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<h1>Computing</h1> <h2>Unit 1: Principles of Computer Science</h2>											
Monday 4 June 2018 – Morning							Paper Reference				
<b>Time: 2 hours</b>							<b>31768H</b>				
<b>You must have:</b> Information Booklet (enclosed)										Total Marks	
										<input type="text"/>	

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*

### Information

- The total mark for this paper is 90.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Answer ALL questions. Write your answers in the spaces provided.

Please refer to the Information Booklet in order to answer Question 1.

- 1 Arnold has a number of bouncy castles that customers can hire for special events such as birthday parties. He wants to create a website to advertise these bouncy castles and to take payments from customers.

Section 1 of the Information Booklet provides details about the website and its requirements.

Some of the website requirements can be seen in **Figure 1a**.

- (a) Identify **two** inputs the website must accept from the user.

(2)

Input 1

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Input 2

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- (b) Identify **two** processes the website code should perform.

(2)

Process 1

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Process 2

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Arnold wants to make sure customer details are entered before an order is processed.

Part of the algorithm is shown here. It is written in pseudocode.

```
BEGIN
status = FALSE
WHILE status = FALSE:
INPUT name
INPUT phoneNumber
IF name AND phoneNumber = TRUE:
status = TRUE
ENDIF
ENDWHILE
PRINT "Input Complete"
END
```

(c) Describe how Arnold could improve the readability of this algorithm.

(3)

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(d) Explain why Arnold has used a **WHILE** loop instead of a **FOR** loop in his algorithm.

(3)

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(e) Arnold is going to use the orders page to receive payment details.

State the protocol Arnold should use and explain why this is needed.

(4)

Protocol

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Explanation

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(f) **Figure 1b** contains the text and formatting requirements for the 'Bouncy Castle Designs' page.

**Figure 1c** shows the HTML code for the page.

Identify **two** lines of the code that do not meet the formatting requirements and describe how the code can be corrected.

(6)

**ONE**

Line number

Correction

**TWO**

Line number

Correction

(Total for Question 1 = 20 marks)



Please refer to the Information Booklet in order to answer Question 2.

2 Martha is a science student. She uses a program to record the temperature at 12:00pm every day over 4 weeks. The temperature is stored in degrees (Celsius) as a whole number. She uses a procedural language for this program.

(a) Martha uses an array to store the temperatures. The array is shown here.

10	12	12	11	9	11	11
16	17	17	13	14	16	13
12	15	16	13	15	15	14
19	20	18	17	15	13	15

Identify the output from the array if these print statements are used:

(2)

```
print(item[1][1])
```

```
print(item[2][4])
```

(b) Martha will use functions in her program.

Describe **two** features that may be specified when writing a function.

(4)

Feature 1

Feature 2

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(c) Martha would like to know how many days in the month had a temperature of 13 degrees.

Explain why Martha would use a count occurrences algorithm and not a linear search.

(4)

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(d) Martha needs to find the average temperature each week.

The average is calculated by adding all temperatures recorded in a week and then dividing this value by 7.

Explain why Martha would use truncation.

(3)

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Martha has written an algorithm using pseudocode for her program. This can be seen in **Figure 2** in Section 2 of the information booklet.

(e) Describe what the algorithm in **Figure 2** does.

(4)

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(f) Describe **one** way that the algorithm in **Figure 2** could be improved.

(3)

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(Total for Question 2 = 20 marks)

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Please refer to the Information Booklet in order to answer Question 3.

- 3 Edward owns a car maintenance business. He employs several mechanics. Edward wants a program to manage the arrangements when a car is booked in for repair. The program must also choose which mechanic to repair the car.

Section 3 of the Information Booklet provides details about the requirements of this program.

- (a) Edward wants to make sure his staff enter the car registration plate in the correct format.

Develop an algorithm using pseudocode that meets the requirements shown in **Figure 3a** and **Figure 3b**.

(8)

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When a customer books their car into the garage, the program will allow the following details to be entered:

- customer name
- telephone number
- details of the problem.

(b) Common built-in functions that have been used in the program, and also the program code can be seen in **Figure 3c**.

Evaluate how effectively the code in Part A validates user input.

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(c) In Part C of the program code, Edward has used the list data structure to store the types of fault a user might enter.

These faults are then compared against the user input to choose the right department for the car to be fixed.

Discuss different ways Edward's program could store and access the fault data.

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**(Total for Question 3 = 24 marks)**



Please refer to the Information Booklet in order to answer Question 4.

- 4 Kisha is creating a computer game to sell. She will create the program code for level 1 first and then create extra levels later.

Figure 4a shows the screen design for level 1.

Figure 4b shows the game requirements.

- (a) Produce example pseudocode statements to show how each Boolean Operator could be used in the game.

(6)

Boolean Operator – **AND**

Example Pseudocode

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Boolean Operator – **OR**

Example Pseudocode

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Boolean Operator – **NOT**

Example Pseudocode

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(b) Discuss the reasons why Kisha may need to translate her program code into another programming language in the future.

(8)

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(c) Analyse how the structure and features of object-orientated programming languages will benefit Kisha when she creates extra levels in her game.

(12)

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**(Total for Question 4 = 26 marks)**

**TOTAL FOR PAPER = 90 MARKS**





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