CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

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.

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International Examinations

1 (a) (i) advantages

- 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) disadvantages

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) requirements specification

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

design specification

- 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

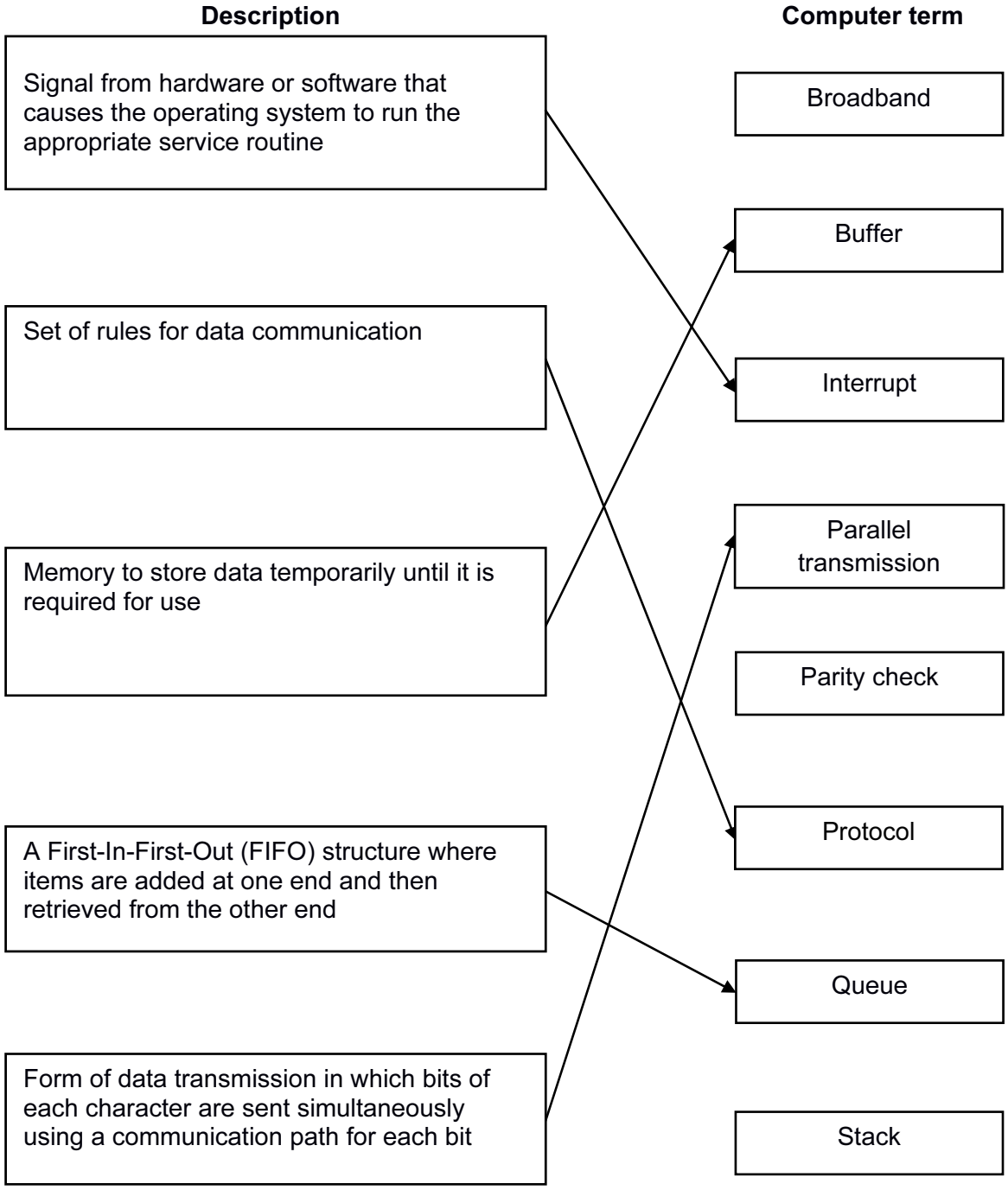
[4]

(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



[5]

4 (a) **magnetic**

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

optical

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

solid state

- 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)

magnetic

- 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)

optical

- 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

solid state

- allows transfer of files/data 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

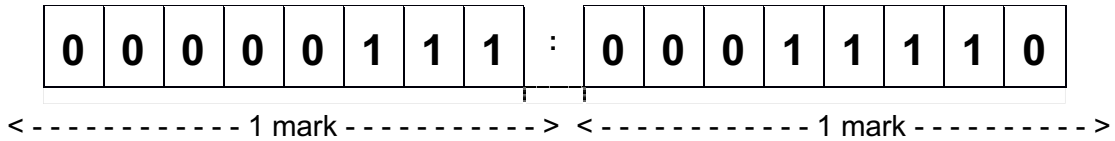
[2]

5 **(a)** 1 8 : 5 3

(1) (1)

[2]

(b)



[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 signal 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 microprocessor
- 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 × 6index
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**

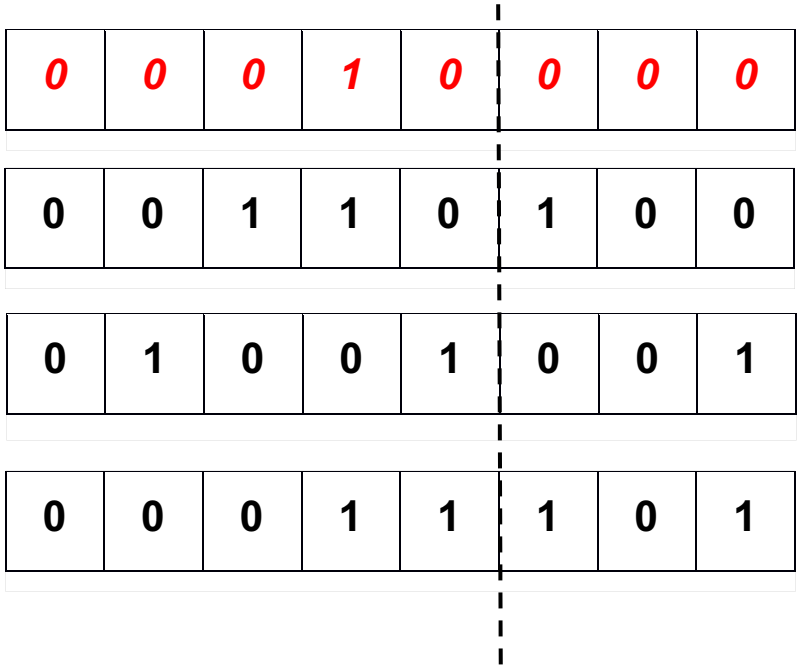
[4]

(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:



[3]

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

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]

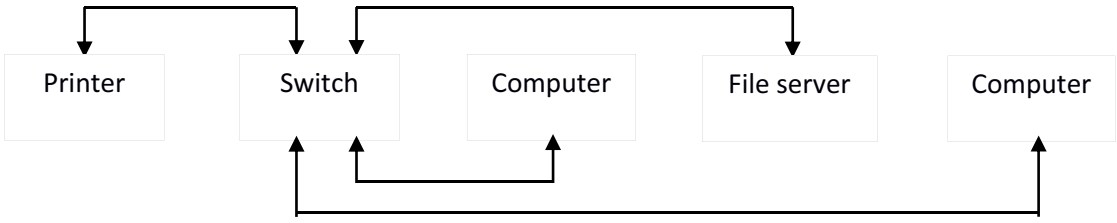
(iii) Any **three** from:

- 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



[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 from experts

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]