UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2009 question paper

for the guidance of teachers

9691 COMPUTING

9691/12 Paper 12 (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, 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.

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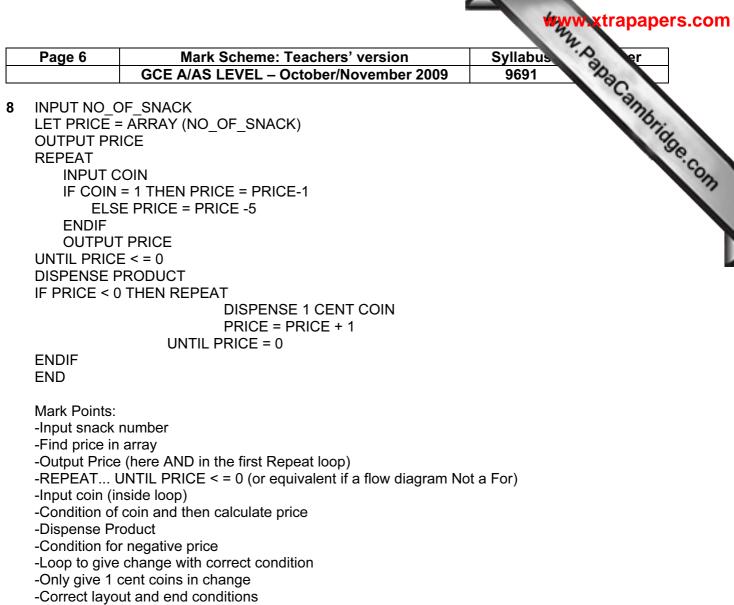
CIE is publishing the mark schemes for the October/November 2009 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 (a) (i) -e.g. To transfer work from home to school/take backups of system
-small/portable/works with any computer/stores a lot of data

(ii) -e.g. To import software/to make backups of data on system/encyclopaedias/films
-large capacity/fast access times/can be used many times/re-writeable [2]

(iii) -e.g. To play music while working/encyclopaedias/to import software
-Compatible with form of albums/large storage capacity/can not be altered [2]
(Note: Accept any sensible application)

(b) -hard drive
-to store data files/software/operating systems [2]
(Note: Other storage may be justified but the question states 'need')

2 (a) (i) Software that manages the computer hardware/allows applications to run

(ii) General purpose software/carries out a number of tasks/that would have to be done
even if there was no computer.

(iii) Software used to convert a program of instructions from one language to another

(iv) Part of O.S. which carries out a commonplace task/housekeeping.
(1 per dotty, max 4) [4]

(b) -Many of the processes will be dangerous...
-many of the processes will be complex
-and must be supervised in real time...
-information must be immediately available
-Small number of operators and...
-there will be a large amount of information...
-which must be prioritised...
-to avoid information overload.
-Some less important data...
-e.g. relating to non time crucial processing
-should be kept for later at non busy time
-Use of priority symbols like colours/inverse video/flashing/sound alarms...
-should be minimised because overuse causes reduction in effect.
-Use of graphics to illustrate processes and effects of parameters on processes
(1 per -, max 6) [6]

3 (a) (i) The characters that a system can recognise/characters on the keyboard [1]

(ii) -Each character assigned a unique binary code...
-Known as a byte/Typically 8 bits
-lower case/upper case in separate orders to allow alphabetic order
-One bit reserved for parity check.
-Meaning 128 characters can be represented
-Extended ASCII uses all 8 bits for characters, ignoring parity
(1 per -, max 3) [3]

(b) (i) Check input to ensure it is sensible/follows set rules for data

(ii) -Type check/character check
　　　　-Ensure characters are all letters
　　-Length check
　　　- >1 and <20 (e.g.) characters entered
　　-Existence check
　　　　-Compare with file to see if there is this name there
　　(1 per -, max 2 pairs, max 4)　　　　　　　　　　　　　　　　　　　[4]

(c) 10000111
　　(1 per nibble)　　　　　　　　　　　　　　　　　　　　　　　　　　[2]

(d) -Multiply 250 and 10000
　　-Add 10%
　　-Signify that should divide by 1024...
　　-Twice
　　-Answer between 2.35 and 2.75
　　-M bytes
　　(1 per -, max 5)　　　　　　　　　　　　　　　　　　　　　　　　[5]

(e) (i) -To keep track of numerical/currency values
　　　　-and do automatic calculations
　　　　-e.g. calculate fines/membership fees/library accounts
　　　　(1 per -, max 2) (keep records of books/borrowers)　　　　　[2]

(ii) -To create slide shows for public performance
　　　-Allows use of sound/video/animation/...
　　　-e.g. to present lessons about famous authors to parties of school children
　　　(1 per -, max 2)　　　　　　　　　　　　　　　　　　　　　　[2]

(iii) -To produce personalised letters/documents...
　　　-by searching file for data and inserting into standard document
　　　-e.g. Producing letters to members who have outstanding books
　　　(1 per -, max 2)　　　　　　　　　　　　　　　　　　　　　　[2]

4 (a) (i) Advantages:
　　　-Hardware can be shared making system cheaper to set up
　　　-Software can be shared making system cheaper to set up
　　　-Hardware and software can be shared making it possible to provide more unusual items
　　　-Any machine can be used for all information
　　　-Software installation made easier
　　　-More easy to manage/control/maintain
　　　-communication is easy between the machines
　　　(1 per -, max 3)
　　　Disadvantages:
　　　-Data is not as secure as when stored on stand-alone machines
　　　-Can be bottlenecks when peripherals are used e.g. using a shared printer.
　　　(1 per -, max 1)　　　　　　　　　　　　　　　　　　　　　　[4]

(ii) -If data being communicated is to be stored at receiver for future use, then the ... can be slow

-If data being communicated is to be used immediately upon arrival then the bit rate used for communication must be faster than the rate at which the data is used.

-bit rate is the number of bits per second [2]

(b) -Modem

-to link LAN to communication medium

-Gateway/Router

-to connect two different networks together

-Firewall

-to protect LAN from unwanted access

-proxy server to allow one Internet connection for whole network

(1 per -, max 4) [4]

5 (a) -Off-the-shelf is a generally available package

-Custom-written is specially produced for the problem solution [2]

(b) -Ready tested/Bug free

-Immediately available

-Training available

-Staff who can use it are available

-Cheaper because of shared development cost.

-compatible with other software

(1 per -, max 3) [3]

6 (a) -Iteration means to repeat a series of steps

-in a given sequence

-The steps and the sequence are shown/it is not possible to depart from the sequence

-The sequence can be entered at any point

-Steps can be repeated as often as is necessary.

(1 per -, max 3, accept answer formed around the stages on the diagram) [3]

(b) -Is solution technically feasible?

   -e.g. Does the hardware exist to automatically identify a student?

-Is the solution economic to produce?

   -e.g. Will the extra costs make the food more expensive?

-Is the solution economic to run?/Will it cut costs in the cafeteria?

   -e.g. Will we need to employ more people, hence increasing costs?

-What will the social implications be?

   -e.g. Will the new system cater for the disabled students?

-Is the skill level among staff high enough?

   -e.g. Will the cafeteria staff have to do a training course?

-Time constraints

   -e.g. The changeover must be finished by the end of a holiday

(1 per -, max 3 pairs, max 6) [6]

7 (a) (i) -Card has a strip of magnetic material...
-which holds data
-in this case student ID number
-Read by swiping through a card reader.
(1 per -, max 2)

(ii) -Is only activated by input of PIN at number pad...
-which is stored in computer system, not on card / is stored on (one of the other two areas of the) magnetic stripe
-photo ID on card
-Ability to freeze account so items cannot be charged to it
(1 per -, max 2)   [4]

(b) -Staff can inspect their own data...
-at any time...
-in order to check its accuracy
-Access to data limited to small/named number of people...
-Password/Physical security
-Data up to date and accurate
-Data erased when no longer needed
-Only relevant data for this example is stored.
(1 per -, max 6)   [6]

(c) (i) -Data is collected
-Processing carried out at quiet time
-Probably with no human intervention
-Process is not time critical
-Preparation of monthly statements
(1 per -, max 2)   [3]

(ii) -Real time
-Customer requires result as soon as data has been input   [2]

(d) E.g.
-Report of popular/unpopular food items...
-provided by the cumulative totals of orders made
-Report on times that are popular among students/staff...
-provided by mean total takings against time
(1 per -, max 2)   [2]

8   INPUT NO_OF_SNACK
     LET PRICE = ARRAY (NO_OF_SNACK)
     OUTPUT PRICE
     REPEAT
         INPUT COIN
         IF COIN = 1 THEN PRICE = PRICE-1
            ELSE PRICE = PRICE -5
         ENDIF
         OUTPUT PRICE
     UNTIL PRICE < = 0
     DISPENSE PRODUCT
     IF PRICE < 0 THEN REPEAT
                        DISPENSE 1 CENT COIN
                    PRICE = PRICE + 1
             UNTIL PRICE = 0
     ENDIF
     END

     Mark Points:
     -Input snack number
     -Find price in array
     -Output Price (here AND in the first Repeat loop)
     -REPEAT... UNTIL PRICE < = 0 (or equivalent if a flow diagram Not a For)
     -Input coin (inside loop)
     -Condition of coin and then calculate price
     -Dispense Product
     -Condition for negative price
     -Loop to give change with correct condition
     -Only give 1 cent coins in change
     -Correct layout and end conditions
     (1 per -, max 9)   [9]