

MARK SCHEME for the May 2009 question paper
for the guidance of teachers

CAMBRIDGE INTERNATIONAL DIPLOMA IN COMPUTING
5218 Further Systems and Software, maximum mark 90

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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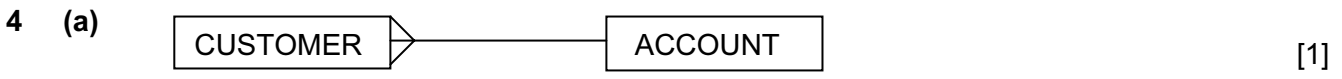
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- 1** -File/Storage
 -Save to another folder/create folders for different types of message.
 -Replying
 -Can send a reply with address automatically put in
 -Copying/Forwarding/multiple forwarding
 -Make a copy of the message forward it to another/many person
 (using their address/book)/No need to retype the message
 -(Automatic) deletion
 -Remove message from box (after reading it to free up space)/to make space
 -Blocking
 -If message is unsolicited or unwelcome then arrange for provider to block future messages
 from that address.
 -Mark as Read/Unread
 -To ensure message remains in box/for future reference
 -Mark as important/high priority
 -To ensure message does not get ignored.
 -Sorting/Grouping
 -According to time received/sender/subject/...
 (Up to 2 per type, max 4 types, max 8) [8]
- 2 (a) (i)** -Data and methods are kept together/Data can only be accessed using the methods
 attached to it. [1]
- (ii)** -Computer told facts and rules and then manipulates them to provide answers to
 queries. [1]
- (b) (i)** -Also known as top-down design
 -Split original problem into smaller parts
 -Continue splitting into smaller and smaller parts until...
 -Each part can be considered to be a single process.
 (1 per -, max 2) [2]
- (ii)** -A procedure/small section of code...
 -which returns a specific value
 -The value is returned whenever the function name appears/acting just like a variable
 name.
 (1 per -, max 2) [2]
- (c) Repeat**
 Compare new value with root value
 -If > root value then follow right subtree
 -Else follow left subtree
 -Until no subtree
 -Insert new value as root of new subtree.
 (1 per -, max 4) (Allow symmetric algorithm) [4]

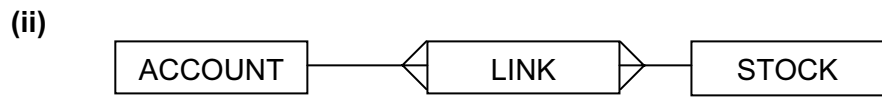
- (d) (i) -Used to combine already compiled procedures
 -with compiled program...
 -to create an executable file.
 -Deals with external references.
- (ii) -Copies object code into...
 -(primary) memory ready for execution.
 -Deals with addressing anomalies,
 -particularly relocatable addressing
 (1 per -, max 2 per doty, max 4) [4]

- 3 (a) -Goods offered for sale on electronic communication medium/Internet
 -Buyer orders goods by providing personal information on Internet..
 -including bank account/credit card/other payment details.
 -data transfer must be secure
 -that firm offering goods is genuine
 -that buyer is genuine
 -Goods dispatched to purchaser after payment checked.
 (1 per -, max 3) [3]

- (b) -Enlarges market...
 -now worldwide rather than just local base.
 -Opens up richer markets where higher prices can be charged.
 -Sells 24/7
 -No need for expensive overheads
 -No need to employ large number of sales staff
 (1 per -, max 4) [4]



- (b) (i) Many to many. [1]



- Marks:
 -Use of Link table with sensible and descriptive name
 -ACCOUNT to LINK is One to Many
 -LINK to STOCK is Many to ONE.
 (1 per -, max 2) [2]

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- (c) (i) -A unique identifier for a record
-e.g. Customer ID. [2]
- (ii) A field/item, not the primary key, offering an alternative identification for the record (not necessarily unique.)
-e.g. Postal area (to arrange delivery schedules). [2]
- (iii) -A field/item in one table which is a primary key in another table/acts as a link between tables.
-Account number in customer table links records to relevant account in account table. [2]
- (d) -Confidential/Personal data of a sensitive type.
-Will have guaranteed privacy of data to customers.
-Must comply with legislation protecting data.
-Do not want to lose any data or have data maliciously altered/used
Important to maintain data integrity.
-Passwords to get onto system...
-and into different tables...
-in hierarchical fashion...
-giving different access rights/RO or RW...
-and providing different views of the data
-Physical protection by (e.g.) locking system terminals away/iris recognition/fingerprints/....
-Protecting system with firewalls etc.
(1 per -, max 6) [6]
- 5 (a) -Concept of a stored program
-Instructions and data use the same (primary) memory
-Use of a single processor
-Follows a sequential set of instructions.
(1 per -, max 3) [3]
- (b) (i) -201/202 (Sensible value)
-because, once sent to MAR the value in the PC is incremented [2]
- (ii) -The result of a jump instruction which...
-requires that the next instruction is not to be handled in sequence/specifically, that held in 180. [2]
- 6 (a) (i) 11011010
- (ii) 10100110
(1 per dotty) [2]
- (b) (i) -The fractional part of the representation
-Place value of MSB is -1...
-remainder of bits are $\frac{1}{2}$, $\frac{1}{4}$...
-Holds the magnitude of the data.
(1 per -, max 2) [2]

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(ii) -Is a two's complement integer which...
 -holds the power of 2...
 -by which the mantissa must be multiplied...
 -to give the original value.
 (1 per -, max 2) [2]

(iii) $0.0101011 \times 10^{0101}$
 $= 1010.11$
 $= 8 + 2 + \frac{1}{2} + \frac{1}{4}$
 Alternative:
 $10 = 1010$ and $.75 = .11$
 $10.75 = 00101011 \times 10^{101}$
 ←
 Point moves 5 places
 (1 per line, max 3) [3]

(iv) 01010110 0100
 (1 for mantissa, 1 for exponent) [2]

7 (a) -A series of bars representing time to be taken on...
 -the different tasks which are needed to produce the system...
 -and relative timings of tasks.
 -Shows when different resources are going to be required/when they should be booked.
 -Also shows reliance of one task on the completion of another.
 -Will show how long the whole system should take to complete.
 (1 per -, max 4) [4]

(b) -A series of manuals to explain the software...
 -in printed form and/or on screen.
 -Overview of package/contents page/index/glossary/...
 -Sample inputs/outputs.
 -Explanation of error messages.
 -Installation of software/hardware.
 -Quick reference guide.
 -How to carry out simple maintenance (like reloading a till roll).
 (1 per -, max 6) [6]

8 (a) -Cheaper than waiting until real thing is built
 -May be impossible to alter things after building
 -Safer than testing in real life, e.g. evacuation procedures, using real people.
 -Impossible to carry out some tests, e.g. burning building down, when building complete.
 (1 per -, max 3) [3]

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- (b) (i) -Width of aisles..
 -to be able to assess the number of people who can use the aisle at once.
 -Number of people in store...
 -evacuation times will depend on number of people.
 -Position of exits...
 -relative to groupings of people.
 -Number of exits...
 -should be kept as low as is safe, for security reasons.
 -Position of fire/spread of fire...
 -different positions will dictate flow of people/speed of spread.
 -Positions of different areas in store (e.g. bakery)...
 -some areas will attract crowds of shoppers.
 -Time taken for emergency services to arrive
 -expert help will alleviate the situation
 (1 per -, max 3 variables, max 6) [6]

- (ii) -Large quantities of data ...
 -all interrelating with each other...
 -because some outcomes rely on outcomes of others.
 -Large quantities of processing required
 (1 per -, max 2) [2]

- 9 -Interrupt given a priority
 -Placed in queue with other jobs/interrupts to be done...
 -according to priority.
 -When it becomes the highest priority interrupt it is dealt with
 -Contents of special registers are placed on a stack/saved
 -Interrupt (and others) dealt with
 -values read from stack into special registers.
 -Check for interrupt(s) at end of each cycle before fetching next instruction
 -Vectored interrupts
 (1 per -, max 6) [6]