



Mark Scheme

Additional Sample Assessment
Material

Pearson BTEC Level 3 – Computing

Unit 2: Fundamentals of Computer
Systems 31769

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Unit 2: Fundamentals of Computer Systems – sample marking grid

General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Marking grids should be applied positively. Learners must be rewarded for what they have shown they can do, rather than be penalised for omissions.
- Examiners should mark according to the marking grid, not according to their perception of where the grade boundaries may lie.
- All marks on the marking grid should be used appropriately.
- All the marks on the marking grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks, if the learner's response is not rewardable according to the marking grid.
- Where judgement is required, a marking grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the marking grid to a learner's response, a senior examiner should be consulted.

Specific marking guidance

The marking grids have been designed to assess learner work holistically. Rows in the grids identify the assessment focus/outcome being targeted. When using a marking grid, the 'best fit' approach should be used.

- Examiners should first make a holistic judgement on which band most closely matches the learner's response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer, in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band, depending on how they have evidenced each of the descriptor bullet points.

Question Number	Answer	Mark
1 (a)	<p>Award one mark for identification and one additional mark for appropriate expansion</p> <p>Event driven (1) so the car can react to situations as they happen (1)</p> <p>Time sharing/multitasking (1) so the car can process the many different events that would be happening (1)</p> <p>No buffering delays (1) to ensure the car can perform tasks that are time sensitive (1)</p>	2

Question Number	Answer	Mark
1 (b)	<p>Award one mark for the identification and one additional mark for the appropriate expansion to a maximum of four marks.</p> <p>Static memory allocation (1) removes 'lag' of searching for suitable sized memory location (1).</p> <p>Does not need to communicate with additional drives (1) reducing response/reaction time (1)</p> <p>Stored on 'solid state'/'flash' medium (1) which has a faster response time than other types of storage (1)</p> <p>Accept any other relevant phrasing/wording.</p>	4

Question Number	Answer	Mark
1 (c)	<p>Award one mark for any of the following up to a maximum of two marks:</p> <ul style="list-style-type: none"> • (More)Difficult to change features or configuration • Security breaches are difficult to patch • Difficult to transfer/back up any stored/generated data 	2

Question Number	Answer	Mark
1 (d)	<p>An explanation to contain two from:</p> <p>It only uses 8 Bits (1) which limits the number of characters it can represent (compared to Unicode) (1) so it cannot be used for some non-English languages (1) meaning the interface cannot have other translation/language options (1)</p> <p>Accept any other relevant phrasing/wording. To award both marks a linked response is required.</p>	2

Question Number	Answer	Mark
1 (e)	<p>A description of the use of interrupts by the system to include four from:</p> <p>Data from the sensor would be analysed (1) against a set of predetermined conditions (1) to see if it is a 'critical' event (1) the system would then stop/override an active process (1) in order to run a more important process/procedure (such as applying brakes/taking evasive action) (1)</p> <p>Accept any other relevant phrasing/wording.</p>	4

Question Number	Answer	Mark
1 (f)	<p>Award one mark for identification and one additional mark for appropriate reason.</p> <p>Channel - Simplex (1)</p> <p>Reason - (the sensor) would only be used to input data in to the system (1)</p>	2

Question Number	Answer	Mark
1 (g)	Award one mark for identification and one additional mark for appropriate expansion. The system would need to process high volumes of data (1). Multi-threading would allow multiple instructions/data to be processed simultaneously (1)	2

Question 1 = 18 marks

Question Number	Answer	Mark
2 (a)	<p>Award one mark for use of correct method at each stage and one mark for correct answer.</p> <p>Stage 1 Method: Matrices converted into Row-major order (1) Quantity – 6,10,1,5,5,4,9,13,78 Price – 19.0, 89.5, 657.0, 1.5, 72.2, 36.1, 99.8, 53, 33.7</p> <p>Stage 2 Method: correct memory locations identified (8th and 5th number in the list) (1) e.g. $a[7]*b[4] = 13*72.2$ Answer: 938.6 (1)</p> <p>Additional guidance Allow follow through for identification of locations at stage 2, i.e. $9*1.5$ (7th and 4th). Award 3 marks for correct answer only</p>	3

Question Number	Answer	Mark
2 (b)	<p>An explanation of an advantage of Bluetooth such as</p> <p>Low power drain (1) means device won't need charging as often/hand held device can be used for longer (1) improving productivity (as more can be processed before it needs recharging) (1)</p> <p>Signal is less prone to interference (1) so signals from other devices affect them less (1) meaning that workers from different terminals can work in the same part of the warehouse (1)</p>	3

Question Number	Answer	Mark
2 (c)	<p>An explanation of an disadvantage of Wi-Fi such as</p> <p>Signal is more prone to interference (1) so signals from other devices/physical objects might affect quality/strength of connection (1) reducing how quickly tasks can be performed/slowing down order processing (1)</p> <p>Signal strength is dependent on distance from access point (1) meaning additional repeaters/access points may need to be installed (1) in order to place the workstations in different</p>	

	places around the distribution centre (1) Bandwidth at each access point will be shared (1) which may cause delays/connection problems (1) if one workstation is sending/receiving a lot of data (1)	3
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Question Number	Answer	Mark
2 (d)	<p>Award one mark for any of the following up to a maximum of three marks:</p> <ul style="list-style-type: none"> • If the primary disk fails the system can run off the 'redundant' disk • Copies/'Mirrors' of data can be made on another disk • Data can be split across more than one disk • Data can be automatically recovered from a 'mirror' if one drive fails • 'Time to fail' is increased (as work is spread across multiple drives) • Data processing times reduced (as data is accessed from different drives to maximise read/write time) • Data can be split across drives in different locations 	3

Question Number	Answer	Mark
2 (e)	<p>A description to contain six from:</p> <ul style="list-style-type: none"> • Website would use HTTPS/Secure Socket Layer (SSL) • The two computers that are communicating make a connection (handshake) and the protocols determine the secure connection is established • The user's computer checks that the web server has a valid security certificate • SSL uses 'public key encryption' to encode the data • Public key encryption – each computer uses two keys public and private • Data is encoded using the sender's private key and the recipient's public key 	

	<ul style="list-style-type: none">• Data is decoded using the sender's public key and the recipient's private key• The private key is known only to the recipient's computer so if data is intercepted during transmission it cannot be read <p>Additional guidance - A linked response needed to gain maximum marks.</p> <ul style="list-style-type: none">•	6
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Question 2 = 18 marks

Question Number	Answer	Mark
3 (a)	<p>An explanation why a stack should not be used to include four from:</p> <p>Stacks are linear structures (1) so data can only be accessed in a 'first in last out' (FILO) order(1) meaning data lower in the stack cannot be accessed directly (1) which makes it inefficient for accessing records (in a large database) (1) because extra processing steps would be required to access specific data (1)</p>	4

Question Number	Answer
3 (b)	<p>Learners to provide an analysis of the implications of implementing a new system with reference to how this will impact on the business</p> <p>Indicative content</p> <p>Timescales</p> <ul style="list-style-type: none"> • Timelines for the implementation of the system/key miles stones, etc. • Identifying and using times that will have least impact on the company and its customers • Ensuring technical staff are deployed at times when their expertise is maximised in the new implementation but still allowing them to provide the technical support/roles they provide during normal operation <p>Testing</p> <ul style="list-style-type: none"> • Ensure as many things have been tested as possible before the system is made 'live' • Check compatibility with current systems in a controlled environment to minimise risk when systems are connected • Carry out security/probe testing to ensure the new system does not introduce a point of weakness to the company's system <p>Migration to new system</p> <ul style="list-style-type: none"> • Consider time scales and methodology for move to new system: <ul style="list-style-type: none"> ◦ Phased introduction versus complete switch • Data concerns – migration of current data, data conversion • Integration of current and new procedures, procedures and processes • Providing consistency of service during migration • Impact on employee productivity/downtime
Level	Mark Descriptor
	0 No rewardable material.

1	1-2	<p>Technical vocabulary is used but it is not used appropriately to support arguments in relation to the issues of the question.</p> <p>Issues are identified but chains of reasoning are not made leading to a superficial understanding of the relative importance of issues to the scenario.</p>
2	3-5	<p>Accurate technical vocabulary is used to support arguments but not all are relevant to the issues of the question.</p> <p>There is consideration of relevant issues using logical chains of reasoning but does not reflect upon their relative importance to the given scenario.</p>
3	6-8	<p>Fluent and accurate technical vocabulary is used to support arguments that are relevant to the issues of the question.</p> <p>There is a balanced and wide ranging consideration of relevant issues using coherent and logical chains of reasoning that shows a full awareness of their relative importance to the given scenario.</p>

Question Number	Answer
3 (c)	<p>An analysis of the impact on JL Associates storing data across multiple computer systems.</p> <p>Indicative content</p> <p>Access</p> <ul style="list-style-type: none"> • Each member of staff would need access to different levels of information for each of the clients (e.g. investment staff would need access to financial details) IT staff would need to assign different permission/access levels to each member of staff to prevent everybody seeing sensitive data • Staff may need portable devices such as laptops and/or may need to have 'roaming profiles' which would allow them to login to the network in other offices so that that they can access the information they need <p>Cost</p> <ul style="list-style-type: none"> • Having a server in each of the offices would be significantly more expensive than just using one central server due to both the cost of having multiple servers and the need to have network administrators at each site <p>Implementation</p> <ul style="list-style-type: none"> • Having multiple servers which store local files and one central server which stores copies of all data makes for a more complicated

implementation. The technical staff would need to ensure that the central server can distinguish between the different local servers (and provide the correct data to each server and user)

- It is likely that the central server would be set up as multiple 'virtual servers' rather than one single server instance which would make it more complex to get the data to be shared between them if needed
- Having multiple server locations adds extra 'fail points', however it minimises impact of the failure of a single server
- More potential maintenance to the system meaning a more complex and comprehensive plan for installation and maintenance would be needed

Productivity

- Some staff may require data that is generated by colleagues in another of the company's offices. As the data is separate they may not have immediate access to this and may need to request this data. Dealing with the request may take time and will reduce the productivity of the member of staff and slow down other processes
- Having data available on the local network for each office can increase productivity as the company can ensure each office has the same level of connectivity and the same infrastructure as they do not need to rely on external internet connections to complete most tasks, as these could vary in different areas of the country

Security

- The company would handle private/sensitive information so would need to ensure it has adequate security including firewalls and appropriate encryption for transferring data between servers
- Keeping data from each office separate provides greater security as it minimises the amount of data available from a single point of entry
- If portable devices are provided for accessing the data, devices would need to be encrypted as these are more easily lost/stolen than office based computers

Level	Mark	Descriptor
	0	No rewardable material.
1	1-3	Technical vocabulary is used but it is not used appropriately to support arguments in relation to the issues of the question. Issues are identified but chains of reasoning are not made leading to a superficial understanding of the relative importance of issues to the scenario.
2	4-7	Accurate technical vocabulary is used to support arguments but not all are relevant to the issues of the question. There is consideration of relevant issues using logical chains of

		reasoning but does not reflect upon their relative importance to the given scenario.
3	8-10	Fluent and accurate technical vocabulary is used to support arguments that are relevant to the issues of the question. There is a balanced and wide ranging consideration of relevant issues using coherent and logical chains of reasoning that shows a full awareness of their relative importance to the given scenario.

Question 3 = 22 marks

Question Number	Answer	
4 (a)	<p>A discussion of the suitability of system-on-a-chip (SoC) architecture/ technology for use in hand held devices.</p> <p>Indicative content</p> <p>SOC is the packaging of all the necessary electronic circuits and parts for a 'system' (such as a handheld gaming device) onto a single integrated circuit or microchip.</p> <p>Despite being on a single chip SoC has cores that are independent of each other, so only need to be turned on when needed. Whereas a traditional processor would be turned on all the time (reducing power consumption and heat production).</p> <p>Many new SoC have a core that is dedicated to power management which controls processes, etc. to maximise battery life which is important for a handheld device. SoC systems usually require less power to run them.</p> <p>A complex SoC may include the on-chip integration of the CPU and a graphics processor unit (GPU) with various other hardware blocks (e.g. image processor, audio/video decoder).</p> <p>No need for additional cooling, which would allow the developers to include additional features in the device (such as larger screen, speaker, etc.) while also keeping the overall size of the case and weight of the device down.</p> <p>Software can be embedded on the chip reducing the need for additional storage/reducing demand on lower memory size of mobile devices. However firmware, etc. is more difficult to update which can be problematic if security issues are found, etc.</p> <p>Easy to embed modern protocols on to the chip as no need to communicate over additional busses, etc., with additional hardware as all components can be integrated and use the same instruction set.</p> <p>Greater system reliability as less connections to be damaged by constant movement (due to reduced number of components on a PCB).</p> <p>Performance of SoC is usually inferior to desktop/traditional CPU architecture. Because of this games may not be able to have the same level of refinement/sophistication as a game on platform that uses desktop architecture. Games that are not optimised for this architecture may 'lag' and provide very poor user experience.</p>	
Level	Mark	Descriptor
	0	No rewardable material.
1	1-3	<p>Technical vocabulary is used but not used appropriately to support arguments in relation to the issues of the question.</p> <p>Issues are identified but chains of reasoning are not made leading to a superficial understanding of the relative importance of issues to the scenario.</p>

		Does not link arguments to the given scenario.
2	4-7	<p>Accurate technical vocabulary is used to support arguments but not all are relevant to the issues of the question.</p> <p>A consideration of relevant issues using logical chains of reasoning but does not reflect upon their relative importance to the given scenario.</p> <p>Considers the various elements of the question and but does not always link arguments to the given scenario.</p>
3	8-10	<p>Fluent and accurate technical vocabulary is used to support arguments that are relevant to the issues of the question.</p> <p>A balanced consideration of relevant issues using coherent and logical chains of reasoning that shows a full awareness of their relative importance to the given scenario.</p> <p>Carefully considers the various elements of the question and links arguments to the given scenario.</p>

Question Number	Answer
4 (b)	<p>An evaluation of the extent to which the features of the device will support the decision to develop applications software for the device.</p> <p>Screen</p> <ul style="list-style-type: none"> • Size – the screen is quite small which would make use of some application software difficult. • Input – The screen is touch sensitive and can be use with a stylus which would make use of graphics software more intuitive (similar to using a pen/pencil) <p>Input methods</p> <ul style="list-style-type: none"> • The main input methods are optimised for games (direction arrows, trigger buttons, etc.) which are not always appropriate or convenient for using other applications • The screen is a capacitive touch screen (as used in most smartphones) so should support similar functionality which allows mobile optimised apps to be used • Typing may be difficult as although there is a touch screen, which would support an onscreen keyboard (as with a smart phone), it would be difficult to type in the same way as a smartphone due to the amount of other buttons around the device • The device has both front and rear cameras meaning it could possibly support communication apps (like VoIP) and creative apps <p>Connections</p>

	<ul style="list-style-type: none"> Although the screen may be difficult to use for typing the device supports Bluetooth and Wi-Fi which could be used to link peripheral devices such as keyboards and printers. This would however reduce the portability of the device <p>Storage</p> <ul style="list-style-type: none"> The device has a micro SD slot which would allow users to transfer/back up files they have worked on or to store the apps that have been downloaded to avoid filling up internal storage 	
Level	Mark	Descriptor
	0	No rewardable material.
1	1-4	<p>Technical vocabulary is used but is not used appropriately to support arguments in relation to the issues of the question.</p> <p>Issues are identified but chains of reasoning are not made leading to a superficial understanding of the relative importance of issues to the scenario.</p> <p>No conclusion is presented or is generic.</p>
2	5-8	<p>Accurate technical vocabulary is used to support arguments but not all are relevant to the issues of the question.</p> <p>There is a consideration of relevant issues using logical chains of reasoning but does not reflect upon their relative importance to the given scenario.</p> <p>An attempt at a conclusion is presented that links arguments to the given scenario but is not justified in that it does not reflect the careful consideration of both sides of the argument.</p>
3	9-12	<p>Fluent and accurate technical vocabulary is used to support arguments that are relevant to the issues of the question.</p> <p>There is a balanced and wide ranging consideration of relevant issues using coherent and logical chains of reasoning that shows a full awareness of their relative importance to the given scenario.</p> <p>A fully justified conclusion is presented that links arguments to the given scenario and that reflects the careful consideration of both sides of the argument leading to a reasoned decision.</p>

Question 4 = 22 marks

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