OCR
RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION

COMPUTING

A451

Computer Systems and Programming

OCE/26571

Candidates answer on the question paper.

OCR supplied materials:
None

Other materials required:
None

Tuesday 11 January 2011
Afternoon

Duration: 1 hour 30 minutes

A451

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **80**.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
- This document consists of **16** pages. Any blank pages are indicated.

1 Jo buys a notebook computer which has a 3MHz quad-core central processing unit (CPU).

(a) State the purpose of the CPU.

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..... **[1]**

(b) Describe what is meant by

3MHz CPU

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..... **[2]**

quad-core CPU

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..... **[2]**

2 A small business has three stand-alone computers, a printer and an internet connection in an office.

(a) State **two** advantages of connecting the computers to create a local area network.

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..... **[2]**

(b) Describe, using a diagram, how the computers can be connected to each other using a bus topology, stating what hardware will be needed.

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..... **[6]**

3 **(a)** Calculate the denary value of the 8-bit binary number 10010111.
You must show your working.

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[2]

(b) Add the following two 8-bit binary numbers **and** explain the result.
You must show your working.

$$\begin{array}{rcccccccc} & 1 & 0 & 0 & 1 & 0 & 1 & 1 & 1 \\ + & 1 & 1 & 0 & 1 & 1 & 0 & 0 & 0 \\ \hline & & & & & & & & \\ \hline \end{array}$$

.....

..... **[3]**

4 A desk-top computer's memory includes ROM and RAM.

Tick **one** box in each row to show whether each of the statements is true for ROM or RAM.

	ROM	RAM
Programs and data which are currently in use are loaded here.		
All the contents are lost when the power is turned off.		
It is used to boot up the computer when it is switched on.		

[3]

5 Karen wants to use handheld computers to take customers' orders in her restaurant. She is thinking of using custom written, open source software.

(a) State what is meant by custom written software.

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..... **[1]**

(b) State **two** reasons why Karen may decide to use custom written software.

1. .....

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2. .....

..... **[2]**

(c)* Discuss the implications of creating open source software for the restaurant.
The quality of written communication will be assessed in your answer to this question.

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..... **[6]**

6 A shopping centre uses several remote-controlled CCTV cameras for security. An operator uses a computer to watch, control and record the output of the cameras.

State an input, output and storage device which will be needed by the computer. For each, explain the reason why it is needed.

Input device

..... **[1]**

Reason

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..... **[2]**

Output device:

..... **[1]**

Reason

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..... **[2]**

Storage device:

..... **[1]**

Reason

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..... **[2]**

7 A teacher uses a database to store the marks of pupils from all year 9 classes.

(a) PUPIL and CLASS are two entities used in this database.

Explain the term entity.

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..... **[2]**

(b) The data for the first four pupils in the PUPIL table is shown below.

PupilNumber	Surname	FirstName	ClassCode
A01	Adams	Michelle	9DK
A02	Ali	Mohammed	9BH
A03	Ali	Shirelle	9DK
A04	Azor	Michelle	9FT

(i) State the primary key for the PUPIL table and explain your answer.

Primary Key ..... **[1]**

Explanation

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..... **[2]**

(ii) The database also contains a CLASS table. The primary key for the CLASS table is ClassCode.

Explain why ClassCode has also been included in the PUPIL table.

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..... **[3]**

8 A syntax error can occur when writing a program.

(a) State what is meant by a syntax error, giving an example.

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..... **[2]**

(b) Describe tools and facilities available in an integrated development environment (IDE) which can help the programmer to identify and correct syntax errors.

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..... **[4]**

9* Computer technology has changed the ways in which teenagers interact with each other. Explain how developments in software and hardware have enabled new methods of communication among teenagers.

The quality of written communication will be assessed in your answer to this question.

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..... **[6]**

10 (a) Explain how ASCII is used to represent text in a computer system.

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..... **[3]**

(b) State what is meant by the character set of a computer.

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..... **[1]**

(c) Unicode is also used to represent text in a computer system.

Explain the difference between the character sets of Unicode and ASCII.

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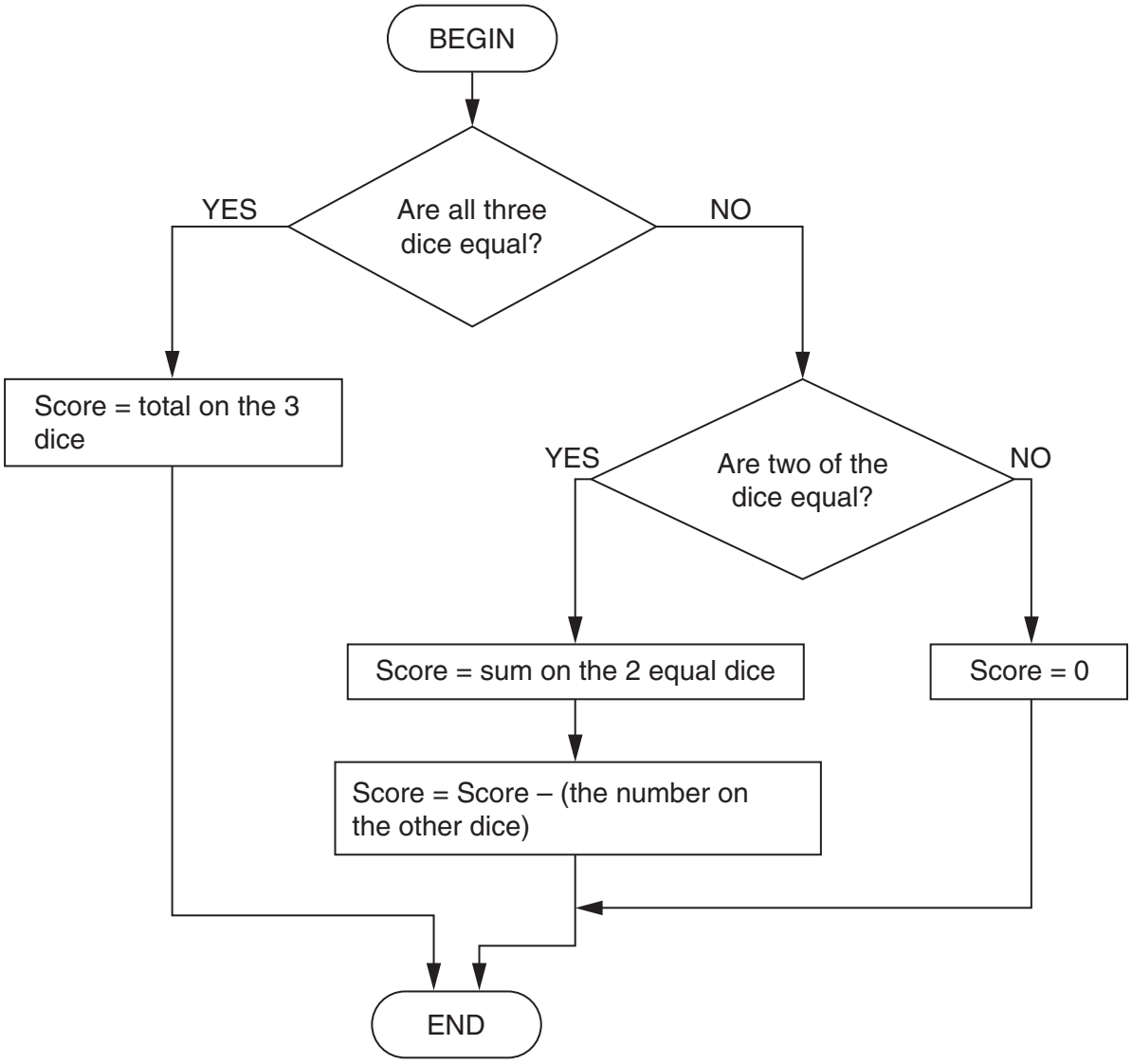
..... **[2]**

PLEASE TURN OVER FOR THE NEXT QUESTION

11 Frances is writing a program which simulates a dice game played with three ordinary 6-sided dice.

(a) When the player rolls the three dice, the player is given points according to the algorithm expressed in the flow diagram below.



State the value of the score if the dice rolled are

3 4 5 Score : .....

4 4 4 Score : .....

5 5 6 Score : .....

[3]

(b) Some rolls of the dice result in a negative score.

State a set of three numbers which can be used to test whether the algorithm produces a negative score when it should, and state the expected output for your test data.

Set of test data: .....

Expected output: ..... **[2]**

When the dice are rolled, the results are stored in an array called DiceResult.

For example, if the first dice shows a 5 then the value of DiceResult(1) becomes 5.

(c) Describe what is meant by an array.

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..... **[2]**

(d) State the data type and size of the array DiceResult giving a reason for each.

Data type of DiceResult: .....

Reason: .....

.....

Size of array DiceResult: .....

Reason: .....

..... **[4]**

PLEASE TURN OVER FOR THE LAST QUESTION

(e) The routine for rolling the dice is written as a sequence below.

```
BEGIN RollTheDice
   DiceResult(1) = Random Number between 1 and 6
   DiceResult(2) = Random Number between 1 and 6
   DiceResult(3) = Random Number between 1 and 6
END
```

Rewrite this routine so that it uses iteration.
You may use a diagram.

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..... **[4]**

[END]

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