Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMPUTER SCIENCE **0478/12**

Paper 1 **October/November 2016**

MARK SCHEME

Maximum Mark: 75

Published

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 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

© UCLES 2016

1 (a) Any **two** from:

- direct access to computer processor / special hardware // machine dependent instructions
- uses up less memory
- can increase the speed of processing a program // executes instructions faster

[2]

(b)

Statements	Interpreter (✓)	Compiler (✓)
Translates the source code into machine code all at once		✓
Produces an executable file in machine code		✓
Executes a high-level language program one instruction at a time	✓	
Once translated, the translator does not need to be present for the program to run		✓
An executable file is produced		✓

[5]

2 Any **four** from:

- Provides a user interface
- Handles interrupts / errors
- Memory management
- File management
- Manages peripherals (inputs/outputs)
- Provides security methods
- Allows multitasking
- Manages multiprogramming
- Enables batch processing
- Manages software installation / removal
- Allows creation of multiple accounts
- Levels of access

[4]

© UCLES 2016

3 (a) (i) Any **two** from:

serial

– one bit sent at a time // bits sent sequentially
– over a single wire
– synchronous or asynchronous

[2]

(ii) Any **two** from:

parallel

– several bits / a byte sent at a time
– using many / multiple wires
– synchronous

[2]

(b) – serial

Any **two** from:

– serial data transmission more reliable over long distances
– less likely for the data to be skewed/out of synchronisation
– less interference as only a single wire
– it is a cheaper connection as only single wire needed // cheaper to set up
– a fast connection is not required as a printer is limited by its printing speed

[3]

4 (a) Intersection of Row 7 and column 4 circled [1]

(b) – Row (byte number) 7 has an odd number of 1s (five 1s)
– Column (bit number) 4 has an odd number of 1s (five 1s)

[2]

© UCLES 2016

5 **(a)** 112 [1]

(b) 56 [1]

(c) divided by 2 // value 112 was halved // multiplied by 0.5 [1]

(d) **(i)**

0	**0**	**0**	**0**	**1**	**1**	**1**	**0**

[1]

(ii) 14 [1]

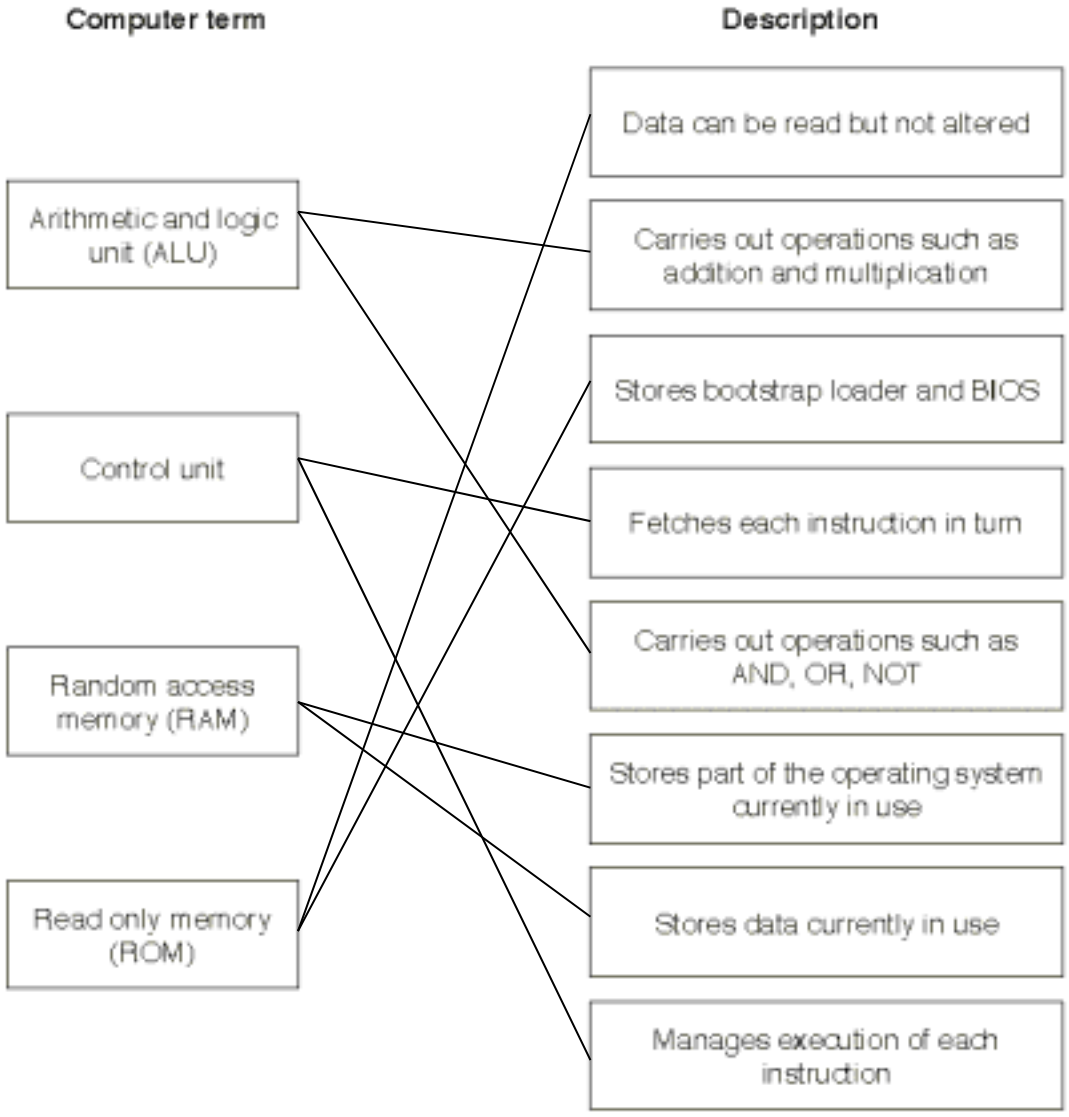
(e) Any **two** from:

- run out of places to the right of register / at the end of register
- right-most 1 would be lost
- number would become 3 instead of 3.5
- loss of precision

[2]

© UCLES 2016

6 1 mark for **both** correct lines from each computer term.



[4]

© UCLES 2016

7 (a) (i) 2 marks for 4 correct outputs,
1 mark for 2 correct outputs

1 mark for correct gate

A	B	Working space	X
0	***0***		**0**
0	***1***		**0**
1	***0***		**0**
1	***1***		**1**

AND gate

[3]

(ii) 2 marks for 4 correct outputs
1 mark for 2 correct outputs

1 mark for correct gate

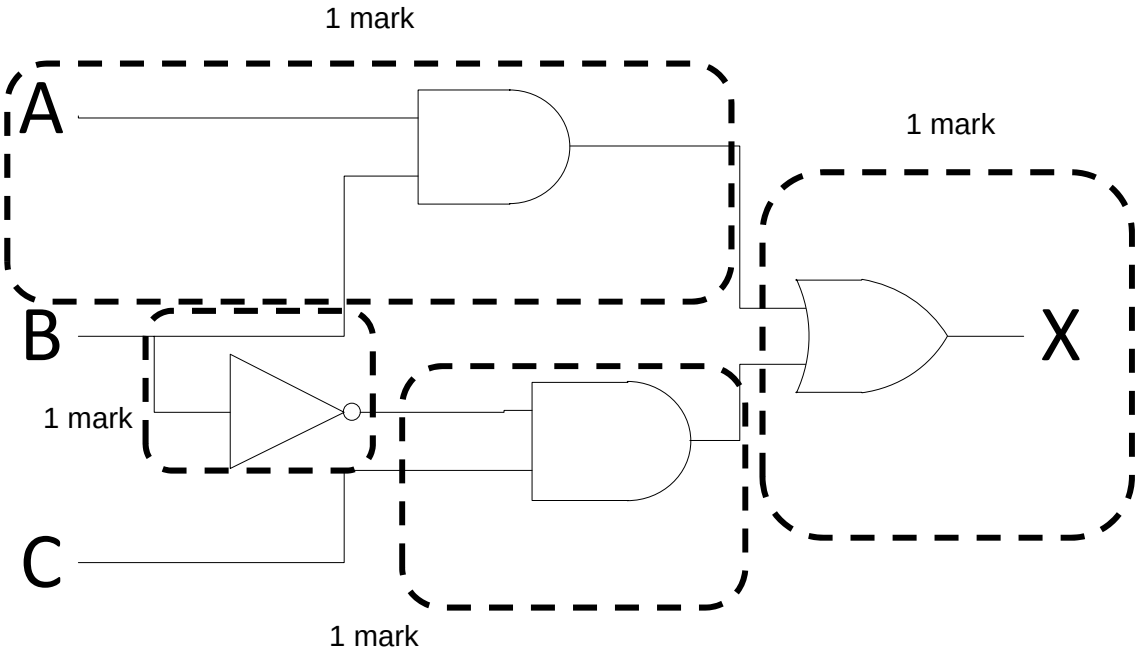
A	B	Working space	X
0	***0***		**0**
0	***1***		**1**
1	***0***		**1**
1	***1***		**1**

OR gate

[3]

© UCLES 2016

(b)(i) 1 mark per correct section.



[4]

(ii) 4 marks for 8 correct outputs
3 marks for 6 correct outputs
2 marks for 4 correct outputs
1 mark for 2 correct outputs

A	B	C	Working space	X
0	***0***	***0***		**0**
0	***0***	***1***		**1**
0	***1***	***0***		**0**
0	***1***	***1***		**0**
1	***0***	***0***		**0**
1	***0***	***1***		**1**
1	***1***	***0***		**1**
1	***1***	***1***		**1**

[4]

© UCLES 2016

8

Statement	TRUE or FALSE
MIDI stores the actual music notes in a compressed format	**FALSE**
JPEG files are examples of lossless file compression	**FALSE**
MP3 files are, on average, 90% smaller than the music files stored on a CD	**TRUE**
MP4 files are examples of lossy file compression	**TRUE**

[4]

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

– a large number of requests are sent to the network/server all at once
– designed to flood a network/server with useless traffic/requests
– the network/server will come to a halt/stop trying to deal with all the traffic/requests
– prevents users from gaining access to a website/server

[2]

(b) 1 mark for each security threat and 1 mark for matching description

Security threat	Description
Viruses	– software that replicates – causes loss/corruption of data // computer may "crash"/run slow
Hacking/cracking	– illegal/ unauthorised access to a system/data
Phishing	– a link/attachment sends user to fake website (where personal data may be obtained)
Pharming	– malicious code installed on user's hard drive / computer – user is redirected to a fake website (where personal data may be obtained)
Spyware/key logger	– send/relay key strokes to a third party

[4]

© UCLES 2016

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

– hyper text mark-up language
– uses both structure and presentation
– web-authoring language/software // used to create websites/webpages
– uses tags to define e.g. colour / font / graphics / layout

[3]

(b)

File name: ComputerSciencePapers

Protocol: http(://)

Web server name: www.cie.org.uk

[3]

11 (a) 1 mark per nibble

0010 1010 1111

[3]

(b) 1 mark for identification of each sensor, max 2 for each description

Infrared/motion sensor

– Receives infrared rays/heat
– Sends data to microprocessor
– Receives microwaves
– Placed in the corner of a room, across a doorway
– Used to detect the heat of an intruder // used to detect if an infrared beam has been broken by an intruder

Pressure sensor

– Receives current if circuit created // stops receiving current if circuit is broken
– Sends data to microprocessor
– Placed on a window/door, at the entrance
– Used to detect a change in pressure

[6]

© UCLES 2016

12 Any **four** from:

- Freeware needs owner's permission to share/copy/amend whereas free software can be shared/copied/amended without permission
- Freeware the owner retains copyright / is subject to copyright whereas free software the owner releases copyright/ is not subject to copyright
- Freeware is normally provided without a fee whereas free software a fee may be charged
- Freeware is distributed without the source code whereas free software is distributed with the source code
- Freeware can be restricted in use e.g. non-commercial whereas free software can be used without restriction

NOTE: The question asks candidates to explain the differences, so each mark needs to have a comparison.

[4]

© UCLES 2016