**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Advanced Subsidiary Level and GCE Advanced Level**

# MARK SCHEME for the May/June 2012 question paper

# for the guidance of teachers

## 9691 COMPUTING

**9691/11** Paper 1 (Written Paper), maximum raw mark 75

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.

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

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

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**1 (a) (i)** – ROM is non volatile/RAM is volatile
– Data held on ROM cannot be altered/Data held on RAM can be altered

(1 per –, max 2) [2]

**(ii)** – Bootstrap/boot program / BIOS
– ...because it must be present when the computer is switched on

[2]

**(iii)** – Loads an operating system ready for use/runs start up sequences (including POST)

[1]

**(b) (i)** A peripheral which can accept data/allows data to be entered to a computer/processor as electrical pulses

[1]

**(ii)** A peripheral which allows information to be reported by a computer after data has been processed/in human readable form (or in a form suitable for reprocessing by the computer at a later date)

To give information from the computer/after processing [1]

**(c)** Input:
– Braille keyboard
– so that the secretary can feel the characters on each key
– Microphone
– so that the secretary can use voice recognition software to write documents

Output:
– Printer/Braille printer
– to produce documents for sending to other members of the league/for the secretary to keep
– Speakers
– so that documents can be read to the secretary using voice synthesiser

Storage:
– Hard drive/zip drive / CD, DVD, Blu-ray
– to permanently store the documents produced by the secretary
– USB flash memory stick/Pen drive
– to take back-ups of the files held on the hard drive in case of corruption

(1 per –, max 3 pairs, one from each category) [6]

**2 (a) (i)** The systems software which controls the operation of the computer.

**(ii)** Software to carry out a task which would need to be done if a computer was not available.

[1]

**(b) (i)**
– Custom-written is software which is written in response to a user's specific requirements.
– Off-the-shelf software is written to respond to the requirements of a group of problems that are similar/is available to buy / is immediately available. [2]

**(ii)**
– Immediately available
– tested with a wider range of users / tried and tested
– Ready trained work force
– Shared cost of development
– greater range of support / help
– Compatible with other software from same manufacturer/with software of other people/ organisations

(1 per –, max 4) [4]

**(c) (i)** To write the report / to enter text into a report / essay [1]

**(ii)** To store rainfall readings and make calculations/predictions about the readings / produce charts/graphs [1]

**(iii)** To produce the final report in a presentable form/ready for publication to combine text and graphics (easily) [1]

**(d)**
– Only one user is allowed access <u>at any one time</u>
– Users are allocated disk space to store their files, accessed by passwords
– Allows individual users to have different access rights to files and software
– Will appear to run more than one piece of software at a time.../ or by example
– ...by allowing each piece of software a slice of processor time

(1 per –, max 4) [4]

**3** TRANSACTION PROCESSING

**(i)** immediate updating of files / immediate response to user

**(ii)** – e.g. airline booking / any booking system [1]

**(iii)** – avoids double booking / overbooking
– confident booking has been made because of immediate response [2]

CONTINUOUS MANUFACTURING PROCESS / MONITORING

**(i)** where the current output affects the next input [1]

**(ii)** – e.g. any control/ monitoring application [1]

**(iii)** – needs response in a reasonable time/immediate
– safety implications needing reasonable response [2]

**4** **(i)** – Reader reads the position of a mark on the paper document
– The position is then translated into information
– light reflected more from no mark / less where mark made
– e.g. School register/lottery ticket/...

(1 per –, max 3) [3]

**(ii)** – Reader reads shape of character
– Shape compared with library of shapes stored in computer
– e.g. Document reader for blind/to input documents to word processor/digitising handwriting / copy from a hard copy into a computer / to read characters on a cheque

(1 per –, max 3) [3]

**5** – Is the technology/hardware available to solve the problem
– to determine if the new system is viable
– Is it economically possible to produce the solution
– Will the end product be so expensive that it bankrupts the company
– Are the social effects likely to be too damaging
– Are there enough skilled people available to make the solution operate effectively / e.g. is cost of training employees too high
– can the new system be created in a time effective manner
– Is the solution legal?
– is it operationally feasible?

(1 per –, max 5) [5]

**6**
– reference to safety to avoid accidents
– interface design to ensure smooth running
– interface design reflects needed level of detail / is relevant
– some information is time critical / safety critical
– Use of colour should be consistent
– Use of position for different types of information must be consistent
– Use of sound / flashing interface in a critical situation
– Input should be minimal
– any necessary input should be straight-forward

(1 per –, max 6) [6]

**7** **(a)** **(i)** 0100010110 [1]

**(ii)** 172 [1]

**(b)** **(i)** e.g. 'A'/"A"/"5" [1]
e.g. 01012012 / 20120101 [1]

**(ii)**

| Field name | Data type | Reason |
|---|---|---|
| StudentName | String/text/alphanumeric | Non-numeric characters |
| NumberOfPrizesWon | Integer/int/Short/Byte | Must be a whole number and will be small in size |
| AverageExaminationMark | Single/Real/Float | Must allow fractions if they are necessary though great precision not necessary |

If wrong data type do NOT allow reason

[6]

**8** **(a)** **(i)**
– share devices
– data/files/software
– can be used for communication between users/email
– to remotely manage computers [2]

**(ii)**
– In parallel a group of bits (often a byte) are transmitted at the same time
– down multiple wires [2]

**(b)** Packet switching
– data is split into packets
– packets may travel through different paths/routes
Advantages:
– difficult for an outsider to be able to hack into a message
– Does not tie up a particular route
– adaptive routing
Disadvantages:

– Message is only received as fast as the slowest packet
– Packets need to be reordered on arrival
– slow to spot missing packets

Circuit Switching
– data is split into packets
– a single route is reserved to transmit the packets (data)

Advantages:
– Packets do not need to be reordered on arrival
– guaranteed bandwidth

Disadvantages:
– Path is tied up for the duration of transmission
– path must be set up which takes time

(1 per –, max 6) [6]

**9** **(a)**

| A | B | X |
|---|---|---|
| 0 | 0 | **1** |
| 0 | 1 | **0** |
| 1 | 0 | **0** |
| 1 | 1 | **0** |

(1 mark for the 1,0 and 1 mark for 0, 0) [2]

**(b)**

| A | B | C | D | Y |
|---|---|---|---|---|
| 0 | 0 | **0** | **1** | **0** |
| 0 | 1 | **1** | **0** | **0** |
| 1 | 0 | **1** | **1** | **1** |
| 1 | 1 | **1** | **0** | **0** |

(1 mark for each row). [4]