



GCE

Computer Science

H046/01: Computing principles

AS Level

Mark Scheme for June 2022

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It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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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 **number of required** standardisation responses.

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

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 40% 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 or the scoris messaging system, or by email.
5. **Crossed Out Responses**
Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

Rubric Error Responses – Optional Questions

Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple Choice Question Responses

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When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).

When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

Contradictory Responses

When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**)

Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth **two or more marks**)

If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)

Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

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. Award No Response (NR) if:

- there is nothing written in the answer space

Award Zero '0' if:

- anything is written in the answer space and is not worthy of credit (this includes text and symbols).

Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

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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 the phone, the scoris messaging system, or e-mail.
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: Not applicable in F501
- To determine the level** – start at the highest level and work down until you reach the level that matches the answer
 - 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 |

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.

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| | A01 | A02 | A03 |
|----------------------------|--|--|--|
| 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. |

| Question | | | Answer | Mark | Guidance |
|----------|-----|------|--|---|--|
| 1 | (a) | | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Stored in ROM • Tests hardware/components (are working) • Boots up the operating system | 2 AO1.2 (2) | Accept description of POST/Power On Self Test for BP2 Accept loads up instead of boots up (BP3) |
| 1 | (b) | (i) | 1 mark for any of the following bullet points: <ul style="list-style-type: none"> • Round Robin • Multi-level feedback queues • Shortest job first • Shortest time remaining | 1 AO1.1 (1) | Do not Allow: <ul style="list-style-type: none"> • First come First Served |
| 1 | (b) | (ii) | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Jobs dispatched on a FIFO basis • Each job/packet is equal priority • Each job/packet switch has the same processing time | 2 AO2.1 (2) | Accept processed instead of dispatched (Bp1) Do not accept task/data instead of jobs (BP1 to 3) |
| 1 | (c) | | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Paging uses physical addressing.... •Segmentation uses logical addressing • Paging uses fixed size memory blocks.... • Segmentation uses variable length memory blocks | 2 AO1.2 (2) | Answer must cover paging and segmentation for 2 marks. Do not accept data instead of memory |
| 1 | (d) | (i) | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Uses separate memory blocks for instructions and data • Has separate buses (data and address) for data and instructions • Has fixed memory sizes for data and Instructions • Instruction memory may be ROM | 2 AO1.1 (1) AO1.2 (1) | Accept unit instead of blocks (BP1) |
| 1 | (d) | (ii) | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Fixed instruction size • No need for memory to be shared between data and instructions • Removes need for secondary storage • Instructions would never be changed | 2 AO2.1 (2) Any 2 (Max 2) | |

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| 1 | (e) | (i) | 1 mark for any of the following points, e.g: <ul style="list-style-type: none"> • GUI will need to remove open file manager windows • OS will need to remove open files/release locks • Inform the CPU to cease transferring files | 1 AO2.1 (1) | Allow other suitable alternative answers. |
| 1 | (e) | (ii) | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Stacks use LIFO/FILO storage • As processes are halted by an ISR they are pushed on the stack • When they are returned, they are popped from the top of the stack • So they are returned to in correct order | 2 AO1.2 (2) | |
| 2 | (a) | | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Word Processing <ul style="list-style-type: none"> ◦ Writing letters to customers • Spreadsheets <ul style="list-style-type: none"> ◦ Completing accounts • Presentation Software <ul style="list-style-type: none"> ◦ Create\Show business plans • DTP <ul style="list-style-type: none"> ◦ Creating marketing literature • Graphics Package <ul style="list-style-type: none"> ◦ Editing photographs of procedures/marketing photos | 2 AO1.1 (1) AO2.1 (1) | 1 Mark for a suitable package and 1 mark for a relevant example for that package. Do not allow: <ul style="list-style-type: none"> • Non-business software (E.g. games) • Brand names (e.g Word/ Excel) • Database software |
| 2 | (b) | | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Disk Defragmentation... • ...To keep optimal r/w speed for her HDD • File management... • ...To allow easy access to her file system • Disk Drivers... • ... To allow her to use new peripheral devices • System Clean-up... • ... to keep her system free of redundant files • Anti-Virus/Malware... | 4 AO1.1 (2) AO1.2 (2) | 1 Mark for a suitable utility and 1 mark for a relevant example for that utility. Do not accept task manager Accept: <ul style="list-style-type: none"> • Compression Software ... • ... to make the file size smaller • Backup Software ... • ... to make copies of files |

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| | | | <ul style="list-style-type: none"> ... to find and remove/quarantine viruses/malware (A worms/trojans etc) | | |
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| 2 | (c) | <p>Mark Band 3–High Level (7-9 marks) The candidate demonstrates a thorough knowledge and understanding of open and closed source software; the material is generally accurate and detailed. The candidate has covered all 4 sections of cost, usability, security and Support available and for the top of this mark band will have covered all 4 well. Evidence/examples will be explicitly relevant to the explanation.</p> <p><i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Mark Band 2-Mid Level (4-6 marks) The candidate demonstrates reasonable knowledge and understanding of open and closed source software; the material is generally accurate but at times underdeveloped. The candidate has covered all at least 2 of the 4 sections of cost, usability, security and Support available. Evidence/examples are for the most part implicitly relevant to the explanation.</p> <p><i>There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.</i></p> <p>Mark Band 1-Low Level (1-3 marks) The candidate demonstrates a basic knowledge of how the layers of open and closed source software; the material is basic and contains some inaccuracies.</p> | <p>AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)</p> | <p>Knowledge: Cost Open Source</p> <ul style="list-style-type: none"> (generally) free to use May have to purchase maintenance contracts Staff training if “non-standard” <p>Closed Source</p> <ul style="list-style-type: none"> (sometimes) have to pay to license the software If paid will (usually) it will come with some level of support <p>Usability/extensibility Open Source</p> <ul style="list-style-type: none"> Tends to have a lower focus on UI Source code released (under license) Source can be edited Can be redistributed (under license) <p>Closed Source</p> <ul style="list-style-type: none"> Professionally developed Distributed with a restrictive license Only executable/object code is distributed//source code not distributed Cannot be redistributed <p>Security Open Source</p> <ul style="list-style-type: none"> potentially massive bank of volunteer developers working on the product Many of the contributors may not be professional Code available to be scrutinised by anyone... |
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| | | <p>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.</p> <p><i>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.</i></p> <p>0 marks No attempt to answer the question or response is not worthy of credit.</p> | <ul style="list-style-type: none"> • ...but this may include people with malicious intentions <p>Closed Source</p> <ul style="list-style-type: none"> • Closed teams of developers • More work scrutiny for code • security fixes usually addressed quicker <p>Support Available</p> <p>Open Source</p> <ul style="list-style-type: none"> • Source code released (under license) • Source can be edited • Open communities mean lots of support options could be available <p>Closed Source</p> <ul style="list-style-type: none"> • <u>Support may be available from the company producing the software.</u> • <p>Application:</p> <p>Cost</p> <p>Open Source</p> <ul style="list-style-type: none"> • Lower overheads to company • Extra staff training and hardware cost could lead to total cost of ownership being higher <p>Closed Source</p> <ul style="list-style-type: none"> • Support from vendor can lead to quicker fixes. <p>Usability</p> <p>Open Source</p> <ul style="list-style-type: none"> • The ability to edit source code means bespoke functionality can be developed in house • Lower focus on UI can mean a harder to use product (leading to higher training costs) <p>Closed Source</p> <ul style="list-style-type: none"> • Due to professional development, finish tends to be a higher standard • As the organisation protects their IP they |
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| | | | | | <p>generally tend to be less buggy as the organisation reputation/business model will rely on it</p> <ul style="list-style-type: none"> • Lack of source code means extra features can only be developed by the vendor. <p>Security</p> <p>Open Source</p> <ul style="list-style-type: none"> • Tends to be less secure as more people working on it, not always under rigorous oversight • No paid developers mean people may not work on security fixes straight away <p>Closed Source</p> <ul style="list-style-type: none"> • Developers work under tighter standards • Code being scrutinised more will mean less likely to be ship with bugs • Professional standards lead to quicker turnaround of bugs <p>Support Available</p> <p>Open Source</p> <ul style="list-style-type: none"> • Editable source code means could self-support • Open communities mean there is vast amounts of knowledge available. <p><u>Evaluation:</u></p> <p>Open Source</p> <ul style="list-style-type: none"> • Open source would lead to potential cost savings if Charlie looked to self support by using online communities or handling the code herself. <p>Closed Source</p> <ul style="list-style-type: none"> • If Charlie lacked technical skills, the better UI design from professional developers may make the UX smoother • Charlies would have a legal obligation to the data stored for her business. Closed source tighter security may strengthen this • Charlies business will rely on the uptime of |
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| | | | | | her system. Professional support offered by the developers may mean less downtime in the case of software issues. |
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| Question | | | Answer | Mark | Guidance | | | | |
|------------------|-----|------|---|-------------------|---|----------------|------|-------------------|---|
| 3 | (a) | | <ul style="list-style-type: none"> A set of rules (for communication) | 1 AO1.1 (1) | Do not accept instructions instead of rules | | | | |
| 3 | (b) | (i) | 1 mark for each completed row up to a maximum of 2 marks: <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>Application</td></tr> <tr><td>Transport</td></tr> <tr><td>Network</td></tr> <tr><td>Link</td></tr> </table> | Application | Transport | Network | Link | 2 AO1.1 (2) | <ul style="list-style-type: none"> Accept in any order Accept Internet instead of Network |
| Application | | | | | | | | | |
| Transport | | | | | | | | | |
| Network | | | | | | | | | |
| Link | | | | | | | | | |
| 3 | (b) | (ii) | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> Allows different layers to be worked on independently Allows layers to be replaced/upgraded without affecting others Allows for layers from different providers to be used interchangeably | 2 AO1.2 (2) | | | | | |

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| 3 | (c) | <p>Mark Band 3–High Level (7-9 marks) The candidate has weighed up benefits and drawbacks of the technology and has applied the moral, legal and ethical issues to both the customer and the business; 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 will have come to a fully justified conclusion.</p> <p><i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Mark Band 2-Mid Level (4-6 marks) The candidate has weighed up benefits and drawbacks of the technology. They will have explored some of the moral, legal and ethical issues but they may not be equally spread across both the customer and the business; 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 will have come to a conclusion although they may not fully justify it.</p> | <p>AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)</p> | <p><u>Knowledge:</u> Benefits Customer: <ul style="list-style-type: none"> Personalised offers Business: <ul style="list-style-type: none"> Targeted adverts Able to track movement habits of customers Provide more personalised shopping experiences. Drawbacks Customer: <ul style="list-style-type: none"> Personal intrusion Invasion of privacy Pressured selling Business: <ul style="list-style-type: none"> Cost of infra structure Viewed as invading personal privacy Moral and Ethical issues <ul style="list-style-type: none"> Violation of civil liberties Recording people on the street who are not going into the shop Legal issues: <ul style="list-style-type: none"> under data protection laws the shop would need to <ul style="list-style-type: none"> Keep any data recorded secure Personal data should be accurate and up to date <u>Application:</u> Benefits Customer: <ul style="list-style-type: none"> Personalised experience will lead to more convenient shopping trips </p> |
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| | | <p><i>There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.</i></p> <p>Mark Band 1-Low Level (1-3 marks) The candidate identifies some of the benefits and drawbacks, though they have probably shown little consideration of the legal, ethical and moral issues; 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 may not reach a recognisable conclusion.</p> <p><i>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.</i></p> <p>0 marks No attempt to answer the question or response is not worthy of credit.</p> | <ul style="list-style-type: none"> • Staff will give personalised service <p>Business:</p> <ul style="list-style-type: none"> • Tracking movement of customers means able to identify best opening times • Tracking customers around shop allows better analysis of popular products • Use of modern technology will make the shop be seen as forward thinking. <p>Drawbacks</p> <p>Customer:</p> <ul style="list-style-type: none"> • Customers may not want to be “pressured” meaning they decide not to shop there anymore. • Tracking data could be hacked and used by criminals <p>Business:</p> <ul style="list-style-type: none"> • Extra hardware costs may lead to higher prices/competitors undercut them. • Customers who feel their privacy has been invaded may “vote with their feet” <p>Moral and Ethical issues</p> <ul style="list-style-type: none"> • Abuse of civil liberties could damage reputation of shop <p>Legal issues:</p> <ul style="list-style-type: none"> • Shop may need to add extra software to blur out faces of non-customers • Shop will need to spend more money on data protection compliance, leading to higher costs. <p>Evaluation:</p> <p>Benefits</p> <ul style="list-style-type: none"> • Increased revenue from directed sales offset extra costs from hardware/legal obligations • Improved reputation through use of modern technologies may attract more customers <p>Drawbacks:</p> |
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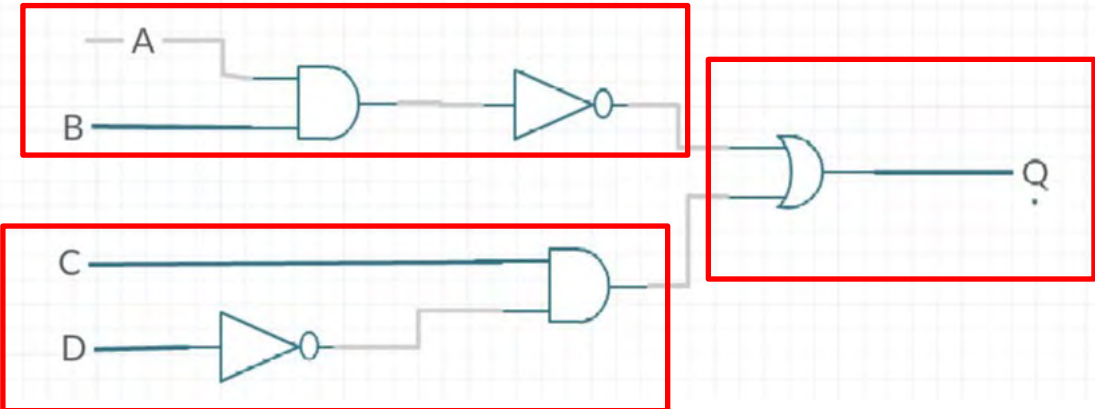
| | | | | | |
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| | | | | | <ul style="list-style-type: none"> • Loss of customer base due to customers unhappy with “pushy techniques” • Poor public opinion from invasive advertising puts new customers off. |
| | | | | | |

| Question | | Answer | Mark | Guidance | |
|----------|-----|--|--|--------------------|--|
| 4 | (a) | 1 mark for any of the following bullet points, e.g: <ul style="list-style-type: none"> • Computers use binary logic for on/off or 1/0 • Computer systems are based on switches/transistors • Binary is high tolerance | 1 AO1.2 (1) | | |
| 4 | (b) | (i) | <ul style="list-style-type: none"> • 0110 0001 | 1 AO2.2 (1) | Must get the whole answer right for the mark to be awarded. |
| 4 | (b) | (ii) | <ul style="list-style-type: none"> • AB | 1 AO2.2 (1) | Must get the whole answer right for the mark to be awarded. |
| 4 | (b) | (iii) | <ul style="list-style-type: none"> • 1001 1111 | 1 AO2.2 (1) | Must get the whole answer right for the mark to be awarded. |
| 4 | (b) | (iv) | <ul style="list-style-type: none"> • 1001 0001 | 1 AO2.2 (1) | Must get the whole answer right for the mark to be awarded. |
| 4 | (c) | <ul style="list-style-type: none"> - Can be easily used in binary arithmetic or - Increased range of numbers available | 2 AO2.2 (2) | Award 0 or 2 marks | |
| 4 | (d) | (i) | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • (1) 0110 0100 • suitable working out | 2 AO2.2 (2) | Award mark for bullet point one with or without the overflow stated. |

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| Question | | Answer | Mark | Guidance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|-----|--|-------------------|---|----|----|----|----|--|--|----|----|----|----|----|----|---|---|---|---|----|----|---|---|---|---|----|----|---|---|---|---|----|----|---|---|---|---|-----------------------------------|---|
| 5 | (a) | <p>Solution:</p> <table border="1" data-bbox="331 256 835 595"> <tr> <td></td> <td></td> <td>AB</td> <td>AB</td> <td>AB</td> <td>AB</td> </tr> <tr> <td></td> <td></td> <td>00</td> <td>01</td> <td>11</td> <td>10</td> </tr> <tr> <td>CD</td> <td>00</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>CD</td> <td>01</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>CD</td> <td>11</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>CD</td> <td>10</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> </table> <p>1 mark per bullet up to a maximum of 4 marks:</p> <ul style="list-style-type: none"> • 1 mark for filling in the table correctly • 1 mark for the group shown in red • 1 mark for the group shown in green • 1 mark for the simplified expression $A \vee (C \wedge D)$ | | | AB | AB | AB | AB | | | 00 | 01 | 11 | 10 | CD | 00 | 0 | 0 | 1 | 1 | CD | 01 | 0 | 0 | 1 | 1 | CD | 11 | 1 | 1 | 1 | 1 | CD | 10 | 0 | 0 | 1 | 1 | 4 AO2.1 (2) AO2.2 (2) | Brackets are not required for the simplified expression |
| | | AB | AB | AB | AB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 00 | 01 | 11 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CD | 00 | 0 | 0 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CD | 01 | 0 | 0 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CD | 11 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CD | 10 | 0 | 0 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | (b) |  <p>1 mark per bullet up to a maximum of 3 marks:</p> <ul style="list-style-type: none"> • An AND gate taking A and B as inputs with the output connecting to a NOT gate • An AND gate taking C and the NOT of D as the inputs • An OR gate taking the outputs of the NOT and AND gates | 3 AO3.1 (3) | <p>TYPE SETTER – Please redraw this diagram.</p> <p>Allow NAND gate as alternative for BP1</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Question | | Answer | Mark | Guidance |
|----------|-----|--|-----------------------------------|---|
| 6 | (a) | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • Float/real/double/single/decimal/currency... • ...because the values in the text file contain a decimal space... • ...representing monetary values... •the values will be used in calculations | 2 AO3.3 (2) | |
| 6 | (b) | 1 mark per bullet up to a maximum of 2 marks, e.g: <ul style="list-style-type: none"> • To setup a loop... • To repeat (the same block of code) • for each line in the text file // until each value has been read | 2 AO3.3 (2) | |
| 6 | (c) | 1 mark per bullet up to a maximum of 7 marks: <ul style="list-style-type: none"> • Suitable logic for initialising variables outside of loop • Suitable logic for opening and closing Sales.txt • Suitable use of a loop which ends when the last line has been reached in Sales.txt • Suitable logic for reading each line of data from file variable • Suitable logic for increasing total (and count) including conversion from string to numeric data type • Suitable logic for calculating averages by dividing total by count • Suitable logic for printing the number of days, the total sales and the daily average | 7 AO3.1 (3) AO3.2 (4) | <p>Some points (for example 5 & 6) can be combined onto one line.</p> <p>Example Solution:</p> <pre> procedure salesAnalysis(): dayCount = 0 salesTotal = 0 dailySales = openRead("Sales.txt") while NOT dailySales.endOfFile() dailySaleFigure = float (percentageFile.readLine()) salesTotal += dailySaleFigure dayCount += 1 endwhile dailyAverage = salesTotal /dayCount print("Over " + dayCount + " days there was a total sales of £" _+ salesTotal + " and an average daily sale of £" + dailyAverage) dailySales.close() endprocedure </pre> <p>There are many different ways that this procedure could have been achieved. Therefore other alternative methods should be given credit.</p> |

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