (e.g.) high Band 3 marks 'in case' something turns up of a quality you have not yet seen. If an answer gives clear evidence of the qualities described in the band descriptors, reward appropriately.

	AO1	AO2	AO3
High (thorough)	Precision in the use of question terminology. Knowledge shown is consistent and well-developed. Clear appreciation of the question from a range of different perspectives making extensive use of acquired knowledge and understanding.	Knowledge and understanding shown is consistently applied to context enabling a logical and sustained argument to develop. Examples used enhance rather than detract from response.	Concerted effort is made to consider all aspects of a system / problem or weigh up both sides to an argument before forming an overall conclusion. Judgements made are based on appropriate and concise arguments that have been developed in response resulting in them being both supported and realistic.
Middle (reasonable)	Awareness of the meaning of the terms in the question. Knowledge is sound and effectively demonstrated. Demands of question understood although at times opportunities to make use of acquired knowledge and understanding not always taken.	Knowledge and understanding applied to context. Whilst clear evidence that an argument builds and develops through response there are times when opportunities are missed to use an example or relate an aspect of knowledge or understanding to the context provided.	There is a reasonable attempt to reach a conclusion considering aspects of a system / problem or weighing up both sides of an argument. However the impact of the conclusion is often lessened by a lack of supported judgements which accompany it. This inability to build on and develop lines of argument as developed in the response can detract from the overall quality of the response.
Low (basic)	Confusion and inability to deconstruct terminology as used in the question. Knowledge partial and superficial. Focus on question narrow and often one-dimensional.	Inability to apply knowledge and understanding in any sustained way to context resulting in tenuous and unsupported statements being made. Examples if used are for the most part irrelevant and unsubstantiated.	Little or no attempt to prioritise or weigh up factors during course of answer. Conclusion is often dislocated from response and any judgements lack substance due in part to the basic level of argument that has been demonstrated throughout response.

	Assessment Objective
AO1	Demonstrate knowledge and understanding of the principles and concepts of computer science, including abstraction, logic, algorithms and data representation.
AO1.1	Demonstrate **knowledge** of the principles and concepts of abstraction, logic, algorithms, data representation or other as appropriate.
AO1.2	Demonstrate **understanding** of the principles and concepts of abstraction, logic, algorithms, data representation or other as appropriate.
AO2	Apply knowledge and understanding of the principles and concepts of computer science including to analyse problems in computational terms.
AO2.1	Apply knowledge and understanding of the principles and concepts of computer science.
AO2.2	Analyse problems in computational terms.
AO3	Design, program and evaluate computer systems that solve problems, making reasoned judgements about these and presenting conclusions.
AO3.1	Design computer systems that solve problems.
AO3.2	Program computer systems that solve problems.
AO3.3	Evaluate computer systems that solve problems, making reasoned judgements about these and presenting conclusions.

Question			Answer	Marks	Guidance
1	a		- A piece of software… - …with one purpose… - usually to do with the upkeep/maintenance of a computer. (1 per -, max 2)	**2** **AO1.1**	
	b		Faster read/write speed than secondary storage media.	**1** **AO1.2**	
	c		- RAM is volatile meaning it loses contents when power is off … - …so must be copied to secondary storage in case of unexpected power failure (1 per -,)	**2** **AO1.2**	
	d		- Memory contents are divided into pages - Pages not needed get moved to virtual memory - Which is an area on a secondary storage device - When required the pages are moved from virtual memory back into RAM. (1 per -)	**4** **AO1.1**	
2			**Mark Band 3–High Level (7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of Magnetic and Flash storage. The material is generally accurate and detailed. The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation. The candidate provides a thorough discussion which is well balanced. Evaluative comments are consistently relevant and well-considered.	**9** **AO1.1** **(2)** **AO1.2** **(2)** **AO2.1**	**AO1: Knowledge and Understanding** The following is indicative of possible factors/evidence that candidates may refer to but is not prescriptive or exhaustive: - Magnetic hard drives work by magnetic patterns being read off platters that mechanically spin at high speeds. - Flash hard drives use memory chips. These can have their contents erased and subsequently overwritten when an electrical charge is applied. - Magnetic hard drives are cheaper per GB and tend to be sold in much higher capacities than flash hard drives. - Flash hard drives tend to have much higher read/write speeds than

9

					(2) AO3.3 (3)	magnetic hard disks. - Flash hard disks have no moving parts and therefore tend to have lower power consumption and are not affected by their device moving.
				There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Mark Band 2-Mid Level (4-6 marks)** The candidate demonstrates reasonable knowledge and understanding of a Magnetic and Flash based storage; the material is generally accurate but at times underdeveloped. The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation. The candidate provides a sound discussion, the majority of which is focused. Evaluative comments are for the most part appropriate, although one or two opportunities for development are missed. *There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.* **Mark Band 1-Low Level (1-3 marks)** The candidate demonstrates a basic knowledge of Magnetic and Flash based storage with limited understanding shown; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides a limited discussion which is narrow in focus. Judgments if made are weak and unsubstantiated.		**AO2.1: Application** The selected knowledge/examples should be directly related to the specific question. The following is indicative of possible factors/evidence that candidates may refer to but is not prescriptive or exhaustive: - Many games tend to incorporate a lot of media and as such a keen gamer is likely to need a lot of storage space. - Games are fast paced and often competitive. High loading speeds can be beneficial. - High performance is often important to gamers and as such will pick highest performing components. - Hybrid approaches exist which offer 'the best of both worlds' - Magnetic hard drives can be noisy (due to parts moving at high speed), this can be undesirable and distracting whilst gaming. Conversely flash drives operate silently. **AO3.3: Evaluation**

			The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks** No attempt to answer the question or response is not worthy of credit.		Candidates will need to consider a variety of issues in relation to the question and will make some evaluative comments about the issues and solutions they are discussing. The following is indicative of possible factors/evidence that candidates may refer to but is not prescriptive or exhaustive: - Due to their high storage capacity magnetic hard disks are the best choice. A gamer could have many games installed at one time. Whilst performance is not quite that of flash drives , to have a similarly sized flash drive would be prohibitively expensive. A high quality magnetic drive will provide good enough performance leaving money to be spent elsewhere. As it is being installed on a desktop there is no need to worry about power consumption or issues with the computer moving. - Gamers need high performance and that includes large amounts of data being loaded quickly. The read/write speed of a solid state drive means this is the natural choice for the gamer's desktop.
3	a	i	240	AO1.2 1	
		ii	F0	AO1.2 1	
	b		00000000	AO1.2 1	
	c		11111111	AO1.2	

				1	
	d	i	00110000	AO1.2 1	
		ii	Multiplying by 4	AO2. 1 1	
	e	i	10001000	AO1. 1 1	
		ii	11111000	AO1. 1 1	
	f		- Calculate the first number as: `010.100` - Calculate the second number as: `01.1000` - Calculate the third number as: `100.010` - Add the three together to get `(1)000.010` - Show carry bits. Discarding of leading one may be shown or implicit. - Normalised result is: 　`010000　1111` (1 per -)	AO1.2 6	If candidate fails to discard the overflowing 1 they can still get marks 1-4.
4	a		- Characters from a computer using ASCII will be interpreted as different characters by a computer using EBCDIC. - Text will be incomprehensible. (1 per -)	AO1.2 2	

	b		- Value between 193 and 201 returns respective ASCII value between 65 and 73 - Value between 209 and 217 returns respective ASCII value between 74 and 82 - Value between 226 and 233 returns respective ASCII value between 83 and 88 - Values less than 193 and greater than 233 return -1 - Values between 202 and 208, and 218 and 225 return -1. (1 per -)	AO3.2 5	```function convert(ebValue)```

```
function convert(ebValue)

    if ebValue >= 193 and ebValue <= 201 then

        return ebValue - 128

    elseif ebValue >= 209 and ebValue <= 217 then

        return ebValue - 135

    elseif ebValue >= 226 and ebValue <= 233 then

        return ebValue - 143

    else

        return -1

    endif

endfunction
```

A program that returns a value 128 less for values between 193 and 208 would receive the first mark but not the last one. (The same principle applies for points 2 and 3)

| 5 | a | | - STA store the value in the accumulator into a given memory location
- LDA loads the value in a memory location into the accumulator.
(1 per -) | AO1.2

2 | |
| | b | | Direct addressing | AO1.2 | Accept Symbolic Addressing |

				1	
	c		- Answer contains at least 1 followed by 0 - Answer contains at least three 10s - Answer contains exactly four 10s (1 per -)	**AO3.3** **3**	1 0 1 0 1 0 1 0 NB allow answers that are vertical or horizontal.
	d		- The address of `one` is stored in the MAR - This value is sent along the address bus AND the fetch signal is sent on the control bus. - The contents of `one` are sent from memory to the processer on the data bus and stored in the MDR - The contents of the MDR and ACC are sent to the ALU - The result is stored back in the ACC (1 per -)	**AO2.2** **5**	Accept MBR instead of MDR
	e		- An instruction can be fetched as the previous one is being decoded… - …and the one before that is being executed. - E.g. `LDA Zero` can be fetched, while `OUT` is being	**AO1.2** **(2)**	

			decoded and `start LDA one` is being executed. (1 per -)	**AO2.2** **(1)** **3**	
	f		- BRP could be followed by one of two possible instructions, which one will only be determined at execution - Meaning the wrong one may be fetched/decoded (1 per -)	**AO2.2** **2**	
	g		- Clock speed - Cache Size - Number of cores (1 per max 1)	**AO1.1** **1**	

6	a		- Adds the tag name…
			- Includes the opening <
			- Includes the closing > and nothing further
			- Tags are added to data structure.
			- Adds all tags in the string.
			- Sensible variable names used
			- Correct use of indentation
			(1 per -)
				AO3.2
				
				7
					`tagStartPos = 0`
					`insideTag = false`
					`i = 0`
					`while i < htmlCode.length`
					`    if htmlCode.substring(i,1) == "<" and`
					`insideTag == false then`
					`        tagStartPos = i`
					`        insideTag = true`
					`    elseif insideTag == true and`
					`htmlCode.substring(i,1) == ">" then`
					`        dataStructureA.add(htmlCode.substring(ta`

```
                                                    gStartPos, i-tagStartPos+1))
                                                        insideTag = false
                                                    endif
                                                    i = i + 1
                                                endwhile
```

	b	i	Queue	AO2.1 1	
		ii	Hashtable	AO2.2 1	Accept Hashmap/Associative Array/Dictionary
		iii	Stack	AO2.2 1	
		iv	Stack uses a last in first out approach… … and the last HTML tag to be opened should be the first to be closed.	AO2.2 2	
7	a		<table><tr><td>A</td><td>B</td><td>Q</td></tr><tr><td>1</td><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>0</td><td>0</td><td>0</td></tr></table>	AO1.2 2	

1 mark for the first two rows

1 mark for the last two rows

b	i		AO1.2	
			4	

A	B	C_{in}	S	C_{out}
1	1	1	1	1
1	1	0	0	1
1	0	1	0	1
1	0	0	1	0
0	1	1	0	1
0	1	0	1	0
0	0	1	1	0
0	0	0	0	0

1 Mark for rows 1 and 2

1 Mark for rows 3 and 4

1 Mark for rows 5 and 6

1 Mark for rows 7 and 8

		ii	- Circuit adds two bits (and a carry bit) together/is an adder. - A B and C_{in} are added together - The result is given in S - And a carry bit in C_{out} (1 per -)	AO2.2 4	

	c	i	$S \equiv A \underline{\vee} B \underline{\vee} C_{in}$	AO2.2 1	Accept XOR instead of $\underline{\vee}$ Accept $\oplus$ instead of $\underline{\vee}$
		Ii	$C_{out} \equiv ((A \underline{\vee} B) \wedge C_{in}) \vee (A \wedge B)$ One mark for $((A \underline{\vee} B) \wedge C_{in})$ One mark for $\vee (A \wedge B)$	AO2.2 2	Accept XOR instead of $\underline{\vee}$ Accept $\oplus$ instead of $\underline{\vee}$ Accept AND instead of $\wedge$ Accept OR instead of $\vee$ Accept + instead of $\vee$
8	a		- A primary key must have a unique value for every record - The values for all these fields could repeat. (1 per -)	AO1.1 (1) AO1.2 (1) 2	
	b		- Advantage: Searches of Artist can be performed more quickly. - Disadvantage: The index takes up extra space in the database. (1 per -)	AO1.2 2	

	c		- `Song` and `Playlist` would have a many to many relationship - This is not allowed - Adding a table between them resolves this - Diagram to illustrate this. (1 per -)	AO3.1 4	
	d	i	Copyright, Design and Patents Act	AO1.1 1	Accept Copyright Act/Law
		ii	- `DELETE FROM Song` - `WHERE Artist='RandomBits'` (1 mark per -, max 2)	AO3.1 2	
		iii	All entries in `PlayListEntry` which contain songs by RandomBits must be removed.	AO2.1 1	
9			**Mark Band 3–High Level (9-12 marks)** The candidate demonstrates a thorough knowledge and understanding of the technical and legal aspects of privacy. The material is generally accurate and detailed.	AO1.1 (2) AO1.2 (2)	**AO1 Knowledge and Understanding** The following is indicative of possible factors/evidence that candidates may refer to but is not prescriptive or exhaustive: - Modern encryption is easy to access. - The strongest encryption is (as far as is known). unbreakable

| | | | | AO2.1

(3)

AO3.3

(5)

12 | even by government agencies.
- People leave a digital footprint wherever they go (mobile phones can track our location, store cards record our shopping habits).
- Our online activities can be tracked by IP address and 3rd party cookies.
- CCTV is ubiquitous. Most people carry round phones capable of taking video/photos.
- Facial recognition AI techniques mean we may be filmed whilst unaware and subsequently identified.
- The Data Protection Act aims to protect people's data.
- Computer Misuse Act Prosecutes those gaining unauthorised access to computer systems which may deter attempts to gain unauthorised access to data.
- The Regulation of Investigatory Powers Act regulates how the authorities can monitor our actions. |

The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation.

The candidate is able to weigh up both sides of the argument which results in a supported and realistic judgment as to how achievable privacy is.

There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.

Mark Band 2-Mid Level (5-8 marks)

The candidate demonstrates reasonable knowledge and understanding of technical and legal aspects of privacy; the material is generally accurate but at times underdeveloped.

AO2.1: Application

The selected knowledge/examples should be directly related to the specific question. Examples may include but are not limited to:

The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed. Evidence/examples are for the most part implicitly relevant to the explanation.

People can secure their data using encryption but the Regulation of Investigatory Powers Act can force them to share their key with the authorities.

The government is becoming increasingly worried about encryption and there is the possibility of laws to limit its use in the future.

The candidate makes a reasonable attempt to come to a conclusion showing some recognition of influencing factors that would determine how achievable privacy is.

There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.

Mark Band 1-Low Level (1-4 marks)

The candidate demonstrates a basic knowledge of the technical and legal aspects of privacy with limited understanding shown; the material is basic and contains some inaccuracies. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided.

The candidate provides nothing more than an unsupported assertion.

The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence

Laws such as the Computer Misuse Act can act as a deterrent but the Internet is global and it is hard to pursue and prosecute offenders from other countries.

Trying to be in a location anonymously is very difficult as movements are tracked in many different ways and this is becoming increasingly automated.

AO3.3: Evaluation

Having considered the different sides to the argument candidates will need to reach a supported judgment based on the evidence included in their response.

There should be no bias in marks as to which viewpoint is chosen but especially in the top mark band there must be a clear link between the points candidates have made and justification.

			may not be clear. **0 marks** No attempt to answer the question or response is not worthy of credit.		
10	a		To control the hardware	**AO1.1** **1**	
	b		- Developers can run their operating system on a software implementation of the phone… - …Until the physical machine is ready. (1 per -)	**AO1.2** **2**	
	c		- Complete the current FDE Cycle - Check the priority of the incoming interrupt. - If its of a higher priority than the current task. - Contents of registers stored in memory.. - …in a stack. - The relevant interrupt service routine is loaded… - ..by loading the relevant value into the program counter. - When the ISR is complete the previous state is popped from the stack - And are loaded back into the registers. (1 per -, max 6)	**AO1.1** **6**	

d	i	- Feasibility Study - Investigation/Requirements Elicitation - Analysis - Design - Implementation/Coding - Testing - Installation - Documentation - Evaluation - Maintenance (1 per -, max 3)	**AO1.1** **3**	
d	ii	- Tends to suit large scale projects… - ..An OS is an example of such a big project. - Tends to suit projects with stable requirements… - …And the base requirements of an OS are unlikely to change. (1 per -, max 2)	**AO1.2** **2**	
	iii	If a change does occur in the requirements the lifecycle cannot respond easily, often at the cost of time and money.	**AO1.1** **1**	
e		**Mark Band 3–High Level (7-9 marks)** The candidate demonstrates a thorough knowledge and understanding of Object Oriented Programming and has discussed inheritance, polymorphism and encapsulation; the material is generally accurate and detailed.	**AO1.1** **(2)** **AO1.2** **(2)** **AO2.1**	**AO1 Knowledge and Understanding** The following is indicative of possible factors/evidence that candidates may refer to but is not prescriptive or exhaustive: OOP involve solutions being constructed by means of objects that interact with each other. OOP uses classes as templates to

The candidate is able to apply their knowledge and understanding directly and consistently to the context provided. Evidence/examples will be explicitly relevant to the explanation.

The candidate provides a thorough discussion which is well balanced. Evaluative comments are consistently relevant and well-considered.

There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.

Mark Band 2-Mid Level (4-6 marks)
The candidate demonstrates reasonable knowledge and understanding of a range of Object Oriented Programming and has discussed at least two of: inheritance, polymorphism and encapsulation; the material is generally accurate but at times underdeveloped.

The candidate is able to apply their knowledge and understanding directly to the context provided although one or two opportunities are missed.
Evidence/examples are for the most part implicitly relevant to the explanation.

(2)

AO3.3

(3)

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construct objects. An object has attributes (variables associated with it) and methods (subroutines that form the actions an object can carry out).

Inheritance is where a class retains the methods and attributes of its parent class as well as having its own.

Encapsulation is the process of keeping an object's attributes private so they can only be accessed and changed via public methods.

Polymorphism means that objects of different types can be treated in the same way.

Procedural programming breaks a solution down into subroutines. These subroutines are re built and combined to form a program.

AO2.1: Application

The selected knowledge/examples should be directly related to the specific question. Examples may include but are not limited to:

Breaking a problem down into objects naturally lends itself to teams as different team members can work on different objects.

Inheritance means that one class can be coded and that code used as the base for similar objects. This will save the team time as they are able to build on work already done.

Encapsulation means that objects only interact in the way intended and prevents unexpected changed to attributes having unforeseen consequences. This means there are likely to be fewer issues as the team combines their code.

The candidate provides a sound discussion, the majority of which is focused. Evaluative comments are for the most part appropriate, although one or two opportunities for development are missed.

There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.

Mark Band 1-Low Level (1-3 marks)
The candidate demonstrates a basic knowledge of Object Oriented Programming with limited understanding shown; the material is basic and contains some inaccuracies. For 3 marks they have described at least one of inheritance, polymorphism or encapsulation. The candidate makes a limited attempt to apply acquired knowledge and understanding to the context provided.

The candidate provides a limited discussion which is narrow in focus. Judgments if made are weak and unsubstantiated. *The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be*

Polymorphism means that code can be written that is able to handle different objects in the same way. This reduces the volume of code the team need to produce.

Procedural programming can be divided between a team with different team members tackling different subroutines.

There are a number of similarities between the two paradigms.

Certain problems lend themselves more to one than the other.

AO3.3: Evaluation

Having considered the different sides to the argument candidates will need to reach a supported judgment based on the evidence included in their response.

			clear. 0 marks No attempt to answer the question or response is not worthy of credit.		
11	a		`<img src="UKstamps.jpg">` - One mark for img tag - One mark for correct src attribute **(1 per -)**	**AO3.1** **2**	Accept self closing tag: `<img src="UKstamps.jpg"/>`
	b		- `<a> </a>` tags plus `Find out more about UK stamps` text between them. - `href` attribute with value `http://ukstampcollectorsguild.co.uk` (1 per -)	**AO3.1** **2**	`<a href="http://ukstampcollectorsguild.co.uk">Find out More about UK stamps</a>`
	ci		- Formatting code has to be rewritten for every page - Changes have to be made to every page - It is a lot of work to keep the look of the site consistent. (1 per -, max 1)	**AO1.2** **1**	

	ii		The site is slower to access (as the formatting information is reloaded for every page) Unlikely to have formatting specific to their device/needs.	**AO1.2** **1**	
	d		- Change the tag body… - So it includes the attribute style - Which should have the value `background-color:lightGreen` (1 per -)	**AO2.2** **3**	Accept: `<body bgcolor="lightGreen">` for full marks
	e		- The number of sites that link to their site - The PageRank of the linking sites - The number of outward links from the site (1 per -, max 2)	**AO1.2** **2**	

Question	Assessment Objectives							Total
	AO1.1	AO1.2	AO2.1	AO2.2	AO3.1	AO3.2	AO3.3	
1a	2	0	0	0	0	0	0	2
1b	0	1	0	0	0	0	0	1
1c	0	2	0	0	0	0	0	2
1d	4	0	0	0	0	0	0	4
2*#	2	2	2	0	0	0	3	9
3ai	0	1	0	0	0	0	0	1
3aii	0	1	0	0	0	0	0	1
3b	0	1	0	0	0	0	0	1
3c	0	1	0	0	0	0	0	1
3di m	0	1	0	0	0	0	0	1
3dii m	0	0	1	0	0	0	0	1
3ei m	1	0	0	0	0	0	0	1
3eii m	1	0	0	0	0	0	0	1
3f m	0	6	0	0	0	0	0	6
4a	0	2	0	0	0	0	0	2
4b	0	0	0	0	0	5	0	5
5a	0	2	0	0	0	0	0	2
5b	0	1	0	0	0	0	0	1
5c	0	0	0	0	0	0	3	3
5d	0	0	0	5	0	0	0	5
5e	0	2	0	1	0	0	0	3
5f	0	0	0	2	0	0	0	2
5g	1	0	0	0	0	0	0	1
6a	0	0	0	0	0	7	0	7
6bi	0	0	1	0	0	0	0	1
6bii	0	0	0	1	0	0	0	1
6biii	0	0	0	1	0	0	0	1
6biv	0	0	0	2	0	0	0	2
7a m	0	2	0	0	0	0	0	2
7bi m	0	4	0	0	0	0	0	4
7bii	0	0	0	4	0	0	0	4
7ci m	0	0	0	1	0	0	0	1
7cii m	0	0	0	2	0	0	0	2
8a	1	1	0	0	0	0	0	2
8b	0	2	0	0	0	0	0	2
8c	0	0	0	0	4	0	0	4
8di	1	0	0	0	0	0	0	1
8dii	0	0	0	0	2	0	0	2
8diii	0	0	1	0	0	0	0	1
9*#	2	2	3	0	0	0	5	12
10a	1	0	0	0	0	0	0	1
10b	0	2	0	0	0	0	0	2
10c	6	0	0	0	0	0	0	6
10di	3	0	0	0	0	0	0	3
10dii	0	2	0	0	0	0	0	2

10diii	1	0	0	0	0	0	0	1
10e*	2	2	2	0	0	0	3	9
11a	0	0	0	0	2	0	0	2
11b	0	0	0	0	2	0	0	2
11ci	0	1	0	0	0	0	0	1
11cii	0	1	0	0	0	0	0	1
11d	0	0	0	3	0	0	0	3
11e	0	2	0	0	0	0	0	2
TOTALS	28	44	10	22	10	12	14	140

* = extended response
 m = mathematical content

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