

**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

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

<b>Hardware item</b>	<b>Application and how the hardware item is used</b>
Barcode reader	Supermarket checkout <ul style="list-style-type: none"> <li>– read barcodes to find prices, description</li> <li>– allows automatic stock control</li> </ul> Library system <ul style="list-style-type: none"> <li>– can track books on loan</li> <li>– can link books to borrowers using barcoded cards</li> </ul> Airport checkouts <ul style="list-style-type: none"> <li>– barcodes on luggage to track whereabouts</li> </ul>
Microphone	Voice recognition system <ul style="list-style-type: none"> <li>– allows computer to recognise spoken words and use them as input to, e.g., a word processor</li> </ul> Multimedia presentations <ul style="list-style-type: none"> <li>– allows voice-overs on presentations</li> </ul> Video conferencing/VoIP <ul style="list-style-type: none"> <li>– allows users to speak to each other</li> </ul>
Touch screen	Mobile telephone/tablet <ul style="list-style-type: none"> <li>– allows user to select apps/icons</li> <li>– easy method to input data</li> </ul> Ticket/information kiosk <ul style="list-style-type: none"> <li>– limits the options available for ease of use</li> </ul>
Infrared sensor	Burglar/intruder detection system <ul style="list-style-type: none"> <li>– detects presence of a person by breaking beam/change of temperature</li> </ul> Automatic doors <ul style="list-style-type: none"> <li>– breaking i/r beam allows detection of person approaching door</li> </ul> Counting, e.g. people/cars <ul style="list-style-type: none"> <li>– every time beam is broken it can automatically send data and allow automatic counting</li> </ul>

[8]

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(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]

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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

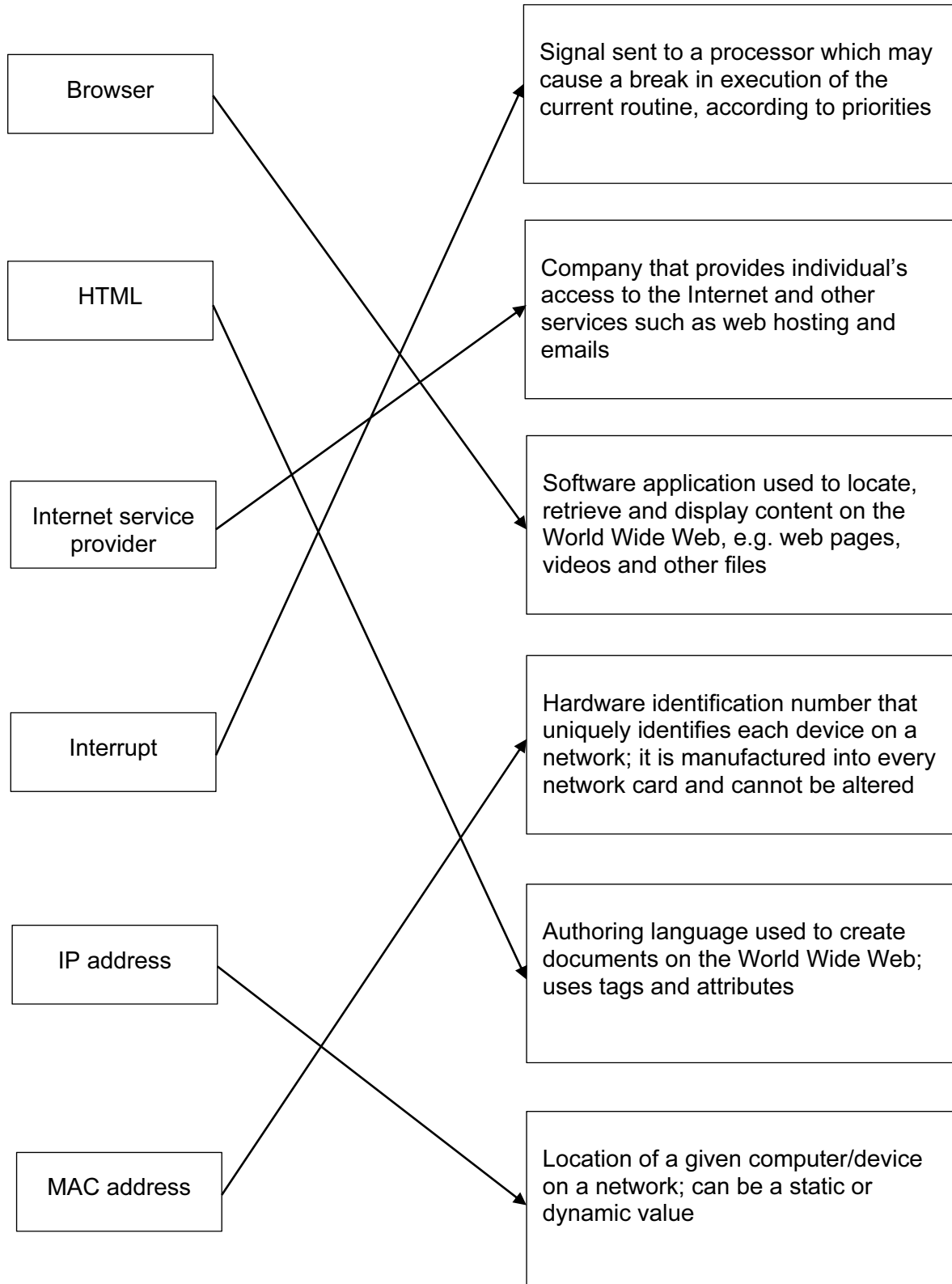
Any **two** from:

- control
- data
- address

[4]

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4



[5]

Page 6	Mark Scheme	Syllabus	Paper
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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:

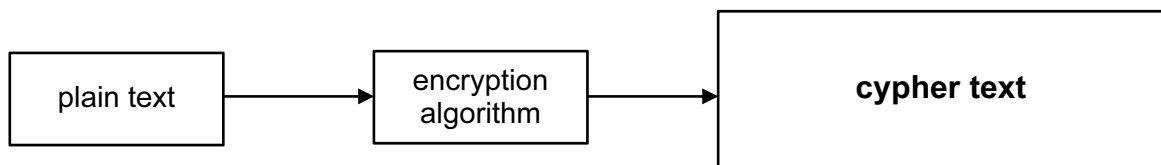
- jumbling up/scrambling characters so that message makes no sense
- requires an encryption key to encrypt data
- need decryption key to decipher encrypted message

[1]

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

[1]

(c) 1 mark for correct name in box



[1]

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**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  $(500 \times 1000)/8 = 62\,500$  files
- customer calculation based on 1 GByte = 1024 MByte
- so  $(500 \times 1024)/8 = 64\,000$  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]

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- 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]



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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)

<b>1</b>	1	1	1	1	0	0	0
<b>0</b>	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]

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- 13 (a)** Firewall [1]
- (b)** Shareware [1]
- (c)** SSL (secure socket layer) (accept HTTPS and TLS) [1]
- (d)** MIDI [1]
- (e)** Microphone [1]