



GCSE

C500U20-1



TUESDAY, 21 MAY 2024 – AFTERNOON

COMPUTER SCIENCE – Component 2
Computational Thinking and Programming

2 hours

The decryption password for the encrypted media files is sugar-if2uQ

C500U201
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ADDITIONAL MATERIALS

You will require the WJEC supplied prototype Python file: ArtPV.py and Payroll.py

Your computer should be pre-installed with a word processing package and a functional copy of Python 3.10.2.

INSTRUCTIONS TO CANDIDATES

Some questions should be answered in a word-processed document. All other questions will require the use of a functional copy of Python 3.10.2 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.

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

Open the **ArtPV.py** file and the **Payroll.py** file and familiarise yourself with the contents.

Investigation

1. Using the **ArtPV.py** file:

- (a) Provide a screenshot of the error message displayed following a failed login attempt. State the incorrect username **and** incorrect password used. [3]
- (b) Provide a screenshot of the message displayed following a successful login attempt. State the username **and** password used. [3]

Save your screenshots and answers in your **ExamAnswers** document.

2. Identify **one** example of each of the following from the **ArtPV.py** file:

- (a) writing information to a file [1]
- (b) navigation code [1]
- (c) an example of selection. [1]

Copy your answers into your **ExamAnswers** document.

3. Describe **one** example of each of the following using annotation in the **Payroll.py** file:

- (a) setting a caption on a form/window [2]
- (b) a mathematical calculation [2]
- (c) an operator [2]
- (d) code to generate a command button. [2]

Provide your answers as code in the **Payroll.py** Python file.

Design

Parkwood Vale Arts Club would like you to design additional features for the system.

4. Parkwood Vale Arts Club requires an additional feature that will calculate the cost of a class.

A class costs £20 per hour plus a fee of £10 per stock item required.

Design an algorithm which:

- allows the user to input the total number of hours
- calculates and outputs the time cost (total number of hours x cost per hour)
- allows the user to input the number of stock items
- calculates and outputs the cost of stock items
- calculates and outputs the total cost by adding the cost of stock items to the time cost.

Your algorithm should be written using pseudo-code and self-documenting identifiers. [6]

Enter your algorithm into your ExamAnswers document.

5. Parkwood Vale Arts Club wishes to offer new pottery classes that have different costs. To avoid people having to pay for pottery stock items each lesson, Parkwood Vale Arts Club requires a feature that will calculate a monthly fee.

Design an algorithm which:

- allows the user to input the cost for clay per lesson
- allows the user to input the cost of glaze per lesson
- allows the user to input the number of lessons attended per month
- calculates and outputs the monthly fee for stock items.

Your algorithm should be written using pseudo-code and self-documenting identifiers. [6]

Enter your algorithm into your ExamAnswers document.

Implementation

6. Parkwood Vale Arts Club would like you to create a new form to input stock details. It has created the outline design shown here:

The image shows a window titled "Add stock item" with a standard macOS-style title bar (red, yellow, green buttons). Inside the window, there are six text input fields stacked vertically, each preceded by a label: "Stock ID", "Name", "Description", "Cost", "Expiry Date", and "Supplier". At the bottom of the form area, there are two buttons: "Back" and "Save".

- (a) Create a form in a new Python file. [1]
- (b) Insert a title on the form "Add stock item". [2]
- (c) Create text boxes to allow a user to input each of the following:
 - Stock ID
 - Name
 - Description
 - Cost
 - Expiry Date
 - Supplier
 [6]
- (d) Provide an appropriate label for each of the text boxes in part (c). Ensure that the layout is clear. [7]
- (e) Create a "Save" button and add code to the Python file to enable the saving of the stock details in a file called "Stock.txt" and display a saved successfully message. [4]
- (f) Create a "Back" button to return the user to the main menu. [2]
- (g) Explain how your program works by annotating the code you have written in your new Python file. [6]

Provide your answers as code in a new Python file called Stock.py.

Testing

Parkwood Vale Arts Club requires you to test the program.

7. These stock details are to be stored using your Python program:

- Stock ID: 101
- Name: A4 Paper
- Description: Low weight A4 paper
- Cost: 4
- Expiry Date: 1/1/2040
- Supplier: WJEC

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

- | | |
|--|-----|
| (a) the form completed with the above details | [1] |
| (b) a message confirming that the details have been stored | [1] |
| (c) the stock.txt file open with the above details stored. | [2] |

Save your screenshots in your ExamAnswers document.

Refinement

Parkwood Vale Arts Club has asked you to carry out refinements to change the function and improve the accuracy of the code.

8. Parkwood Vale Arts Club is aware of changes to the tax system that they will have to implement. Refine the code within Payroll.py to take account of the following changes.
- (a) (i) Change the Tax Rate to 21%. [2]
 - (ii) Describe the refinements you have made to your code for the increase in Tax Rate by annotating your code. [2]
 - (b) (i) Change the National Insurance Rate to 8.5%. [2]
 - (ii) Describe the refinements you have made to your code for the change in National Insurance Rate by annotating your code. [2]

Provide your answers as code in Payroll.py.

Refinement testing

9. Provide a screenshot of your Payroll form showing all outputs when a gross pay of £1000.00 is input. [5]

Save your screenshot in your ExamAnswers document.

Evaluate

10. Evaluate how successful your final program is in meeting Parkwood Vale Arts Club's requirements.
You should consider:

- **two** refinements that your program succeeds in implementing
- how the code achieves those refinements
- areas for improvement in your final program. [6]

Enter your answers into your ExamAnswers document.

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