



GCSE

C500U20-1B



SEPTEMBER 2023

COMPUTER SCIENCE - Component 2
Computer Programming

PRE-RELEASED MATERIAL

INSTRUCTIONS TO CANDIDATES

You must **not** take this material or any associated research material into the examination with you.

INFORMATION FOR CANDIDATES

The information overleaf is provided to assist your preparation for the Computer Programming examination.

All programs should be developed using Python version 3.10.2

Original Requirements

Parkwood Vale Arts Club is a small start-up business that runs art classes for all age ranges and abilities. It also sells art supplies, such as paints and brushes.

Parkwood Vale Arts Club would like to store data of its stock and classes on a computerised system. Whilst the business could buy an off-the-shelf package, it has decided to commission you to develop a bespoke solution.

Authentication

Data security is very important to the business. It has insisted that the system has a login screen that requires a username and a password for authentication. The system must display a message stating whether login was successful or unsuccessful. It must also allow for new usernames and passwords to be added.

Main Menu and Navigation

The business owner and employees of Parkwood Vale Arts Club are highly skilled art practitioners and teachers however they are non-specialist computer users and they have requested that the new system be user friendly; therefore, a Graphical User Interface (GUI) will be required.

Classes

Parkwood Vale Arts Club encourages the staff to create and advertise new classes throughout the year. Each class has a unique reference code that identifies the different classes on offer.

Add Classes

Parkwood Vale Arts Club has decided that it would like a form to input the following details for each art class:

- Class Code
- Class Name
- Start Date
- Description
- Number of Sessions

The form should also include buttons that:

- save the details to a file on disk called ArtClassDetails.txt
- return to the main menu.

Parkwood Vale Arts Club has provided a partial design of the user interface it would like to use:

The image shows a window titled "Add Art Class" with a standard macOS-style title bar (three colored buttons: red, yellow, green). Inside the window, there are five labels on the left, each followed by a rectangular input field on the right:

- Class Code
- Class Name
- Start Date
- Description
- Number of Sessions

Below these input fields, centered horizontally, are two buttons: "Back" and "Save". Both buttons have a rounded rectangular shape with a slight shadow effect.

Payroll

Parkwood Vale Arts Club must pay its staff for the hours worked and needs to calculate the correct amount of pay for each staff member.

Users will input the monthly salary (Gross Pay) and the system will calculate and display deductions (Tax, National Insurance and Pension Contribution), and the correct amount of take-home pay (Net Pay).

The following calculations should be used for the prototype software:

- Tax= 19% of Gross Pay
- National Insurance= 12.5% of Gross Pay
- Pension Contribution= 10% of Gross Pay
- Deductions = Tax + National Insurance + Pension Contribution
- Net Pay = Gross Pay - Deductions.

They have decided that currently there is no need to store the results of these calculations.

The Payroll form should include buttons that:

- carry out the calculation
- return to the main menu.

A partial design for the user interface has been provided:

The image shows a software window titled "Payroll" with a logo on the left. The window contains several input fields and two buttons. The input fields are labeled "Gross Pay", "Tax:", "National Insurance:", "Pension Contribution:", "Deductions:", and "Net Pay:". The "Gross Pay" field contains the value "0", while the others contain "0.0". A "Calculate" button is located below the "Gross Pay" field, and a "Back" button is at the bottom center of the window.

Parkwood Vale Arts Club would like the system developed using the Python programming language to enable them to make additions and changes to the program later.