CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the May/June 2015 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 May/June 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

CAMBRIDGE
International Examinations

1 (a)

	Red				Orange
Green	Green	Green		Blue	Blue

1 mark for columns 1–4
1 mark for final two columns
Allow reverse fill i.e. from top down. **[2]**

(b)

Green				
Green	Red			
	Red			
		Blue		
		Blue	Orange	

1 mark for 1st 4 rows, 1 mark for bottom 2 rows (Allow reverse i.e. fill from RHS)
[2]

2 (a) buffer

- temporary storage area/memory

Interrupt

- signal sent from a device/program requesting / to get processor's attention

[2]

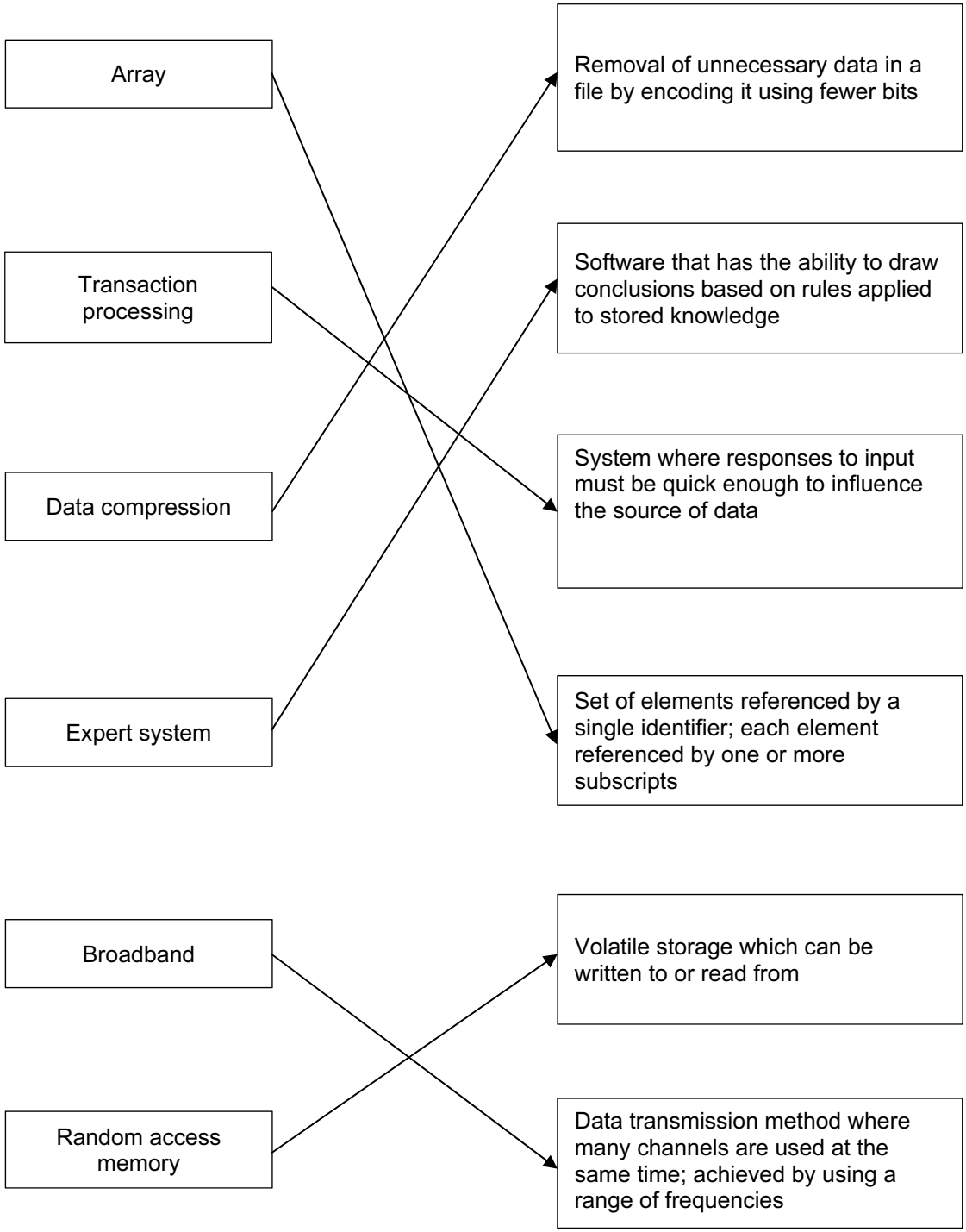
(b) Any **four** from:

- operating system/processor sends data to the printer buffer
- the data in the buffer is emptied to the printer
- meanwhile processor carries on with other tasks

- any reference to double buffering to speed up printing process
- once the (printer) buffer is empty, an interrupt is sent to the processor …
- requesting more data to be sent to the buffer
- the request is serviced depending on its order of priority

[4]

3



Subtract 1 mark for each incorrect line

[5]

4 (a) 1 mark for first 3 items in their correct places + 1 mark for last 2 items in correct places

address	record
0	
1	
2	
3	2003
4	
5	
6	
7	4007
8	7008
~	~
96	
97	3097
98	6098
99	

[2]

(b) (i) record 3097 will be over-written

[1]

(ii) 1 mark for name/description and a further mark for more detail

use an overflow area / bucket
- any record subject to collision is placed serially in overflow area
- set flag (to show overflow in use)

use of linked lists
- original location acts as head of list and points to list of any records
- that have been subject to a collision/use of tag

next location after occupied one is used if not yet occupied
- this process continues until an empty location is found

use a secondary hashing algorithm
- to generate a new address for the record **[2]**

5 (a) Any **three** from:

- obsolescence of existing hardware and software
- inability to repair existing equipment/obtain spare parts
- improved/better hardware / software + reason
- company that produced original software/hardware is no longer in business
- no longer possible to get technical support for existing hardware/software
- changes in technology over the years
- expansion of the power station
- need to improve the overall reliability
- changes to rules or legislation / changes to company policies

[3]

(b) (i) 1 mark for name + 1 mark for description
Name and description MUST match

direct changeover
- system is installed immediately/overnight/in one go, benefits are noticed straight away

pilot implementation
- new (monitoring) system will be installed for one reactor /control room only, the remainder rolled out if it works

phased implementation
- part of the new system is installed and fully tested before any other parts are introduced

[2]

(ii) parallel implementation – since the old and new system cannot operate concurrently

Accept: 'Direct' if not used for (i) since this method may be regarded as unsafe **[2]**

(c) 1 mark for description + 1 mark for appropriate example

corrective
- solve any bugs/problems in the software not removed during testing (or equivalent) / reported by the user
- example: a named problem related to the nuclear power station

adaptive
- alter the system to take into account changes in legislation, company policy.
- example: any law / policy change that is relevant to the power station

perfective
- alter solution to improve the overall performance of the system
- example: any change that is relevant to improve power station/monitoring performance.

[6]

6 (a)

application	storage medium
a programming text book provided with sample code in electronic form	**CD-ROM**
storage of photographs in a digital camera	**flash memory**
a backup of the complete PC file system; to be kept off-line	**external hard disk**
storage of the operating system and applications software	**internal hard disk**
simultaneous recording and playback of video files	**DVD-RAM**

[5]

(b) (i) flash memory **[1]**

(ii) Any **two** from:

- more robust / no moving parts / if dropped less likely to be damaged
- physically small
- don't have to wait to reach "running speed"
- low energy consumption
- low heat generation
- faster access time / latency
- More read / write cycles // longer longevity

[2]

7 (a) (i) 1 mark for each feature + 1 mark for each drawback

laser printer features
- high speed printing
- suitable for large volume printing
- high quality printing

drawbacks
- expensive to buy toner/diffuser
- produce ozone/toner particulates in the air

inkjet printer features
- high quality colour printing

drawbacks
- large print runs require frequent changing of cartridges
- ink needs time to dry or it smudges
- heads can clog up with ink if left standing
- expensive running costs / high cost of ink
- too slow for large print runs

[2]

(ii) 3D printer features
- builds up a solid object by “printing” thin layers (tomography technique)
- creates prototypes
- solid objects actually work which is ideal for CAD work
- many types now exist that use resin, powdered metal, paper, plastics, etc.

drawbacks
- expensive to buy
- very slow to produce output
- raw materials / consumables expensive to buy
- can only produce items of a small size

(graph) plotter features
- ability to produce very large drawings/blueprints
- they use “pens” to draw lines / accurate shapes

drawbacks
- expensive to purchase / maintain
- very large footprint
- slow plotting process

[2]

(b)
- barcode reader/scanner
- Keypad / numpad / number pad
- Touchscreen / touchpad
- Mouse

[4]

8 (a) (i) 1 mark for each pair of rows

Inputs			Working space	Output
A	B	C		X
0	0	0		0
0	0	1		0
0	1	0		0
0	1	1		0
1	0	0		1
1	0	1		1
1	1	0		1
1	1	1		1

[4]

(ii) input A only produces the same output

[1]

(b) (A is NOT 1 OR B is NOT 1) OR (B is NOT 1 AND C is 1) //

(NOT A OR NOT B) OR (NOT B AND C) //

$(A + \overline{B})$ $\overline{\ }$ + $(\overline{B}.C)$ //

IF (A = 0) OR (B= 0) OR (B = 0 AND C= 1)

[3]

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

9 (a) Any **three** from:

- use of video/animation catches attention of passers by
- use of sound/voice-overs/ to explain about courses, etc.
- use of multimedia if neither sound or animation
- shopping mall display likely to be more up to date / easier quicker to change / edit
- links to Internet / other web pages to allow passers-by to get course information
- more likely to be seen; newspaper easily thrown away/advert not seen

[3]

(b)

input	widget (GUI control)	justification
Name		
card number	text box	The exact number of 16–digits are required
email	text box	division into the constituent parts is made clear/ variable length fields
course code	drop-down list // combo box	Only certain values are permitted – No keying in required
start month	radio button	User selects from one of two possible options // choices are mutually exclusive
agreement	check box / tick box	User must select before submission
Back/Submit	Button / command button	Allows user to navigate through the software / to trigger an action

1 mark for each – widget name + description **[6]**

10 (a) Minutes: 61 Seconds: 28 **[2]**

(b)

A									B							
0	**1**	**1**	**0**	**1**	**1**	**1**	**0**	**:**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**0**

Must have the leading zeros **[2]**

(c) RFID/tag reader **[1]**

(d) Any **four** points from:

- runner detected at starting line, signal sent to microprocessor
- if analogue, signal converted to digital (by ADC)
- this triggers microprocessor to set registers A and B
- microprocessor starts counting / microprocessor records RFID ID and start time
- microprocessor constantly monitors/samples sensors at finishing line
- when athlete detected at finishing line, signal sent to microprocessor
- microprocessor stops counting / records RFID and stop time
- calculates running time

[4]