

**MARK SCHEME for the October/November 2013 series**

**9691 COMPUTING**

**9691/13**

(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 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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**1 (a) hardware**

- physical/electronic parts of the computer

**software**

- instructions/programs

**[2]**

**(b) 1 mark for each device + 1 mark for corresponding reason**

**input**

**touch screen**

- to choose where to sit in cinema
- select payment options
- select number of seats

**keypad**

- to input PIN
- to input number of seats

**magnetic stripe reader/card reader**

- to read data from credit card/debit card when making payment

**sensors**

- to count/recognise money if paying by cash for tickets

**output**

**printer**

- to print the tickets/receipt

**screen**

- instructions to the customer
- show prices of tickets
- show available seats on seating plan
- show which films are showing that week

**speakers**

- to indicate an error or that purchase procedure is OK

**[8]**

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- 2 (a) (i) 173 [1]
- (ii) (0) 1 0 0 1 0 0 1 [1]
- (b) - symbols recognised/used by a computer  
- often equates to symbols on a keyboard [2]
- (c) - represented by a set of bits  
- each set of bits is unique for each character  
- ASCII/UNICODE is a common set used  
- example of set of bits [2]
- 3 (a) 1 mark for name of software + 2 marks for reasons
- CAD
- reasons**
- 3D (modelling) is possible  
- possible to calculate cost of the final bathroom  
- has features such as rotate, zoom, vector diagram, etc.  
- possible to create drawings/blue prints  
- library of parts (available bathroom items, for example)  
- wire frames (for bespoke designs)  
- links with CAM (for specialist items) [3]

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**(b) (i)** Max of **three** points from:

- temperature sensor used here (NOT heat sensor)
- the sensor sends data continuously to microprocessor
- the data is first converted to digital (\*\*)
- microprocessor compares sensor reading with temperature selected by user
- if temperature is higher, then microprocessor will send a signal...
- ...to actuators to open cold water valve more ...
- ...and to reduce hot water flow by closing hot water valve
- if temperature is lower, then microprocessor will send a signal...
- ...to actuators to open hot water valve more ...
- ...and to reduce cold water flow by closing cold water valve
- if temperature is within acceptable range, no action taken
- if cold water supply fails, system shuts down
- if temperature  $\geq 35^{\circ}\text{C}$  and sensor detects human hand (for example), the system stops the water flow

**(ii)** Max of **three** points from:

- if hand detected, “movement” sensor send signal to microprocessor
- signal is first converted to digital (\*\*)
- microprocessor sends signal to actuator...(\*\*)
- ... to open both valves
- when hand removed, “movement” sensor sends signal to microprocessor
- signal is first converted to digital (\*\*)
- microprocessor sends signal to actuator...(\*\*)
- ... to close both valves
- microprocessor constantly monitors for signals from the sensors

**[6]**

**4 (a)** 1 mark for media type + 2 marks for examples

**optical**

- DVD-RAM (playback/record at same time)
- CD-R/CD-RW (recording music or files)
- blu-ray/DVD (recording films)

**solid state**

- memory sticks (portable devices allowing easy transfer of files between computers)
- memory cards in cameras/mobile phones (to store photos)
- memory in MP3 players (to store music files)

**[6]**

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

- buffer is a temporary storage device
- data transferred from primary memory to buffer
- when buffer full, processor can do other tasks
- buffer emptied to memory device
- when buffer empty, sends interrupt...
- ...to processor
- ...requesting more data to be sent to buffer
- according to priorities

**[4]**

**5 (a)** Any **four** points from:

- purpose of the system
- how to log on/log off the system
- installation procedure/load/run software
- file utilities (save, sort, search, amending records etc.)
- screen layouts (input formats)
- print layouts (output formats)
- hardware and software requirements)
- sample runs (with test data and results)
- error handling/meaning of errors
- troubleshooting guide/FAQs

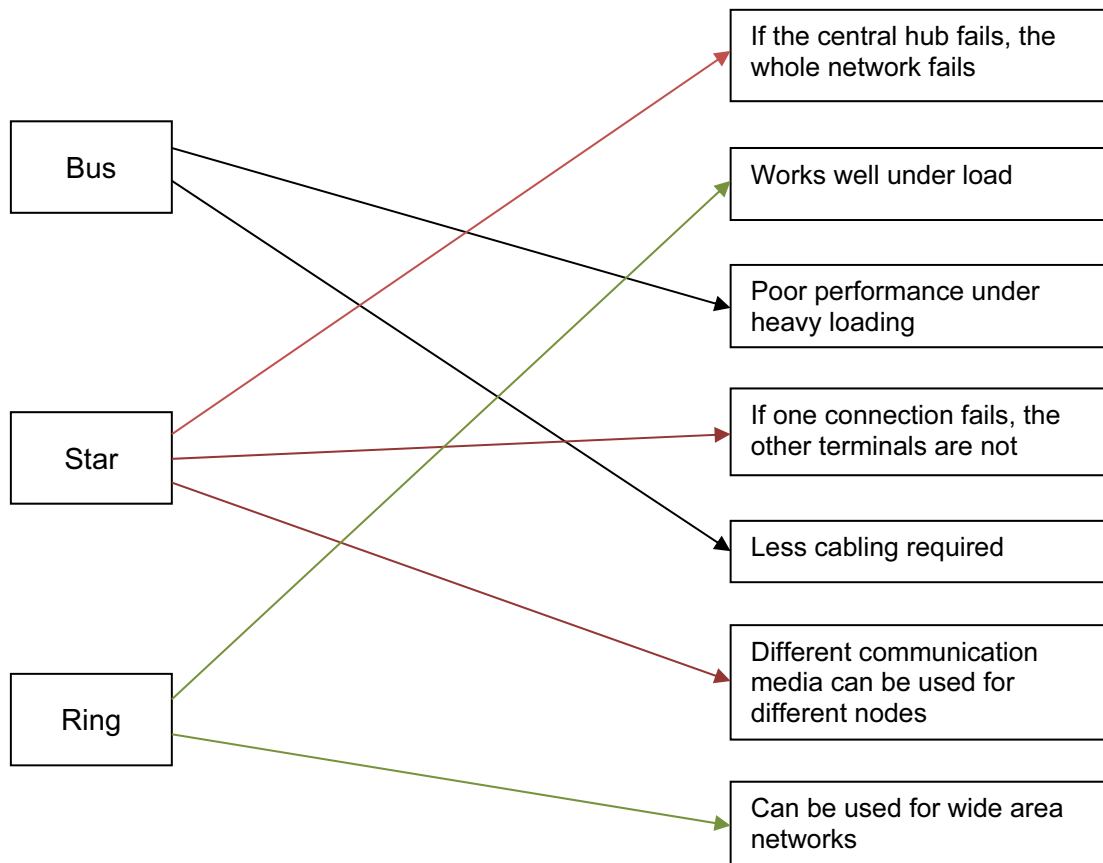
**[4]**

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

- combinations of colours to allow contrasts/highlight key points
- colours should be consistent (e.g. everything to do with purchasing of electronic toys will be shown in blue)
- avoid red/green colour combinations because customer may be colour blind/avoid flashing colours in case they cause epileptic fits)
- screen layout should follow natural reading pattern (i.e. left to right, top to bottom)
- large buttons to allow easy choice/screen navigation
- stages in ordering process should be simple to follow/not use complex or ambiguous language)

**[4]**

6 (a)



[7]

(b) Any **four** from:

- messages assembled into one or more packets
- includes address and control codes
- these packets can be sent independently through the network.
- ...collected together and re-assembled into original information at the destination
- individual packets do not have to travel by the same route
- unlike conventional switching where a channel is established and left open for duration of entire transmission

[4]

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7 (a) Any **four** points from:

- training will be necessary (this can be expensive for the company and it also takes the workers away from their job while undergoing training)
- possibility of redundancies (for reasons above) but also because the new computer systems may require fewer staff to do the work
- greater productivity – production of work will take less time (e.g. CAD software allows modifications to drawings to be made in a fraction of the time manually)
- possibility of working from home (can email work, use VoIP etc.)
- better working environment for staff (less noisy)
- creation of new jobs....all computer related (e.g. computer maintenance) **[4]**

(b) 1 mark for each benefit and 1 mark for each drawback

**off-the-shelf**

**benefits**

- usually less expensive since the development costs can be spread over many purchasers of the software
- they are frequently more sophisticated since the money generated from large sales (often global) allows more development work to be done
- there will usually be **user groups** who can give help and support
- the ability to export/import files into/from other packages is often easier since they are more likely to be compatible
- the software is available immediately – there is no need to wait while it is being written and developed
- the software is usually relatively “bug free” since it has been highly developed using feedback and targeted user groups.

**drawbacks**

- the software tends to be over-complex since it tries to cover as many aspects as possible; the average user will probably only use a small fraction of the features available
- because of the unwanted features, the software tends to be over-complex in use
- the software may not exactly fit the requirements of the user and may be a compromise
- any major problems for a user (requiring a re-write) will not be resolved quickly – a software re-write may cause problems for other users and may even cause software instability

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### **custom-written**

#### **benefits**

- these are designed and written to meet the user's specific requirements; consequently, they will be more efficient and won't contain unwanted features
- the writers of the software can develop it so that it will not interfere with other software being used by the company; this will avoid any software clashes
- it is frequently easier to use since the software can be written in conjunction with the end users in mind (the users get exactly what they need)
- any modifications needed (e.g. due to changes in the business requirements) can be done more easily and more quickly since the changes are probably specific to the company
- usually better customer support since the users can be in direct contact with the software designers/writers

#### **drawbacks**

- there is much greater dependence on the software company; e.g. if they go out of business then future support may be non-existent
- it is unlikely to be as well developed as "off the shelf" software
- it is usually far more expensive since the development costs have to be met fully by the user
- the development time may be quite lengthy, particularly if the application is unique or complex
- in some ways, the company takes a gamble – the final package may not actually meet the user requirements especially if the development time is long and the company's needs have changed in the meantime

**[4]**



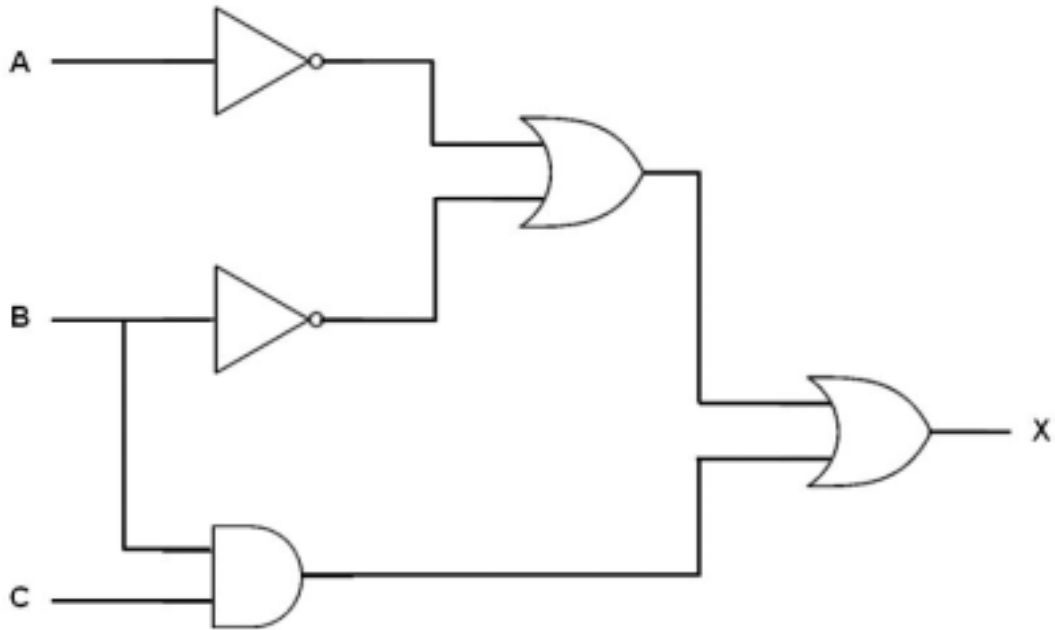
(a)

<b>A</b>	<b>B</b>	<b>C</b>	<b>X</b>	
<i>0</i>	<i>0</i>	<i>0</i>	<b>0</b>	} 1 mark
<i>0</i>	<i>0</i>	<i>1</i>	<b>0</b>	
<i>0</i>	<i>1</i>	<i>0</i>	<b>1</b>	} 1 mark
<i>0</i>	<i>1</i>	<i>1</i>	<b>0</b>	
<i>1</i>	<i>0</i>	<i>0</i>	<b>1</b>	} 1 mark
<i>1</i>	<i>0</i>	<i>1</i>	<b>0</b>	
<i>1</i>	<i>1</i>	<i>0</i>	<b>1</b>	} 1 mark
<i>1</i>	<i>1</i>	<i>1</i>	<b>0</b>	

[4]

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(b) 1 mark per correct logic gate:



PLEASE NOTE: If a candidate has attempted to simplify the logic circuit to either:

$$X = (A \text{ NAND } B) \text{ OR } (B \text{ AND } C)$$

or:

$$X = (A \text{ NAND } B) \text{ OR } C$$

then award 3 marks for the NAND gate and then either 1 mark each for the **OR** gate and **AND** gate in the first expression or 2 marks for the **OR** gate in the second expression. [5]

- 9 (a) (i) Green [1]  
(ii) Colour (3) [1]
- (b) (i) Yellow [1]  
(ii) Colour (5) [1]