

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
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8	
9	
10	
11	
12	
TOTAL	



General Certificate of Education
Advanced Subsidiary Examination
June 2009

Computing

COMP2

Computer Components, The Stored Program Concept and The Internet

Friday 15 May 2009 9.00 am to 10.00 am

You will need no other materials.
You must **not** use a calculator.

Time allowed

- 1 hour

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- The use of brand names will **not** gain credit.
- Question 12(b) should be answered in continuous prose. In this question you will be marked on your ability to:
 - use good English
 - organise information clearly
 - use specialist vocabulary where appropriate.



J U N 0 9 C O M P 2 0 1

Answer **all** questions.

1 Peripherals can be classified as input, output or input/output (I/O) devices.

1 (a) Explain what a peripheral is.

.....

 (1 mark)

1 (b) The table below lists two peripherals.

Put **one** tick in each row to identify each peripheral as either an input, output or I/O device.

Peripheral	Input	Output	Input/Output (I/O)
Mouse			
Laser Printer			

(2 marks)

2 Figures 1, 2 and 3 show three versions of the same program.

Figure 1	Figure 2	Figure 3
Total := 60 + 10;	LD #60	00101000 00111100
	ADD #10	00111000 00001010
	ST Total	01100000 00101001

2 (a) What type of translator program would be used to convert **Figure 1's** program into **Figure 3's** program?

.....
 (1 mark)

2 (b) What type of translator program would be used to convert **Figure 2's** program into **Figure 3's** program?

.....
 (1 mark)

3

2



3 High level programming languages can be classified as being either imperative or declarative.

3 (a) Explain what is meant by a *declarative language*.

.....

.....

.....

.....

(1 mark)

3 (b) Name **one** type of application for which a declarative language could be used.

.....

.....

(1 mark)

2

4 (a) Look at the truth table below.

Input A	Input B	Output Q
0	0	1
0	1	0
1	0	0
1	1	0

What logic gate does the table represent?

.....

(1 mark)

Question 4 continues on the next page

Turn over ▶



- 4 (b) An interior light in a two-door car is controlled by two switches that the driver can turn on or off and two sensors, one per door.

The switches are named A and B.

The door sensors are named C and D.

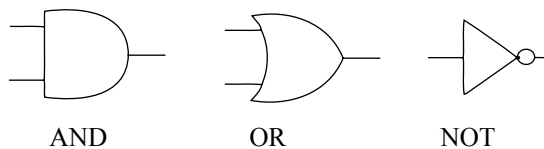
The interior light is named L.

If a door is open the output of its sensor is on.

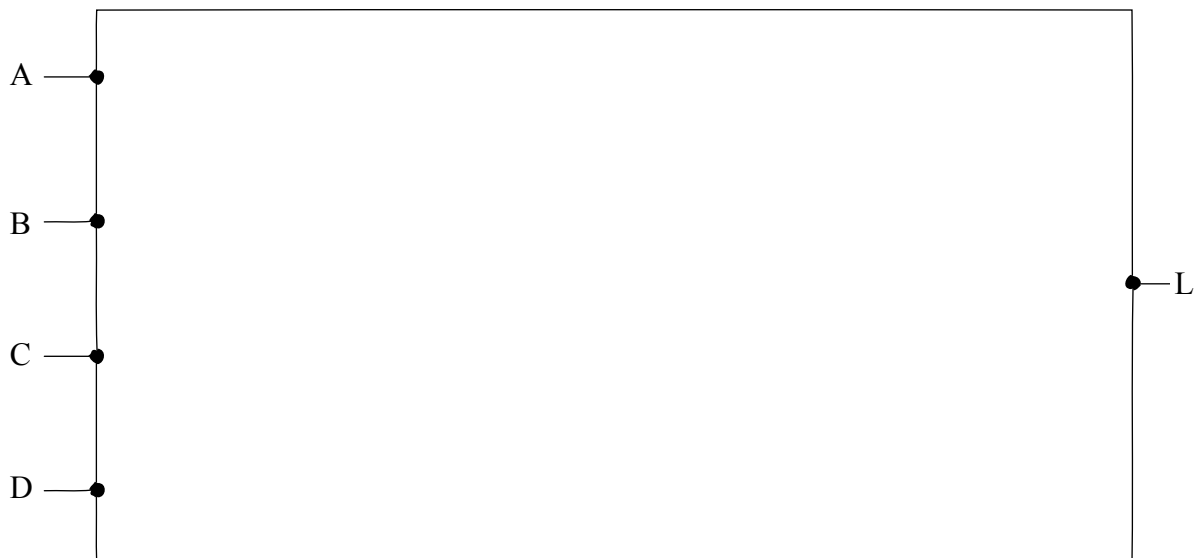
If a door is closed the output of its sensor is off.

- If both switches A and B are off then the light L is always off.
- If switch A is on the light L is always on.
- If switch B is on and switch A is off then:
 - the light L turns on if one or more of the car doors is opened
 - the light L turns off if both of the doors are closed.

The following symbols are used to represent logic gates:



- 4 (b) (i) Using only AND, OR and NOT gates draw a logic circuit for this system in the box below. You may not need to use all three types of gate.



(3 marks)

- 4 (b) (ii) Write a Boolean expression to represent the logic of the interior light system.

.....

(1 mark)



4 (c) Simplify the Boolean expression below, showing your working.

$$\overline{\overline{A + B}} + B \cdot \overline{A}$$

.....

.....

.....

.....

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(3 marks)

8

5 (a) Explain the difference between application software and system software.

.....

.....

.....

.....

(2 marks)

5 (b) Utility programs are one type of system software.

Name **two** other types of system software.

1.....

(1 mark)

2.....

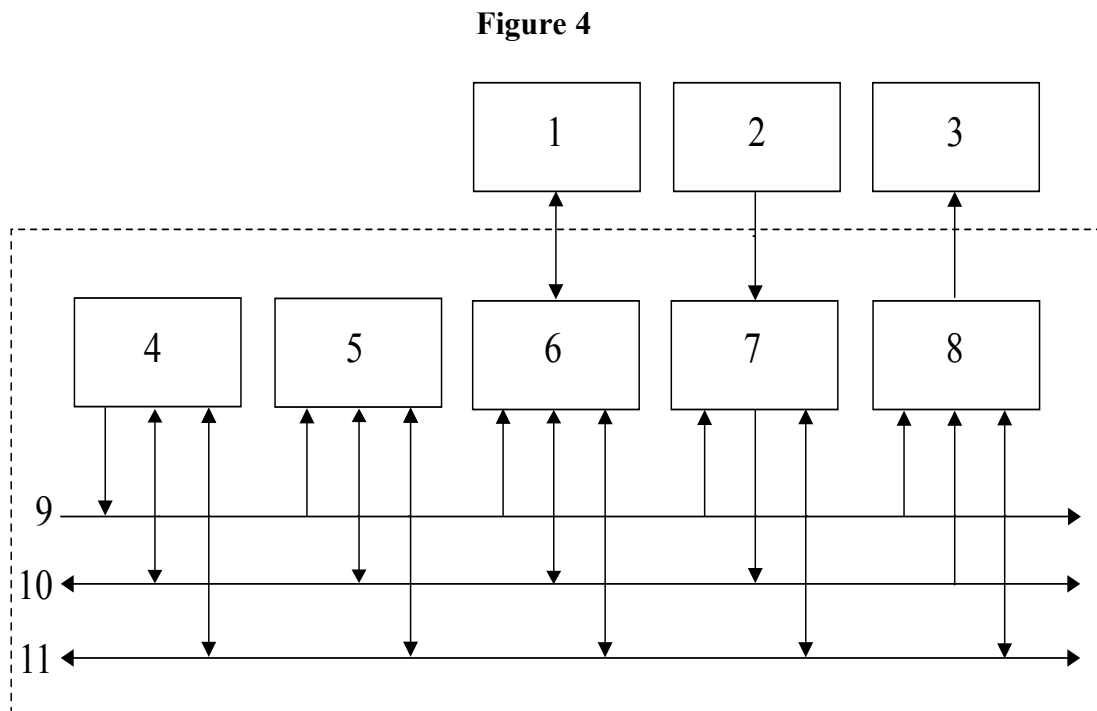
(1 mark)

4

Turn over ▶



6 **Figure 4** is a diagram of some of the components of a computer system.



Match the component names to the numbers shown in **Figure 4** by completing the tables below. Some of the numbers have already been written in for you.

Internal Components	
Data Bus	
Address Bus	
Control Bus	11
VDU Controller	
Disk Controller	6
Keyboard Controller	
Main Memory	
Processor	

External Components	
Keyboard	
Visual Display Unit	
Secondary Storage	1

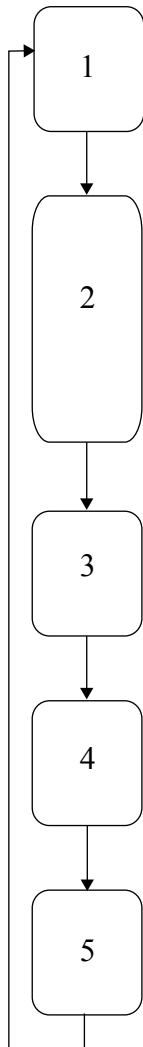
(6 marks)

6



7 The diagram below shows the fetch-execute cycle. Some of the steps have been described.

- 7 (a) Describe the missing steps 1, 2b and 4 using either register transfer notation or a written description. Steps 2a and 2b occur at the same time.



Step 1:

.....

Step 2a: $PC \leftarrow [PC] + 1$
(Increment contents of Program Counter Register)

Step 2b:

.....

Step 3: $CIR \leftarrow [MBR]$
(Transfer contents of Memory Buffer Register into Current Instruction Register)

Step 4:

.....

Step 5: Execute Instruction

(3 marks)

Question 7 continues on the next page

Turn over ▶



7 (b) What would be the effect on the performance of the computer system of increasing the

7 (b) (i) width of the data bus?

.....

.....

7 (b) (ii) width of the address bus?

.....

.....

7 (b) (iii) clock speed?.....

.....

.....

(3 marks)

<hr/>
6



8 Imagine that you are a computer programmer in a company that stores personal data. The company must comply with the Data Protection Act.

8 (a) What is personal data?

.....
.....
(1 mark)

8 (b) You are writing a new program to handle personal data.

State **one** principle of the Data Protection Act that could be met by the careful design of your program.

.....
.....
(1 mark)

8 (c) Name **one** feature that you could include in your program and describe how it would help the company comply with the principle stated in part (b).

.....
.....
.....
.....
(2 marks)

4

Turn over for the next question

Turn over ▶



9 A student is creating a website of several web pages which must conform to accessibility and consistency guidelines. She is using Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS).

9 (a) What should she use HTML for?

.....
(1 mark)

9 (b) What should she use CSS for?

.....
(1 mark)

9 (c) The CSS that the student created is shown in **Figure 5** below.

Figure 5

```
<style type = "text/css">
  body {background-color : yellow}
  h1 {color : red; text-align : center}
  p {color : green}
</style>
```

9 (c) (i) Name **one** example of a type selector that has been used in **Figure 5**.

.....
(1 mark)

9 (c) (ii) The student wants to change the CSS so that standard paragraph text appears in bold as well as green.

Write the full statement that the student would need to use to do this.

.....
(2 marks)



10 (a) Explain **one** similarity and **one** difference between the Internet and an intranet.

Similarity:.....

.....

.....

(1 mark)

Difference:

.....

.....

(1 mark)

10 (b) Computers connected to the Internet use the TCP/IP suite of protocols for data transmission.

10 (b) (i) What is a protocol?

.....

.....

.....

(1 mark)

10 (b) (ii) Name **two** of the layers in the TCP/IP protocol stack.

Describe **one** function of each of the layers that you have named.

	Layer name	Description of layer function
1		
2		

(4 marks)

7

Turn over ▶



11 A company sells music to its customers over the Internet. The music can be downloaded as files and saved on the user’s computer. It is protected by Digital Rights Management (DRM).

11 (a) What is DRM and why does the company use it to protect the music that it sells?

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(3 marks)

11 (b) Explain how the company could use DRM to protect its music.

.....
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(2 marks)

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5



12 (a) Give **two** differences between primary and secondary storage.

1.....

.....

2.....

.....

(2 marks)

12 (b) Explain the principles of operation of a hard disk drive.

Your answer to this question will also be assessed on your ability to organise your answer clearly and coherently in complete sentences, using specialist vocabulary where appropriate.

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(6 marks)

END OF QUESTIONS

8



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