UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2008 question paper

9691 COMPUTING

9691/01 Paper 1 (Written Paper 1), maximum raw 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.

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 must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 (a) (i) -Physical components

(ii) -Programs/instructions to make computer do something

(b) (i) -Keyboard/magnetic stripe reader/chip reader/touchscreen
-Input pin or amount or other request/card holder's details

(ii) -Screen/printer
-Output results of requests/request inputs/hard copy for customer to take away

(iii) -Hard drive/tape
-To store customer requests for statements/store transactions
(1 per -, max 6) [6]

(c) (i) -Data is collected for later processing
-Requests for statements/data about transactions...
-saved for later input to main frame/during "off" period [3]

(ii) -Data must be processed immediately
-Requests for money must be accompanied by processing to establish identity/sufficient funds…
-which must be done in real-time or user would go away/would overdraw/someone else could use your card [3]

2 (a) (i) -The code produced by the programmer/program code in hll

(ii) -The code in executable form/machine code/binary [2]

(b) -Code produced by programmer is not understandable by computer/computer requires program in binary form
-Translator translates high level language into binary form/source code into object code
-To provide error diagnostics
(1 per -, max 2) [2]

(c) -Syntax error/error in the language or rules of the program/e.g. PLINT instead of PRINT
-Logic error/error in the original algorithm or in the transfer of algorithm to the code/e.g. jump to the wrong instruction
-Arithmetic error/request to carry out inappropriate or impossible arithmetic/e.g. divide by zero
(Up to 3 per -, max 2-, max 6) [6]

3 (a) (i) -Data files/user files in use
-Software in use
-Parts of O.S.
(1 per -, max 2, NB lack of 'in use' only penalised once) [2]

(ii) -Boot program/bootstrap
-Because the boot program must be in memory when the computer is switched on/all contents of RAM are lost when computer turned off [2]

(b) (i) -Manages execution of instructions
-Fetches instructions in sequence/decodes them
-(Uses control signals to) manage rest of processor
(1 per -, max 2) [2]

(ii) -Carries out all arithmetic
-Carries out logical operations
-Acts as gateway to processor for data
(1 per -, max 2) [2]

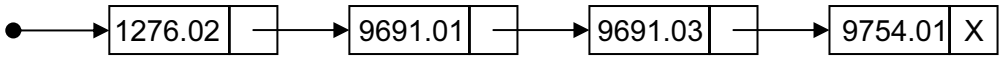
4 **(a)** e.g.

```
SET       I = O = OPEN, ALARM = OFF
WHILE ALARM = OFF
     INPUT W
     IF W > =H  THEN       I = SHUT
                           REPEAT
                           UNTIL W<H
                           I = OPEN
                ELSE  IF W < L   THEN      O = SHUT
                                           TIME = 0
                                           REPEAT
                                                TIME = TIME + 1 MINUTE
                                           UNTIL W > L OR TIME = 60
                                           IF TIME = 60 THEN ALARM = ON
                                                        ELSE O = OPEN
                                           ENDIF
                ENDIF
     ENDIF
ENDWHILE
```

Mark Points:
-Initialise I and O to open
-Initialise ALARM to off
-Suitable loop to keep system working, with...
-sensible condition
-Read value of water level within loop
-Condition W > = H
-Correct use of I...
-with loop and condition
-Condition W < L with…
-correct use of O
-Timer in loop for O
-Condition to set off alarm
-Algorithm does not repeat if alarm set off
-Readability of candidate's algorithm (at least two loops or selections properly indented and with matching endifs)
(Accept algorithm in any form, except a regurgitation of the question)
(1 per -, max 8) [8]

(b) Interface must be good because:
-Single operator
-Large quantity of information
-Importance of some of the information
Features:
-Use of colour
-Use of layout
-Use of video reverse/flashing/bold/…
-use of graphics
-Use of sound
(1 per -, max 5) [5]

5 **(a)** HEAD OF LIST



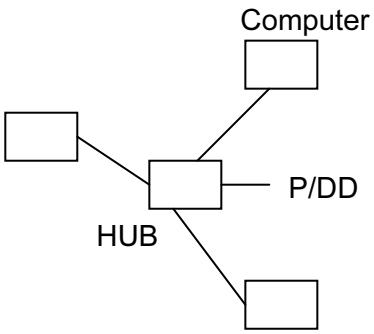
Mark Points:
-Head of list pointer
-All numbers in correct order
-Pointers clearly shown
-End of list/null pointer
(Same mark points apply to list in array format)
(1 per -, max 4) [4]

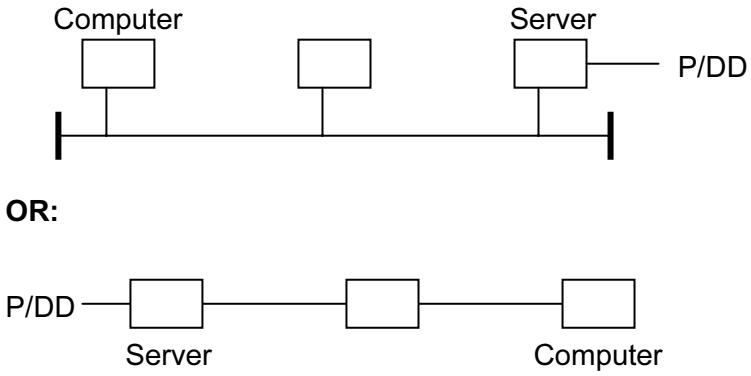
(b) **(i)** -LIFO means that the last data item to be inserted into the structure will be the first to be read
-FIFO means that the first data item to be inserted into the structure will be the first to be read [2]

(ii) Advantage
-No maximum size of queue
-Does not tie up large amounts of memory needlessly
-Allows use of multiple index pointers
Disadvantage
-Reading from/writing to the structure can be a lengthy process
(1 for each of advantage and disadvantage) [2]

(iii) -No maximum size of stack
-Stack is only active at one end
-Reading and writing at same end
-Can always be at the front end of list
-Therefore no reading through list to find the other end
(1 per -, max 3) [3]

6 Star: Bus:





In each case: 1 mark for shape, 1 mark for labelling (at least computers and server/terminators or computers and hub/server), 1 mark for shared peripherals
Advantage of Star is reliability
Advantage of Bus is less disruption/cheaper because less cable to be laid in the building [8]

7 **(a)** -Picture taken with camera
-Down loaded to computer through USB port/graphical picture scanned in
-Picture edited to a standard size using tools on software like cropping…
-and contrast
-Picture pasted on to software used to produce rest of card (word processor)
-Card printed out using colour printer
(1 per -, max 5) [5]

(b) **(i)** -Each barcode is unique to a specific account
-Pairs of bars correspond to digits in a code
-Different widths of bars refer to different digits
-Complete code is the key to customer record
(1 per -, max 2) [2]

(ii) -Sound/to signify correct (or wrong) input of data
-Hard copy/printed/receipt/to give customer a record of transaction
-Monitor/VDU/LCD output/identifying individual goods/shopper/soft copy/to allow verification of the data
(Up to 2 per -, max 2-, max 4) [4]

8 -Accuracy of billing
-Encouraged to spend more than they can afford
-If lost, will it be possible for someone else to use it?
-Privacy of their data from workers
-Is the data safe from hackers?
-Selling on their data to other agencies
-How will the store use the data?
(1 per -, max 4) [4]

9 -An expert system...
-which takes large volumes of (trivial) data...
-to provide large amounts of management level information
-Provides operational day to day information/condition driven…
-e.g. used to stock goods at right level
-Provides strategic information for planning purposes…
- e.g. budgets/sales figures
(1 per -, max 4) [4]

10 **(a)** -Corrective/to correct errors in the system discovered during operation
-Adaptive/to change the system according to changes in requirements
-Perfective/to improve the operation of the system
(Up to 2 per -, max 2-, max 4) [4]

(b) -Hardware may begin to malfunction...
-replacement hardware may have different characteristics
-Improved hardware and software may become available/used by competitors...
-which means that new system may become necessary to allow store to keep pace with competitors
-System may no longer be compatible with other systems
-External/legal requirements may alter
(1 per -, max 3) [3]