MARK SCHEME for the October/November 2014 series

9691 COMPUTING

9691/12   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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2014 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

1 (a) (i) <u>advantages</u>

- immediate benefits
- because no need to phase introduction (benefits are immediate)
- less expensive no need to employ additional staff
- less likely to fail (fully tested system)

[1]

(ii) <u>disadvantages</u>

disastrous if it does fail … no fall back position
no opportunity for live training

[1]

(b) Any **three** from
- installation of hardware
- installation of software
- transfer of files to the new system
- training of the staff
- setting up security / access control features

[3]

(c) <u>requirements specification</u>

- description of what the <u>customer / (end) user</u> wants the system to do
- document that defines the <u>customer's / (end) user's</u> needs
- so that it is possible to check if final system meets the analysis
- outcome of the analysis stage of systems life cycle

<u>design specification</u>

- describes how a system performs the requirements outlined in the requirements specification
- may include specific details (accept examples e.g. inputs, flowcharts, screen layout, data type, validation etc.)
- defines the objectives of the system

[2]

2 (a)

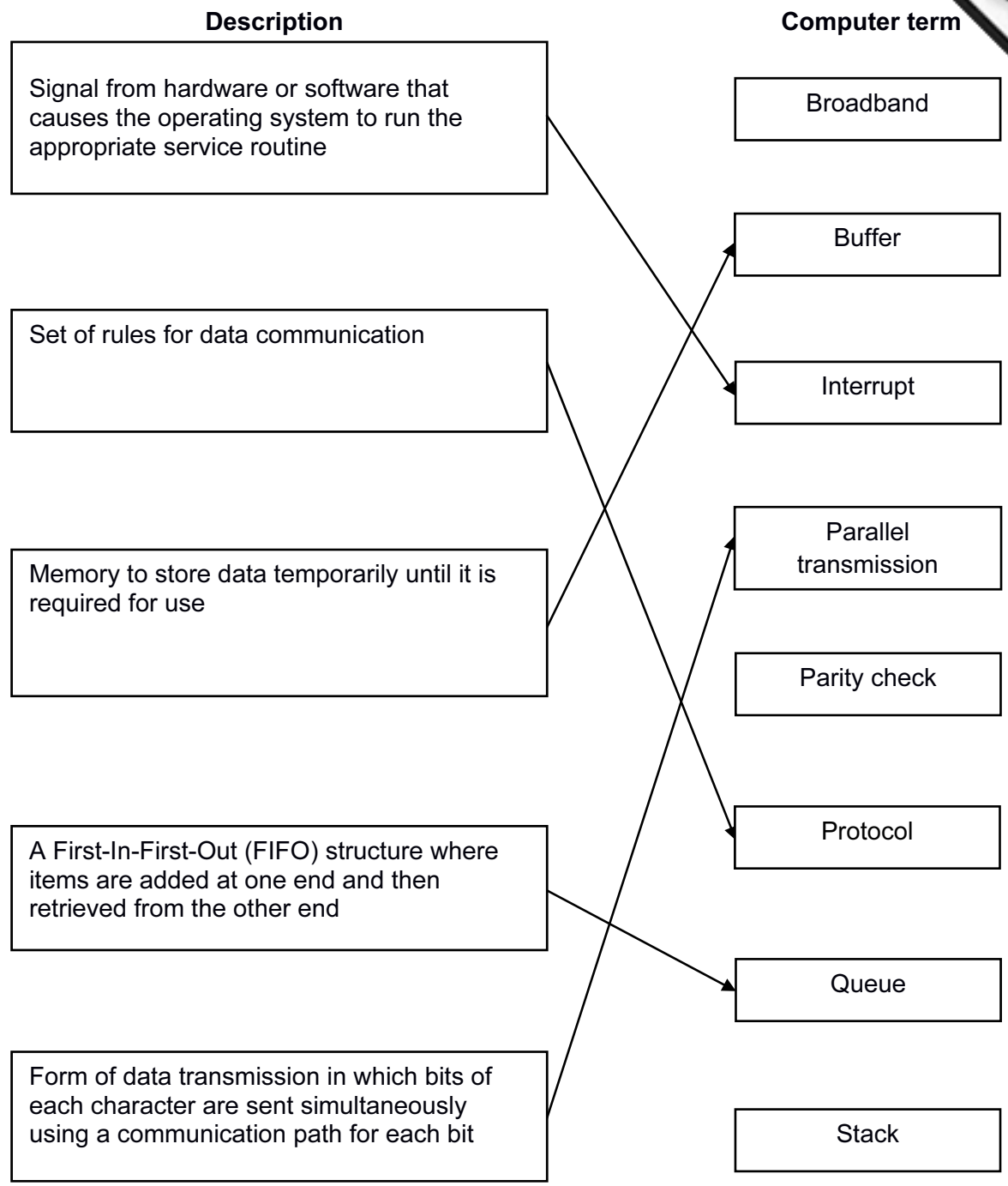| Description of field	Data type
Name of the film	- string - text
Running time (minutes)	- integer
Category (A, B or C)	- Character
Available on Blu-ray	- Boolean

[4]

(b) Any **two** from:

- microphone
- voice recognition
- voice output
- speakers
- accessibility options (e.g. larger icons / larger fonts / high contrast font)
- braille keyboard
- braille printers

[2]

3

Description		Computer term

Description **Computer term**

Signal from hardware or software that causes the operating system to run the appropriate service routine

Broadband

Buffer

Set of rules for data communication

Interrupt

Parallel transmission

Memory to store data temporarily until it is required for use

Parity check

Protocol

A First-In-First-Out (FIFO) structure where items are added at one end and then retrieved from the other end

Queue

Form of data transmission in which bits of each character are sent simultaneously using a communication path for each bit

Stack

[5]

4 (a) <u>magnetic</u>

- hard disk, portable hard disk (drive)
- floppy disk
- magnetic tape

<u>optical</u>

- DVD
- CD
- DVD-RAM
- Blu-ray

<u>solid state</u>

- pen drive / flash drive / memory stick
- memory cards
- SSD (solid state drives …. replacing hard disk drives in computers)

[3]

(b) the use given should match up with example given in part (a)

<u>magnetic</u>

- store applications software (hard disk drive)
- store operating system (hard disk drive)
- store files for later use (all examples)
- allows transfer of files/data between computers (floppy, mag tape, portable hard disk)
- back up system (floppy, mag tape, portable hard disk, solid state)

<u>optical</u>

- store multimedia/music/video (all examples)
- allow transfer of files/data between computers (all examples)
- allows simultaneous read/write ops to record live whilst watching live (DVD-RAM)
- used for archiving

<u>solid state</u>

- allows <u>transfer of files/data</u> between computers (pen/flash drive)
- storage of photos (memory card)
- security dongle (pen/flash drive)
- store application software (SSD)
- store operating system (SSD)

[3]

(c) Any **two** from:

- longer media life (very stable)
- not affected by magnetic fields / static electricity / finger prints
- almost no risk of head crash since the read/write head doesn't need to be very close to the disk surface (unlike magnetic media which are very prone to head crash)
- very good for archiving since several forms of optical media are write-once, read-many format and cannot be over-written
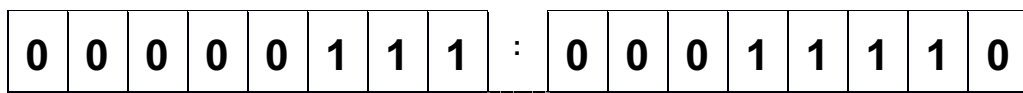
[2]

5 (a) 1 8 : 5 3

     (1)   (1)

[2]

(b)

0	0	0	0	0	1	1	1	:	0	0	0	1	1	1	1	0

< - - - - - - - - - - - 1 mark - - - - - - - - - - - > < - - - - - - - - - - - 1 mark - - - - - - - - - - >

[2]

(c) Any **two** from:

- contents of locations C and D are checked against contents of locations A and B
- if A matches with C and B matches with D
- then the microprocessor sends a <u>signal</u> to sound the alarm

[2]

(d) Two marks maximum for each method described. One mark per point.

method 1

- use a (light) sensor
- signals/data from the sensor (continuously) sent to <u>microprocessor</u>
- sensor data is compared to pre-set data stored in memory
- if data from sensors < pre-set stored data
- reduce voltage to LED
- signals sent to lower the back lighting

(ignore any reference here to use of ADC/DAC)

method 2

- known timings when it normally gets dark (in that location)
- for each day of the year are stored in microprocessor memory
- microprocessor loads darkness time for the relevant day into memory
- microprocessor continually checks this time/value against data in registers A and B
- if they match
- reduce voltage to LED
- signals sent to lower the back lighting

method 3

- the alarm clock is linked to the Internet (using WiFi)
- website stores times when it normally gets dark/dusk/sun down (in that location)
- the relevant darkness time for the day is loaded into the microprocessor memory
- microprocessor continually checks this time/value against data in registers A and B
- if they match
- reduce voltage to LED
- signals sent to lower the back lighting

[4]

(e) RAM

- stores the current time
- stores the settings (e.g. alarm time)

ROM

- stores start up procedure in case power lost to the clock
- stores instructions to operate clock

[2]

6 (a) (i) Any **two** from:

- one FOR … TO loop
- with x values 1 to 8 (0 to 7)
- to store names in array **team_name(x)**
  (accept description or algorithm/pseudocode
  e.g. 1D array
      of 8 elements / indexed
      of type STRING)

                            [2]

(ii) Any **three** from:
- two FOR … TO loops
- with values 1 to 8 (0 to 7) for x and 1 to 6 (0 to 5) for y
- to read numerical values from table into array **league_table(x, y)**
  (accept description or algorithm/pseudocode
  e.g. 2D array
      of 8×6 elements / 8×6 index
      of type INTEGER)

                            [3]

(b) Any **four** from:

- one FOR … TO loop
- with x values 1 to 8 (0 to 7)
- checks if **league_table(x, 3) > 2 (or league_table(x, 2) > 2)**
- if it is, then prints out name from array **team_name (x)**
  (accept description or algorithm / pseudocode)

  (FOR x ← 1 TO 8
  IF league_table (x, 3) > 2 THEN PRINT team_name (x)
  NEXT x)

                            [4]

7 (a) 1 mark for each correct 4 lines of output.

inputs				Outputs		
sensor 1	sensor 2	sensor 3	sensor 4	A	B	C
0	0	0	0	0	0	0
0	0	0	1	0	0	1
0	0	1	0	0	0	1
0	0	1	1	0	0	1
0	1	0	0	1	0	0
0	1	0	1	1	0	1
0	1	1	0	1	1	1
0	1	1	1	1	1	1
1	0	0	0	1	0	0
1	0	0	1	1	0	1
1	0	1	0	1	0	1
1	0	1	1	1	0	1
1	1	0	0	1	0	0
1	1	0	1	1	0	1
1	1	1	0	1	1	1
1	1	1	1	1	1	1

[4]

(b) (i) 1 mark for red and yellow, 1 mark for white and blue

sensor 1	sensor 2	sensor 3	sensor 4	coloured light
0	*0*	*0*	*1*	**red**
1	*0*	*0*	*1*	**yellow**
1	*1*	*1*	*0*	**white**
0	*1*	*0*	*0*	**blue**

[2]

(ii) 1 mark for each correct content:

0	*0*	*0*	*1*	*0*	*0*	*0*	*0*

0	0	1	1	0	1	0	0

0	1	0	0	1	0	0	1

0	0	0	1	1	1	0	1

[3]

8 (a) (i) 3 marks maximum for circuit switching and 3 marks maximum for packet switch...

circuit switching

- path decided on before the data transmission starts
- system decides on which route to follow / reserved
- and transmission goes through this path/route / one route
- for whole length of communications session the route is dedicated and exclusive
- route only released once data transmission stops

packet switching

- packets are reassembled / reordered at the destination
- packets include destination / senders address
- packets include a sequence number
- packets are sent towards destination independent of each other
- each packet has to find its own route to the destination
- decision as to which path/route to take decided when each *node* is reached
- nodes are switches, routers, etc.
- each packet finds its way based on the information it carries

[4]

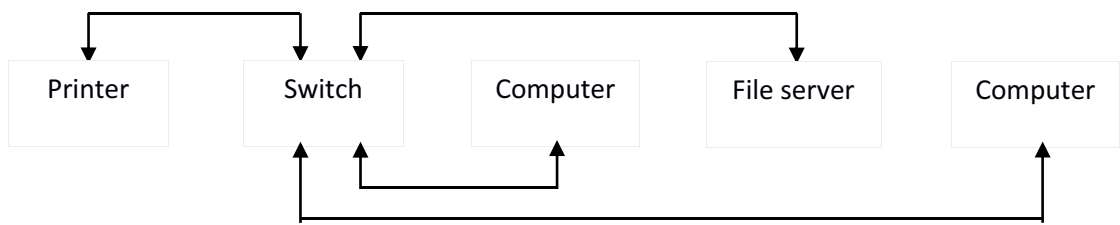   (ii) - packet switching

[1]

   (iii) Any **three** from:

- can multi-task
- easier to have conferencing calls /or comparison to phones
- video calls are possible

- drop out / loss of packets
- echoing

[3]

(b) (i) 1 mark for lines from switch to the 2 computers, 1 mark for line from switch to printer and 1 mark for line from switch to file server

Printer	Switch	Computer	File server	Computer

[3]

   (ii) Any **one** from:
- each device could use a different type of line / cable
- if one segment goes down the rest of the network is not affected
- it is easier to track down a fault
- it is easier to expand a star network if required
- better security

[1]

9   (a) **One mark from each:**
        knowledge base:

- complex data storage and retrieval system
- contains the data/information gathered <u>from experts</u>

rule base:

- stores the rules used by the inference engine
- allows inference engine / set of rules used to draw conclusions

inference engine:

- applies rules in rule base to knowledge base
- acts as a reasoning engine
- uses facts/knowledge base to draw conclusions

[3]

   (b) Any **two** from:

- allows simple navigation
- use of yes/no type of questions
    / OR multiple choice type questions
    / OR graphic display (test here)
- simple touch screen to select responses
- output screen to display results
- % probability of fault output on screen

[2]

   (c) 1 mark for off-the-shelf feature and 1 mark for custom-written feature:

Off-the-shelf software:

- available straight away
- less expensive since costs shared by other users
- network of users / discussion groups / more training options
- more likely to be fully tested in a number of different scenarios
- more likely to be compatible with other software

Custom-written software:

- time to develop the software from scratch
- will only meet the demands of the user / no unnecessary features
- need to rely on software developers if a fault occurs / requirements change
- only available to a single organisation

[2]