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**GCSE**

**COMPUTER SCIENCE**

**UNIT 2**

**Computational Thinking and Programming**

**SAMPLE ASSESSMENT MATERIALS**

**2 Hours**

### **ADDITIONAL MATERIALS**

You will require the electronic answer booklet for this examination and files for question 8, all of which should be pre-installed on your examination account.

Your computer should be pre-installed with text editing software, a word processing package and a functional copy of a familiar version of the Greenfoot IDE.

### **INSTRUCTIONS TO CANDIDATES**

You will need to enter your answers to questions 1, 3, 4, 5, 6 and 7 within the electronic answer booklet provided.

You will need to create a new plain text file to answer question 2.

You will complete the work for question 8 within the Greenfoot IDE.

Carry out all tasks and make sure that you check your work carefully to ensure that the work you produce is accurate and correct.

Save your work regularly.

### **INFORMATION FOR CANDIDATES**

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the need for good English and orderly, clear presentation in your answers.

The total number of marks available for this examination is 60.

Questions 5, 6, 7 and 8 will require you to draw on your knowledge from multiple areas of your course of study.

1. State the HTML tags needed for each of the following: [3]

- (a) Italic text.
- (b) Centre text.
- (c) Horizontal Rule.

Enter your answers in the electronic answer document.

2. A first attempt at producing an HTML web page to advertise a fitness tracking wristband is shown below. [10]

My Fitness Tracker  
Fitness tracking wearable technology!

Do you need to monitor:  
your heart rate  
your running speed  
total calories burned

All of the above in a sturdy, sporty, and comfortable design. Displays time, steps, and other stats on your wristband. Wirelessly syncs with your mobile device using Bluetooth to upload to our tracking website!

Click the link below to find out more:  
[www.myfitnesstracker.co.uk](http://www.myfitnesstracker.co.uk)

The web page was then improved using various HTML tags to provide the formatting and content shown below.



Copy the text from the electronic answer document into a basic text editor. Insert the HTML tags that would be needed to display the content and formatting shown in the improved web page above.

Save your new web page as myfitnesstrackerFinal.txt

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3. (a) Describe the main difference between local and global variables. [2]
- (b) Explain why it is usually better practice to use local variables rather than global variables. [3]

Enter your answers in the electronic answer document.

4. Below is an assembly program written using Little Man Computer (LMC) mnemonics:

```
1  INP
2  STA FIRST
3  INP
4  ADD FIRST
5  OUT
6  HLT
```

State the purpose of the following lines of code in the assembly program above: [6]

- (a) Line 1
- (b) Line 2
- (c) Line 3
- (d) Line 4
- (e) Line 5
- (f) Line 6

Enter your answers in the electronic answer document.

5. Below is an incomplete algorithm which is intended to check the username and password entered by a user. The user has 3 attempts.

```
1  Declare Subroutine LoginScreen
2  username is string
3  password is string
4  counter is integer
5  flag is boolean
6  set flag = false
7  set counter = 0
8  repeat
9  output "Type in username"
10 .....
11 .....
12 input password
13 .....
14 output "Username and password correct"
15 set flag = true
16 else
17 output "Username or password incorrect"
18 end if
19 set counter = counter + 1
20 .....
21 End Subroutine
```

Lines 10, 11, 13 and 20 are missing from the algorithm above. Using four of the lines of code below, complete this algorithm in the electronic answer document. [4]

- else is true
- if username = "User1" AND password = "Pass1" then
- input username
- input flag
- until counter = 3
- if username = "User1" OR password = "Pass1" then
- output "Type in password"

6. An algorithm is required to calculate the total, average, highest and lowest value of a set of positive integers.

The algorithm needs to:

- input the number of integers to be used
- input the value of each integer
- output the total of all the integers
- output the average of all the integers
- output the highest integer
- output the lowest integer

An example of the **input** and output of the algorithm is shown below.

Please enter the number of integers: **3**

Enter integer: **4**

Enter integer: **3**

Enter integer: **5**

Total: 12

Average: 4

Highest: 5

Lowest: 3

Write the required algorithm in the electronic answer document.

[9]

7. Using your knowledge of how a bubble sort operates and of how a merge sort operates, demonstrate how the following data would be sorted using both methods, clearly describing each step:

9	5	10	2
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Enter your answers in the electronic answer document.

[8]

8. Open the Greenfoot world WJECAquarium and familiarise yourself with its contents.
- (a) Populate the world with a **crab**, at least two **sharks** and at least two **fish**. [3]
  - (b) Edit the **fish** and **sharks** so that they turn and move randomly. [3]
  - (c) Edit the program code to make the **crab** move at an appropriate speed in the direction of the arrow keys when pressed. [2]
  - (d) Edit the **crab** so that it “eats” a **fish** when they collide (removes the **fish** from the world). [1]
  - (e) Add a sound which will play every time the **crab** “eats” a **fish**. [1]
  - (f) Add a **counter** and edit the code so that the **counter** displays how many **fish** have been “eaten” by the **crab**. [2]
  - (g) Edit the code so that the **counter** loses a point (1 point is deducted) if the **shark** “eats” a **fish**. [2]
  - (h) Save your completed world as FullAquarium [1]

