MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

9691 COMPUTING

9691/13   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) - It is necessary to be able to alter them/faster access to the data   [1]

      (iii) - Parts of operating system <u>in use</u>
             - Parts of applications software currently <u>in use</u>   [2]

   (b) - Purpose is to store files/software/O.S....
        - To store files/software/O.S. because RAM is too small to do so
        - ...when the computer is switched off because there is nowhere else to store them/RAM
           is volatile
        - ...to act as a back-up of files in case the main copy in use is corrupted
        - if portable device, allow files to be transferred to another computer
           (1 per -, max 2)   [2]

   (c) Input   - Sensor of suitable type (Touch/pressure/radar/...)
                      - so that the computer can know when an object is blocking the robot's path
                   - Keypad/Touch Screen
                      - to allow instructions to be given to the robot

        Output: - Actuator
                    - to control the motors driving the wheels
                 - LED screen
                    - to show program choices made
                 - Buzzer/beeper/speaker
                    - to allow warning if error/battery power low/dust bag full

        Storage:- ROM/solid state storage
                   - to store the control program for the robot
        (1 per -, max 3 pairs, max 6)   [6]

2 (a) (i) The systems software which controls the operation of the computer. [1]

(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 in a shop. [2]

(ii) Advantages
- Individually produced and specific to requirements
- No unused facilities wasted

Disadvantages
- Will be a lengthy process to produce it/not immediately available
- high cost because have to pay for whole development cost
- Workforce will need training to use it because they will not have used it before

(1 per -, max 4) [4]

(c) (i) To give customers visual representation of what their kitchen will look like with the new appliances [1]

(ii) To store details of potential customers who arrange a visit / taking orders [1]

(iii) To produce an audio visual presentation to attract people in the mall [1]

(d) - Many users can use the same computer simultaneously...
- ...while believing they are the only user
- Each user is given a slice of computer time in turn...
- before going on to the next
- Will eventually get back to first on a round robin basis
- This is repeated so quickly that there is no discernible delay for the user
- Use of flags to indicate if processor time is required
- Some terminals may be of a higher priority and hence have more time.
- users need login name and password
- each user's "work" is stored in different parts of computer memory

(1 per -, max 4) [4]

3   (i)   One where the required data is collected together before processing/processed all in one go
[1]

   (ii)   -   e.g. Payroll production/utility billing/cheque clearing at banks

   (iii) -   The pay of a worker cannot be calculated until all the data about work done is collected
       -   The pay is calculated at the end of the week/all the calculations are similar/large amounts of data   [3]

4   (i)   -   Barcode is a series of dark and light lines of varying widths
     -   The widths are measured by shining a laser light onto the lines
     -   Pairs of lines stand for digits in the barcode
     -   e.g. Checkout till in a supermarket
   (1 per –, max 2 of first 3 points + last point, max 3)   [3]

   (ii) -   Three strips of information available on each card/small amount of data is stored
     -   The stripe is read by swiping the stripe through a card reading machine
     -   e.g. Paying for goods by credit card
   (1 per –, max 2 of first 3 points + last point, max 3)   [3]

5   -   Corrective maintenance
  -   To solve any problems/bugs that may arise with the software
  -   Adaptive maintenance
  -   To alter the solution in order to take account of external influences e.g. the factory wins an order requiring SI units as opposed to metric ones
  -   Perfective maintenance
  -   To alter the solution to improve performance
(1 per -, max 5)   [5]

6   -   The interface will need to hold the attention of the child...
  -   ...use of colour will be important/..use of animation/..use of cartoon characters/...large size for any numbers displayed
  -   Sound must be used to encourage children...
  -   ...e.g. perhaps a fanfare for a right answer
  -   Must consider special needs of children:
  -   …e.g. are they colour blind/are they disabled...?
  -   Consideration must be given to the way the child interacts with the interface...
  -   ...use of touch screen/use of speech into microphone...
  -   Appropriate level of language used/level of difficulty
  -   Appropriate use of feedback
  -   Relevant/limited content only shown
(1 per -, max 6)   [6]

7 (a) (i) 00110 11110 [1]

(ii) 108 [1]

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

(ii)

Field name	Data type	Reason
SupplierName	**String/Text**	**Non-numeric characters**
MinimumStockLevel	**Integer/int/Short/Byte**	**Must be a whole number and will be small in size**
Price	**Decimal/Single/Float/Currency/Real**	**Must allow currency to two decimal places**

If wrong data type do NOT allow reason

[6]

8 (a) (i) - Computers are geographically remote
- Communication links are typically provided by a third party/telephone link
- Will allow communication between the different LANs.
(1 per -, max 2) [2]

(ii) - Single bits are transmitted in sequence
- …down a single wire [2]

(b) (i) - Type of parity (odd or even) is agreed by both devices concerned with the communication
- Transmitting device counts number of 1 bits in the byte
- One bit is reserved for parity bit
- This parity bit is set to 1 or 0 in order to make the number of 1s in the byte an odd or even number dependent on what type of parity is used
- receiving device on receipt of byte counts number of 1s
- …odd number of 1s in even parity gives an error
/even number of 1s in odd parity gives error
(1 per -, max 3) [3]

(ii) - odd parity is used
- byte number 5 has an even number of 1s therefore an error
- Column 4 has an even number of 1s
- Therefore the 0 in row 5, column 4 needs to be changed to 1
(1 per -, max 3) [3]

9 (a) A B X
    0 0 1
    0 1 1
    1 0 1
    1 1 0
(1 mark for the 1,1 and 1 mark for 1, 0)   [2]

(b) A B C D Y
    0 0 0 1 1
    0 1 0 0 0
    1 0 0 1 1
    1 1 1 0 1
(1 mark for each row).   [4]