Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	

General Certificate of Education
Advanced Subsidiary Examination
June 2012

Computing COMP2

Unit 2 Computer Components, The Stored Program Concept and the Internet

Tuesday 29 May 2012 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. Do not write outside the box around each page or on blank pages.
- 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 5 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.

Answer **all** questions in the spaces provided.

1 (a) **Table 1** below lists some components of a computer system.

Put **one** tick on each row to identify each component as either:

- software
- hardware
- hardware and software.

Table 1

Component	Software	Hardware	Hardware and software
Wireless router			
Compiler			
Keyboard			

(3 marks)

1 (b) System software performs the tasks needed to operate the hardware. The operating system and library programs are system software.

1 (b) (i) State **one** role of the operating system.

.....

(1 mark)

1 (b) (ii) State **one** purpose of library programs.

.....

(1 mark)

1 (c) A company is looking at purchasing some bespoke software to help them run their ordering and purchasing activities.

1 (c) (i) State **one** advantage of purchasing bespoke software.

.....

.....

(1 mark)

1 (c) (ii) State **one** disadvantage of purchasing bespoke software.

.....

.....

(1 mark)

7

2 (a) A machine code instruction can be split into an opcode part and an operand part.

2 (a) (i) What does an opcode represent?

.....

.....

(1 mark)

2 (a) (ii) What does an operand represent?

.....

.....

(1 mark)

2 (b) State **two** advantages of writing a program in assembly language over writing a program in machine code.

Advantage 1:.....

.....

Advantage 2:.....

.....

(2 marks)

4

Turn over for the next question

3 An ICT technician at a secondary school has access to a variety of programs that she uses to manage a group of servers.

3 (a) State **one** use for each of the protocols listed below.

3 (a) (i) Telnet: .....

(1 mark)

3 (a) (ii) FTP: .....

(1 mark)

3 (a) (iii) POP3: .....

(1 mark)

3 (b) Whilst remotely connecting to one of the servers the technician executes a command that displays the current network connections. **Figure 1** shows these network connections.

Figure 1

```
Active Internet Connections

Proto  Recv-Q  Send-Q  Local Address        Foreign Address             (state)

tcp4   0       0       192.168.3.205:80     74.125.4.148:58539      ESTABLISHED

tcp4   0       0       192.168.3.205:80     208.43.202.29:57458     ESTABLISHED

tcp4   37      0       192.168.3.205:25     208.43.202.29:57459      CLOSE_WAIT
```

From **Figure 1** provide an example of the following:

3 (b) (i) IP address: .....

(1 mark)

3 (b) (ii) Port: .....

(1 mark)

3 (b) (iii) Socket: .....

(1 mark)

3 (c) State **two** reasons why the technician uses remote management software from her computer rather than going to the actual servers.

Reason 1: .....

.....

Reason 2: .....

.....

(2 marks)

8

4 There are many third generation programming languages available. Some of these can be classified as imperative high level languages.

4 (a) Explain what is meant by the term *imperative high level language*?

.....

.....

.....

.....

(2 marks)

4 (b) Give **one** reason for there being so many third generation programming languages.

.....

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.....

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(1 mark)

3

Turn over for the next question

5 The following registers are used in the Fetch-Execute cycle:

- Current Instruction Register (CIR)
- Memory Address Register (MAR)
- Memory Buffer Register (MBR)
- Program Counter (PC)
- Status Register (SR)

Describe, **using full sentences**, the steps involved in the Fetch-Execute cycle, making reference to how the registers above are used. Your description should cover the fetch, decode and execute phases of the cycle. You may use the abbreviations given above for the register names in your response; for example PC for Program Counter.

In your answer you will be assessed on your ability to use good English and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.

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(6 marks)

6

6 (a) Here is a list of input devices:

smart card reader, Radio Frequency Identification (RFID) reader, flatbed scanner, touch-sensitive screen.

For each of the situations below, state the name of the most appropriate input device from the list above. You should **not** use the same device more than once.

6 (a) (i) Information kiosk at a railway station

.....

(1 mark)

6 (a) (ii) Payment for food at a school canteen

.....

(1 mark)

6 (a) (iii) To identify a book being removed from a library without authorisation

.....

(1 mark)

6 (b) Describe the principles of operation of a flatbed scanner.

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(4 marks)

7

7 **Figure 2** shows the Hypertext Markup Language (HTML) for a web page.

Figure 2

```
<html>
  <head>
    <title>AQA COMP2</title>
    <meta name="keywords" content="AQA, Computing, COMP2" />
  </head>
  <body>
    <div id="header">
      <h1>AQA COMP2</h1>
    </div>
    <p>Welcome to the <span class="boldRed">new</span> page
for COMP2 students</p>
  </body>
</html>
```

Figure 3 shows the external style sheet `styles.css` which contains three rules.

Figure 3

```
h1 { color:darkblue; font-style:italic }
#header { font:bold 130% Verdana }
.boldRed { color:red; font-weight:bold }
```

7 (a) Using **Figure 2** and **Figure 3** provide an example of the following:

7 (a) (i) ID selector: .....

(1 mark)

7 (a) (ii) Class selector: .....

(1 mark)

7 (a) (iii) Block-level tag: .....

(1 mark)

7 (b) One colour scheme used for websites is the monochromatic colour scheme.

Describe the type of colours that would be used in a monochromatic colour scheme.

.....

.....

(1 mark)

7 (c) Describe the purpose of the meta elements line in **Figure 2**.

.....

(1 mark)

7 (d) The HTML code required to link the web page to the external style sheet is missing.

The incomplete HTML code below will be added to the web page to link it to the external style sheet.

```
< (1) rel=" (2) "  type = "text/css"  href="  (3) " />
```

Complete **Table 2** by writing the missing parts of the HTML code.

Table 2

Label	Missing part
1	
2	
3	

(3 marks)

8

Turn over for the next question

8 (a) Complete the truth tables for the following logic gates.

AND Gate		
Input X	**Input Y**	**Output Q**
0	0	
0	1	
1	0	
1	1	

XOR Gate		
Input X	**Input Y**	**Output Q**
0	0	
0	1	
1	0	
1	1	

(2 marks)

8 (b) A line-following robot has three sensors. It moves along a black line on a white background whilst the following conditions are met:

- the ultrasonic sensor U does not detect any obstacle
- either, but not both, of the infrared sensors L and R are on the black line.

Sensor U returns 1 if it detects an obstacle and 0 if the path is clear.
Sensors L and R each return 1 if they detect black and 0 if they detect white.

A logic circuit will process the input from the sensors and produce an output M.

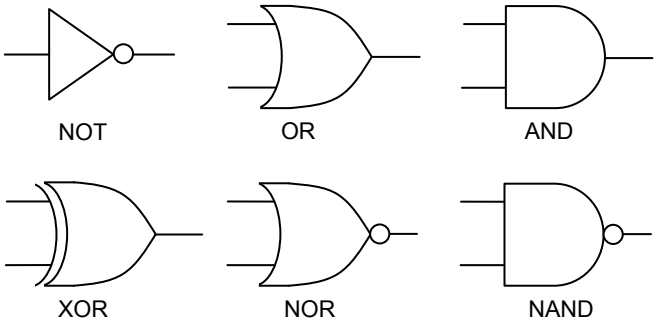
M should be 1 if the robot is to move and 0 if the robot should stop.

8 (b) (i) Represent the output M as a Boolean expression.

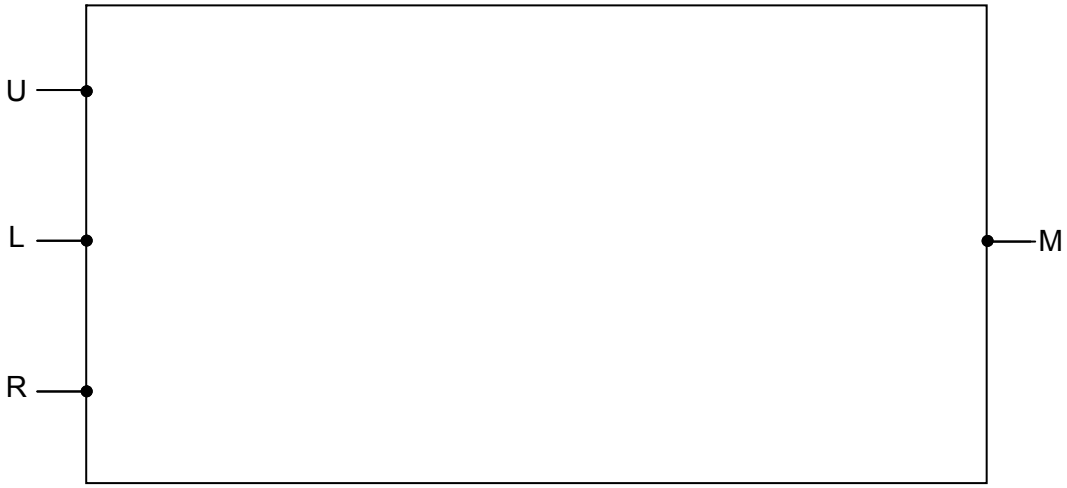
M = ...

(3 marks)

8 (b) (ii) The following symbols are used to represent logic gates:



Using a combination of any of the above logic gates draw a logic circuit for this system in the box below. You will **not** need to use all of the different types of logic gates.



(3 marks)

8 (c) Apply De Morgan's Law(s) to the following expression and simplify the result.

$$Q = \overline{\overline{A} + (B \cdot A)}$$

Show the stages of your working.

.....

.....

.....

.....

(2 marks)

Final answer .....

(1 mark)

11

Turn over ▶

9 You have been asked to design and set up a computer work area for the employees of a library.

9 (a) State the legislation that is concerned with how the work area should be physically set out and state **two** ways that this legislation will affect the design.

Legislation:.....

Affect 1: .....

.....

Affect 2: .....

.....

(3 marks)

9 (b) Application software has already been installed onto computers in another room.

9 (b) (i) State the **full name** of the law that may be broken by installing the same software onto the new computers.

.....

(1 mark)

9 (b) (ii) What information should you find out before installing this software to ensure that you will comply with the law identified in part (b) (i)?

.....

.....

(1 mark)

9 (c) As soon as an employee logs onto one of the computers they have to agree to the Code of Conduct relating to their use of the computer system.

What is a *Code of Conduct*?

.....

.....

.....

.....

(1 mark)

6

END OF QUESTIONS