CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0478 COMPUTER SCIENCE

0478/11 Paper 1, 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.

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CAMBRIDGE
International Examinations

1 (a) 1 mark for each name of application + 1 mark for description of use

Hardware item	Application and how the hardware item is used
Barcode reader	Supermarket checkout – read barcodes to find prices, description – allows automatic stock control Library system – can track books on loan – can link books to borrowers using barcoded cards Airport checkouts – barcodes on luggage to track whereabouts
Microphone	Voice recognition system – allows computer to recognise spoken words and use them as input to, e.g., a word processor Multimedia presentations – allows voice-overs on presentations Video conferencing/VoIP – allows users to speak to each other
Touch screen	Mobile telephone/tablet – allows user to select apps/icons – easy method to input data Ticket/information kiosk – limits the options available for ease of use
Infrared sensor	Burglar/intruder detection system – detects presence of a person by breaking beam/change of temperature Automatic doors – breaking i/r beam allows detection of person approaching door Counting, e.g. people/cars – every time beam is broken it can automatically send data and allow automatic counting

[8]

(b) Any **two** from:
- Blu-ray discs use blue/violet lasers rather than red lasers as used by DVDs
- storage capacity of Blu-ray discs is much higher than standard DVDs
- Blu-ray discs use one polycarbonate layer; DVDs use two layers
- Blu-ray discs have a built-in secure encryption system

[2]

(c) Any **two** from:
- DVD has one spiral track; DVD-RAM has several concentric tracks
- DVD-RAM can be written to and read from at the same time; DVD-R only allows the read operation to occur
- DVD-R only allows data to be read (can't write to it) whereas DVD-RAM allows reading and writing operation

[2]

2 **(a)** 1 0 1 1 0 1 0 1

F 6 [2]

(b) Any **two** from:
- HTML
- MAC address
- used in assembly language/machine code
- debugging (displays bytes in hex when using memory dumps)

[2]

(c)
- Can represent 16 bit words as only 4 hexadecimal digits
- It is easy to convert hex digits back to binary if necessary [2]

3 (a)

Statement	True	False
Cookies can destroy or modify data in a computer without the user's knowledge		✓
Cookies generate website pop-ups		✓
Cookies allow a website to detect whether a viewer has viewed specific web pages	✓	

[3]

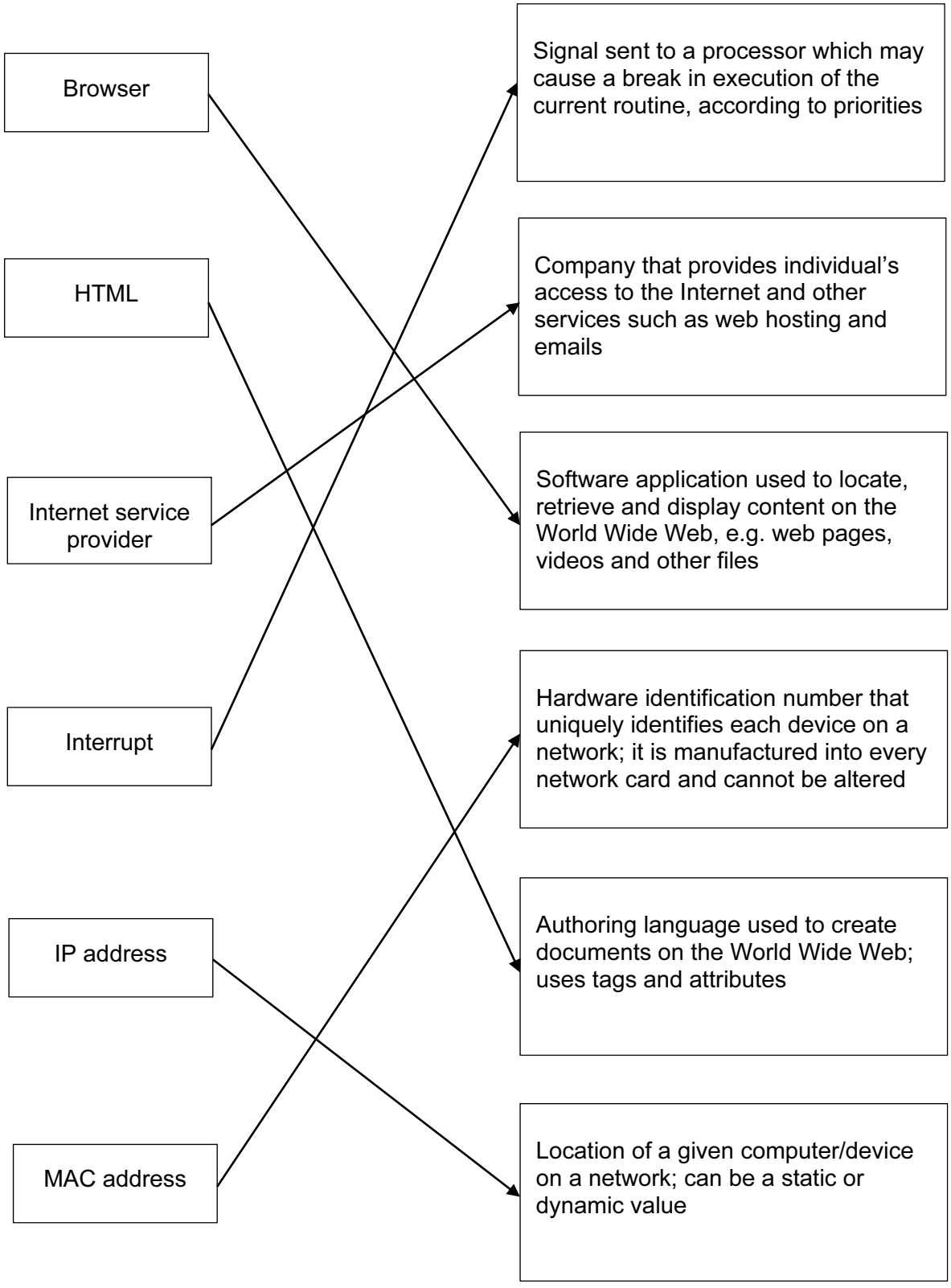
(b) Registers

Any **two** from:
– PC (Program Counter)
– MAR (Memory Address Register)
– MDR (Memory Data Register)
– CIR or IR ((Current) Instruction Register)
– ACC (Accumilator)

Buses

Any **two** from:
– control
– data
– address [4]

4



[5]

5 (a) (i) Inkjet printer

Any **four** from**:**
- uses cartridges/liquid ink
- makes use of thermal bubble/piezoelectric technology
- sprays ink in droplets on the paper
- uses a moving print head
- suitable for low volume (high quality) output, e.g. a photo

[4]

(ii) Laser printer

Any **four** from**:**
- uses powdered ink/toner cartridges
- uses a (charged) printing drum
- makes use of static electricity charges
- uses a fuser to fix/melt ink onto the paper
- uses a discharge lamp to remove static charge from the drum
- useful for high volume (high quality) output, e.g. leaflets

[4]

(b) Any **three** from:
- produces solid, 3D objects/prototypes
- used in CAD/CAM
- makes use of tomography/slices of an object
- solid built up in thin layers
- uses resin, powdered metal, paper, plastic…

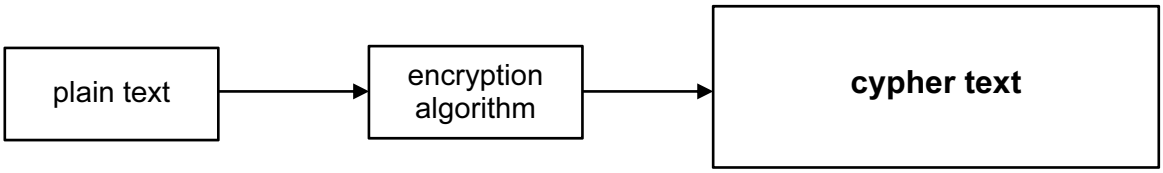
[3]

6 (a) Any **one** from:
- jumbling up/scrambling characters so that message makes no sense
- requires an encryption key to encrypt data
- need decryption key to decipher encrypted message

[1]

(b) Uses the same key to encrypt and decrypt message [1]

(c) 1 mark for correct name in box



[1]

7 **(a)** Lossy
- when decompressed, some detail is lost and file is not exactly like the original (but difference is usually not noticeable)

Lossless
- when decompressed the original file is restored with no loss of data

[2]

(b) 1 mark for type of file + 1 mark for description
e.g:

- JPG
- Used to store images/pictures

- MP3
- Used to store audio/sound files

[2]

(c) Any **three** from:
- company calculation is based on 1 GByte = 1000 MByte
- so (500 × 1000)/8 = 62 500 files
- customer calculation based on 1 GByte = 1024 MByte
- so (500 × 1024)/8 = 64 000 files
- giving the difference of 1500 files

[3]

8 Any **three** from:
- provides a user interface
- input/output control/handling
- security
- (handling) interrupts
- spooling
- memory management
- processor management
- utilities (e.g. copy, save, delete, rename, etc.)
- maintain user accounts
- load/run software
- error reporting/handling
- multiprogramming
- batch processing/JCL
- multitasking

[3]

9 (a) Any **one** from:
- verification is being described
- validation is when data follows a set of rules, e.g. length/range/type check

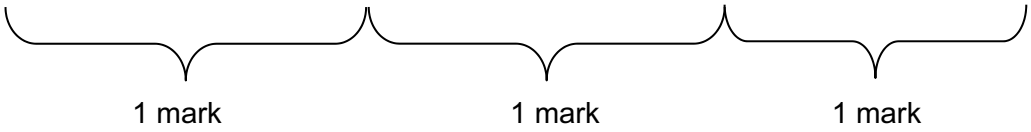
[1]

(b) Any **one** from:
- send as JPEG files
- carry out a file compression first

[1]

10 (a)

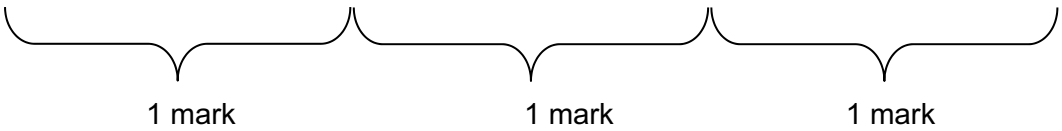
w	**w**	**w**	**.**	**c**	**i**	**e**	**.**	**o**	**r**	**g**	**.**	**u**	**k**
%77	%77	%77	**%2E**	**%63**	**%69**	**%65**	**%2E**	**%6F**	**%72**	**%67**	**%2E**	**%75**	**%6B**



[3]

(b)

%77	**%77**	**%77**	**%2E**	**%72**	**%6F**	**%63**	**%6B**	**%69**	**%63**	**%74**	**%2E**	**%63**	**%6F**	**%6D**
W	**W**	**W**	**.**	**r**	**o**	**c**	**k**	**i**	**c**	**t**	**.**	**c**	**o**	**m**



[3]

11 1 mark for each input device + 1 mark for correct MATCHING reason for each device

Input Devices

– Barcode scanner
– … to scan the barcode on boarding pass/mobile phone screen

– keyboard
– … to key in data in case barcode fails to scan

– (electronic) scales
– … weigh luggage at check-in

1 mark for each output device + 1 mark for correct MATCHING reason for each device

Output Devices

– beeper/speaker
– … confirm barcode read/indicate error if barcode not read

– (LCD) screen
– … select options (e.g. airline) at check-in

– printer
– … produce bag labels

[4]

12 (a)

1	1	1	1	1	0	0	0

0	0	0	0	0	1	1	1

[2]

(b) 1 mark for error detection method and 1 mark for description

– Check sum
– … sum of bits is transmitted and checked against the sum of the received bits

– Check digit
– … a digit that is calculated (e.g. using modulo-11) and transmitted with the data

– ARQ
– … when an error is detected in a packet of data a request is automatically sent for the data to be resent

[2]

13 (a) Firewall [1]

(b) Shareware [1]

(c) SSL (secure socket layer) (accept HTTPS and TLS) [1]

(d) MIDI [1]

(e) Microphone [1]