

2.2.2

**COMPUTATIONAL
METHODS**

TOPIC WISE EXAM QUESTIONS

ANSWERS

A-LEVEL

OCR

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| 2 | <p>Mark Band 3 – High level (7-9 marks) The candidate demonstrates a thorough knowledge and understanding of both computational thinking methods; 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. <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 both computational thinking methods; 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 reasonable discussion, the majority of which is focused. Evaluative comments are, for the most part appropriate, although one or two opportunities for development are missed. <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 both computational thinking methods with limited understanding shown; the material is basic and contains some inaccuracies. The</p> | 9 | <p>AO1: Knowledge and Understanding Indicative content</p> <ul style="list-style-type: none"> • Problem recognition is identifying that there is a problem to be solved, to determine exactly what the problem is from a description/scenario and to determine if the problem can be solved with computational methods • Decomposition is splitting the problem down into subproblems that can be solved independently <p>AO2: Application</p> <ul style="list-style-type: none"> • Problem recognition: identifying the need for the scheduling system, what it will take as its inputs, what will need to be output etc. • Decomposition: subproblems could include: <ul style="list-style-type: none"> ○ inputting the requirements ○ generating possible routes ○ evaluating the routes ○ outputting the schedule <p>AO3: Evaluation Computational methods allow the e.g.:</p> <ul style="list-style-type: none"> • programmer to determine what the problem, what the challenges may be and what additional information is required before starting to code the solution • identification of the key features for programmers to focus on • splitting of the task into smaller, more manageable/solvable problems which allows for a solution to be developed quicker • design of an effective/efficient solution that makes best use of a processor • splitting of a task to allow programmers to focus on areas they specialise in. |
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| 5b | <p>1 mark e.g.</p> <ul style="list-style-type: none"> • Symbols are used to represent the address • The edges represent possible connections between addresses not the actual physical routes | 1 | Allow other suitable answers that a context of the problem |
| 5di | <p>1 mark per bullet to max 1</p> <ul style="list-style-type: none"> • Simulate/model behaviour of the system (before it is) used under load • Because it would be too expensive/unsafe/time critical to test the real system | 1 | |
| 5dii | <p>1 mark per bullet to max 2 e.g.</p> <ul style="list-style-type: none"> • Test with large and small values • e.g. largest number of deliveries • e.g. largest number of possible routes • Model how well the system scales with increasing use. | 2 | |

Mark Band 3 – High level (7-9 marks)

The candidate demonstrates a thorough knowledge and understanding of data mining; 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 is able to weigh up the use of data mining which results in a supported and realistic judgment as to whether it is possible to use them in this context.

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 data mining; 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 makes a reasonable attempt to come to a conclusion showing some recognition of influencing factors that would determine whether it is possible to use data mining in this context.

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 data mining with limited understanding shown; the material is basic and contains some inaccuracies. The candidates 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 may not be clear.

0 marks

No attempt to answer the question or response is not worthy of credit.

9
AO1.1
(2)
AO1.2
(2)
AO2.1
(2)
AO3.3
(3)

AO1: Knowledge and Understanding Indicative content

- Data mining searches large amounts of data
- Searches for relationships between facts/components/events that may not be obvious
- May include pattern matching algorithms
- May involve anomaly detection algorithms
- Used for business modelling
- Used to plan for future eventualities

AO2: Application

- Can look for how people use the website e.g. visiting times, what they click on, how long they spend on certain features, what they do first, which elements are used least
- Give recommendations for future changes to the game e.g. features to add, or remove

AO3: Evaluation

Candidates will need to evaluate the benefits and drawbacks of using data mining.

- e.g.
- Can use to introduce new features
 - Increase use from users
 - Increase revenue by selling features used more often
 - Make the game more appealing
 - Remove features people don't use
 - Use to target advertising
 - Privacy concerns from users
 - Misuse of information

1e

6a

1 mark for each interval

Interval 1

- A is fetched

Interval 2

- A is decoded
- B is fetched

Interval 3

- A is executed
- B is decoded
- C is fetched

Interval 4

- B is executed
- C is decoded
- D is fetched

4
AO1.2
(4)

6b

1 mark per bullet up to a maximum of 2 marks:

- Reduces/removes latency
- ... CPU is not idle while waiting for next instruction
- Next instruction is fetched while current one is decoded/executed
- All parts of the processor can be used at any instance in time.

2
AO1.2
(2)

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| 2a | <p>1 mark per bullet to max 4 e.g.</p> <ul style="list-style-type: none"> • Decomposition splits the problem into smaller sub problems • Repeated decomposition gives solvable parts • The division can lead to the development of subroutines/modules • The division can lead to a logical division between programmers/teams • ...e.g. one team works on one section and another concurrently on another | <p>4 AO1.1 (2) AO1.2 (2)</p> | |
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| 4a | <p>1 mark per bullet</p> <ul style="list-style-type: none"> • She can split the problem down into sub problems • It will creates a more manageable problem / simpler to understand / maintain • can tackle each sub problem independently | <p>2 AO1.2 (1) AO2.2 (1)</p> | |
| 4biii | <p>1 mark per bullet</p> <ul style="list-style-type: none"> • The result from one process / procedure feeds into the next • E.g. the result of detecting a character touching an enemy feeds into reducing the number of lives | <p>2 AO1.2 (1) AO2.2 (1)</p> | <p>Note: 1 Mark Max for a generic description of pipelining</p> |

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| 6 | <p>Mark Band 3 – High level (7-9 marks) The candidate demonstrates a thorough knowledge and understanding of data mining; 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 is able to weigh up the context which results in a supported and realistic judgment as to whether it is possible to use data mining in this context. <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 data mining; 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 makes a reasonable attempt to come to a conclusion showing some recognition of influencing factors that would determine whether it is possible to use data mining. <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 data mining with limited understanding shown; the material is basic and contains some inaccuracies. The candidates makes a limited attempt to apply acquired knowledge and understanding to the context provided. The candidate provides nothing more than an unsupported assertion. <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>9 AO1.1 (2) AO1.2 (2) AO2.1 (2) AO3.3 (3)</p> | <p>AO1: Knowledge and Understanding Indicative content</p> <ul style="list-style-type: none"> • Extracting data from databases • Using large data sets • Looking for patterns/specific occurrences of data • Gathering data that can be analysed and used to inform decisions <p>AO2: Application e.g.</p> <ul style="list-style-type: none"> • Use to find out what his users do • Find features that are used most often • Find features that are not used • Find out what people in his target age group do on other sites • Find out characteristics of people who use the site <p>AO3: Evaluation e.g.</p> <ul style="list-style-type: none"> • Can identify areas to focus attention • Save time and money by identifying areas that are not popular/used • New features targeted at specific groups could bring in new business e.g. advertising • But care would need to be applied to privacy issues / GDPR and potential impact on the users |
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| 2 | (a) | (i) | <p>Recognition</p> <ul style="list-style-type: none"> Identify there is a problem to be solved // what the problem is <p>Decomposition</p> <ul style="list-style-type: none"> Splitting down a problem into sub-problems | <p>2 AO1.1 (2)</p> | |
| 2 | (a) | (ii) | <p>e.g.</p> <ul style="list-style-type: none"> Divide and conquer Abstraction | <p>1 AO1.1 (1)</p> | Accept other credible answers e.g.: Critical thinking, Modelling, Heuristics, Concurrency, Visualisation, Backtracking |
| 2 | (b) | (i) | <ul style="list-style-type: none"> Turning large quantities of data into useful information / Finding patterns within large quantities of information | <p>1 AO1.1 (1)</p> | Must refer to large quantities of data |
| 2 | (b) | (ii) | <p>1 mark per identifying data, 1 for use</p> <p>e.g.</p> <ul style="list-style-type: none"> Identify customer trends To identify items to sell/offers to send customers Identify which stores are making the most profit To identify what the other stores are doing well Which items are not selling well To replace them with other items | <p>4 AO2.2 (4)</p> | Accept any valid responses |
| 2 | (c) | (i) | Simulate/test the behaviour of the system before it is used | <p>1 AO1.1 (1)</p> | |
| 2 | (c) | (ii) | <p>e.g.</p> <ul style="list-style-type: none"> Testing it with a large number of simultaneous orders (stress testing) Testing it with a large number of customers/items/orders | <p>1 AO2.2 (1)</p> | |
| 3 | (a) | (ii) | <p>1 mark per bullet to max 2</p> <ul style="list-style-type: none"> The puzzle is not shown in the diagram The graph shows different sequences of sub problems in the puzzle that can be solved to get to the final solution The puzzle does not have all states visible at once | <p>2 AO1.2 (1) AO2.1 (1)</p> | Answers must be in context of the puzzle |

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| 6 | b | i | <p>1 mark per bullet to max 2</p> <ul style="list-style-type: none"> Splitting a problem down Into its component parts/sub-procedures/modules | <p>2 AO1.1 (2)</p> | |
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**If you found this
useful, drop a follow
to help me out!**

THANK YOU!

GCST