UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

9691 COMPUTING

9691/11 Paper 1 (Written Paper), 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, which would have considered the acceptability of alternative answers.

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UNIVERSITY of CAMBRIDGE International Examinations

1 -To control the hardware of the computer/to ensure that the hardware can communicate/use of hardware drivers/IO control
-Memory management/to ensure efficient use of memory
-provide a platform on which to run/load software/provide translators for software.
-To control access to the computer/user IDs and passwords/security and privacy of system.
-Provide utility programs/to aid with housekeeping, maintenance/example utility/description of example
-second example of utility/description
-HCI/example/description e.g. WIMP interface
-Automatic backup/description of a backup routine/incremental backup
-allow computer to be used in different ways/description of a type of OS e.g. network/multi-task
-interrupt handling/example of a type of interrupt with action required
-File management + example

(Max 2 per -, max 4-, max 8) [8]

2 **(a)** **(i)** -The code produced by the programmer…
-in high-level language. [2]

(ii) -Source code is in human understandable language/the computer cannot understand the commands.
-The translator produces binary/machine code/executable form which the computer can understand.
(Accept machine readable if clear that candidate is referring to translated version of the code.) [2]

(b) **(i)** -Error in the grammar (language rules) of the program *(not just by example)*

(ii) -Instruction to perform inappropriate arithmetic (accept examples) [2]

(c) **(i)** -The testing of logical paths through the code
-**All** logical paths
-tests structure and logic of program
-use of a dry run
(1 per -, max 2) [2]

(ii) -Testing by members of software house
-Version may not be finished
-Testers have knowledge of programming/software.
(1 per -, max 2) [2]

3 **(a)** **(i)** -Text/alpha/string/alphanumeric *(not character)*
-These are sets of characters, not numbers/no calculation involved with them [2]
(second mark depends on the first)

(ii) -Integer/byte …
-Must be whole number [2]

(iii) -Boolean (accept yes/no, true/false, 0/1)
-Only two possible values (yes/no) [2]

(b) -Files (all the data on all the students) comprise…
-Records (all the data about a single student) comprise…
-Fields (individual pieces of data e.g. home telephone number).
Accept points made on a diagram *(only award one mark for the hierarchy)* [3]

4 **(a)** -That part of the system which holds data…
-which has been collected from experts and…
-can be interrogated to find information
Accept points made in terms of this example e.g. info collected from doctor
(1 per -, max 2) [2]

(b) -Comprises all the rules that the system knows…
-which the expert system has to adhere to
-These rules are applied to the knowledge to provide results (by inference engine)
Accept points made in terms of this example e.g. symptoms from patient applied to knowledge base to get diagnosis (= 2 marks)
(1 per -, max 2) [2]

5 -Use of stock control software
-Each item is bar coded
-Barcode read (on exit from shop/entrance to shop)
-Item code found on item file
-Number in shop decremented/incremented
-Comparison made with reorder level
-If < reorder level then order placed if…
-no outstanding order yet made
(1 per -, max 6) [6]

6 **(a)** Hardware:
Cable/NIC or Wireless network card/Server/wireless access point
Software:
Network Operating System/Network versions of software.
(2× hardware+ 1× Software) [3]

(b) Mark points:
-Shape
-Hub/Server/Switch at centre
-Peripheral shown/Central storage [3]

(c) -Each byte has extra parity bit
-Number of ones in byte (+ parity bit) is set to…
-either odd or even (dependent on parity) *(reject: byte is odd/even)*
-After data transmitted the parity is again calculated
-If it is not the agreed odd or even then an error has occurred.
(1 per -, max 4) [4]

7 e.g.

```
T = M = NewT = MFour = 0                                              (1)

FOR Year = 1900 TO 2009                                               (1)
    READ Mean                                                         (1)
    LET T = T + Mean                                                  (1)
NEXT

LET M = T/110                                                         (1)

REPEAT
    INPUT ChosenYear                                                  (1)
UNTIL (ChosenYear >= 1900) AND (ChosenYear <= 2006)                   (1)

FOR Year = ChosenYear TO ChosenYear + 3                               (1)
    READ Mean                                                         (1)
    LET NewT = NewT + Mean                                            (1)
NEXT

LET MFour = NewT/4                                                    (1)

IF MFour > M + 4
    THEN OUTPUT "HOT"                                             }
    ELSE OUTPUT "NORMAL"                                          }   (1)
ENDIF
```

Mark Points:
-Initialise variables
-Sensible variable names used
-Loop to read all means...
-with correct condition
-Mean read inside loop
-Running total kept
-Calculation of mean of summer means outside loop
-Input of year
-loop to read four means…
-with correct condition
-Mean read and cumulative total kept
-Mean of 4 years calculated outside loop
-Comparison with mean+4
-Two outcomes with sensible conditions
-validation of one of the inputs
(1 per -, max 10) [10]

8 **(i)** Adv: See first hand the system operating/may spot problems actual users do not see
Dis: People do not act naturally if they are being watched/only see a snapshot. [2]

(ii) Adv. Detail can be explored/direction of enquiries can be altered
Dis. Very time consuming [2]

(iii) Adv. Shows how data is collected/shows data that needs to be collected/shows information that needs to be output.
Dis. Documentation often difficult for an outsider to understand/Privacy issues/ Relevance of files [2]

9 **(a)** -Technique of measuring by callipers…
-probably by shining laser light at metal and measuring shadows produced.
(or other sensible method) [2]

(b) **(i)** -Range check *(or a description of range check)*
-Between a maximum which will fit in machine/minimum must be greater than finished length. [2]

(ii) -Value input twice
-Computer compares two values, if different, then error
-Visual check
-Operator looks at value typed in as it appears on screen and checks it is correct. [4]

10 -Graphs/e.g. to show temperatures of machines
-Printed reports/hard copy/e.g. to show details of the day's output
-On screen image/e.g. showing progress of jobs on each machine
-Lights or sound/e.g. to show alarm for machine, or a machine requiring attention.
(2 per -, max 3 -, max 6) [6]

11 **(a)** -Monitor
-e.g. to allow operator to see immediate confirmation of inputs (when changing parameters)
-Printer
-e.g. to retain permanent copy for records
-buzzer
e.g. to signify that change is accepted/not passed validation procedures
(1 per -, max 2 pairs, max 4) [4]

(b) -replicates a hard copy form
-Areas of screen reserved for specific inputs
-Instructions can be supplied
-Radio buttons/drop down lists

-Does not allow any necessary data to be missed
-Input can be self-validating …
-Data to be input will be standard dependent on machine.
(1 per -, max 3 of first four points, max 4) [4]

12 -Worry about being made redundant
-Worry that they will not be able to cope with new system
-They will have to learn new skills
-new skills will mean better qualifications/more pay
-Much of tedium of job taken over by new system
-work may be made safer
-Management will be able to check up on their work through new system.
-de-skilling
(1 per -, max 5) [5]