MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

9691 COMPUTING

9691/03   Paper 3 (Written Paper 3), maximum raw mark 90

UNIVERSITY *of* CAMBRIDGE
International Examinations

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]

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(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 dotty, 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
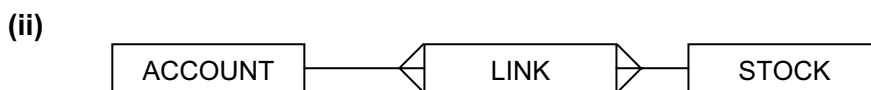-No need to employ large number of sales staff
(1 per -, max 4) [4]

4 **(a)**

CUSTOMER ▷——————⊏ ACCOUNT

[1]

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

(ii)

ACCOUNT ——⊏◁ LINK ▷—— STOCK

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]

(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 ½, ¼…
-Holds the magnitude of the data.
(1 per -, max 2) [2]

(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 * 10 ^ 0101
= 1010.11
= 8 + 2 + ½ + ¼
Alternative:
10 = 1010 and .75 = .11
10.75 = 00101011 x 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]

(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 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]