



GCSE



C500U20-1

FRIDAY, 27 MAY 2022 – AFTERNOON

COMPUTER SCIENCE – Component 2

Computational Thinking and Programming

2 hours plus your additional time allowance

ADDITIONAL MATERIALS

You will require the WJEC supplied prototype Python file: ParkWoodGYM.py and Payroll.py and Data.dat

Your computer should be pre-installed with a word processing package and a functional copy of Python 3.8.0.

INSTRUCTIONS TO CANDIDATES

Some questions should be answered in a word-processed document. All other questions will require the use of the Python 3.8.0 IDE.

Save your work regularly.

INFORMATION FOR CANDIDATES

The total number of marks available for this examination is 80.

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 quality of your written communication, including appropriate use of punctuation and grammar, will be assessed in your answers.

1. INVESTIGATION

- (a) Create a new word-processed document called ExamAnswers.**

Open the ParkWoodGYM.py file and the Payroll.py file and familiarise yourself with the contents.

Using the ParkWoodGYM.py file:

Provide a screenshot of the error message displayed following a failed login attempt. State the incorrect username AND incorrect password used. [3 marks]

- (b) Provide a screenshot of the message displayed following a successful login attempt. State the username and password used.**

Enter your answers in your ExamAnswers document.

[3 marks]

2. Identify ONE example of each of the following from the ParkWoodGYM.py file. Copy each example identified into your ExamAnswers document:

- (a) a user-defined function or subroutine**
- (b) assignment**
- (c) code to generate a button on a form.**

Enter your answers in your ExamAnswers document.

[3 marks]

3. Describe ONE example of each of the following using annotation in the ParkWoodGYM.py file:

- (a) iteration**
- (b) a Boolean value**
- (c) selection**
- (d) writing information to a file.**

Enter each of your answers as a line of annotation in the existing code in the ParkWoodGYM.py Python file.

[8 marks]

(Turn over)

4. DESIGN

Parkwood Vale Gym would like you to design additional features for the system to allow it to store members' details.

Design an algorithm that accepts the input of a new member's last name. Your algorithm should output a suitable error message if the data entered contains any numeric values.

Your algorithm should be written using pseudo-code and self-documenting identifiers.

Enter your answer in your ExamAnswers document.

[6 marks]

5. **Parkwood Vale Gym requires an additional feature that will calculate the insurance fee to be paid by new gym members.**

The insurance fee is calculated as 10% of the monthly membership fee.

Design an algorithm which:

- **allows the user to input the monthly membership fee**
- **calculates the insurance fee**
- **calculates the new total fee by adding the membership fee to the insurance fee**
- **outputs the result of the calculations.**

Your algorithm should be written using pseudo-code and self-documenting identifiers.

Enter your answer in your ExamAnswers document.

[6 marks]

6. IMPLEMENTATION

Parkwood Vale Gym would like to create a new form to store members' details.

- (a) Create a new form. [1 mark]**
- (b) Insert a title on the form “Add member”. [2 marks]**
- (c) Create text boxes and provide appropriate labels to allow a user to input each of the following:**
 - Member ID**
 - First name**
 - Surname**
 - Weight**
 - Date of birth. [11 marks]**
- (d) Create a functioning “Back” button that returns the user to the main menu. [2 marks]**
- (e) Add code to implement a presence check on Member ID. [2 marks]**
- (f) Create a “Save” button and add code to the Python file to enable the saving of the above details in a file called “MemberDetails.txt” displaying a successfully saved message. [3 marks]**

(Turn over)

6 (g) Annotate your code to explain the functionality of the code in the new file. [6 marks]

Enter your answers as code in a new Python file called Members.py

7. TESTING

Parkwood Vale Gym requires you to carry out the following tests on the program.

- (a) Test the functionality of the presence check on the Member ID field and provide a screenshot of the error message.**
- (b) The following member details are to be stored using your Python program:**
 - Member ID: 121**
 - First name: Gary**
 - Surname: Davies**
 - Weight: 72**
 - Date of birth: 6/1/1998.**

Test the functionality of the Python program by providing screenshots of the following:

- (i) the form completed with the above details**
- (ii) a message confirming that the member details have been stored**
- (iii) the MemberDetails.txt file open with the above details stored**

Enter your answers in your ExamAnswers document.

[5 marks]

(Turn over)

8. REFINEMENT

Parkwood Vale Gym has asked you to carry out the following code refinements to change the function and improve the accuracy of its code.

Parkwood Vale Gym is aware of changes to the tax system that it will have to implement. Refine the code within Payroll.py to take account of the following changes.

- (a) (i) Increase the Tax Rate from 20% to 24%.**
- (ii) Annotate your code to describe the refinements you have made.**
- (b) (i) Change the National Insurance Rate to 8.5%.**
- (ii) Annotate your code to describe the refinements you have made for the change in National Insurance Rate.**

Enter your answers as code in Payroll.py [8 marks]

(Turn over)

9. REFINEMENT TESTING

Provide a screenshot of your Payroll form showing all outputs when a Gross pay of 1100 is input.

Enter your answer in your ExamAnswers document.

[5 marks]

10. EVALUATE

Evaluate how well your final program meets Parkwood Vale Gym's requirements.

You should consider:

- **Two refinements that you have made to your program**
- **How the code achieves those refinements**
- **Areas for improvement in your final program.**

Enter your answers in your ExamAnswers document.

[6 marks]

END OF PAPER