



GCE AS

B500U20-1



MONDAY, 19 MAY 2025 – AFTERNOON

COMPUTER SCIENCE – AS component 2
Practical Programming to Solve Problems

2 hours 15 minutes

The decryption password for the encrypted media files is key-hYnBPU7

B500U201
01

INSTRUCTIONS TO CANDIDATES

Answer **all** of questions 1, 2, 3, 4 and **all** parts of question 5.

You will need to record all of your answers to questions 1, 2, 3 and 4 in a **single** word-processed document.

Answer **all** parts of question 5. This is the section which requires you to use the Integrated Development Environment (IDE) of your chosen programming language.

INFORMATION FOR CANDIDATES

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

The total number of marks available is 60.

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

You will need a computer with an installed functional copy of the Integrated Development Environment (IDE) appropriate to your chosen programming language and word processing software.

A calculator is allowed in this examination.

Remember to save your work regularly.

Scenario



Parkwood Vale Local Pharmacy (PVLP) is a small local pharmacy that offers a range of products and services to its rural community. **PVLP** provides pharmaceuticals and health-related products, and it also intends to provide personalised advice to its customers. Currently keeping records on paper, **PVLP** is expanding and now wishes to transition to a computerised system for efficient management of its data.

PVLP would like to offer its customers the option to register appointments for repeat prescriptions, health check-ups and other health-related services. This system will enable **PVLP** to send timely reminders to its customers to encourage better health management. In addition to the next appointment date and time, **PVLP** intends to collect customer information, including full name, home address, postcode, a contact email and a contact telephone number.

PVLP is considering the implementation of an electronic payment system to streamline transactions. **PVLP** is exploring whether a bespoke solution or an off-the-shelf solution would be more suitable for its needs.

Analysis and Design

You have been asked to analyse the scenario as a preliminary step towards creating a prototype computer system for **Parkwood Vale Local Pharmacy (PVLP)**.

Present your answers as a single word-processed document ‘Section A Analysis and Design’.

1. Draw a data structure table that will allow **PVLP** to store its customers’ details. [8]

2. **PVLP** is evaluating the best way to introduce the new computerised system. Compare **two** different methods of changeover available to the pharmacy. Choose the more appropriate method for this situation and justify your choice.

Your answer should be related to the impact of these methods on **PVLP** and its customers. [8]

3. Customers of **PVLP** are charged for certain services. **PVLP** stores the cost for these services in an array. The costs are calculated depending on how busy the time of day traditionally is for bookings. **PVLP** uses an algorithm to populate the array. The algorithm also provides a discount for a longer booking.

```

1  costArray[4,2] is real      {array to store data}
2  bookingLength is integer
3  timeOfDay is integer
4  bookingPrice is real
5
6  output "Please enter time of Day:"
7  input timeOfDay {User inputs timeOfDay}
8
9  for i = 1 to 4
10     costArray [i,1] = i
11     costArray [i,2] = (i * 0.1) * timeOfDay
12 next i

```

- (a) Copy and complete the table to show the contents of the `costArray` with the input `timeOfDay = 4`. [8]

1	2

- (b) **PVLP** is making additions to its algorithm to return the booking price in relation to the length of the session.

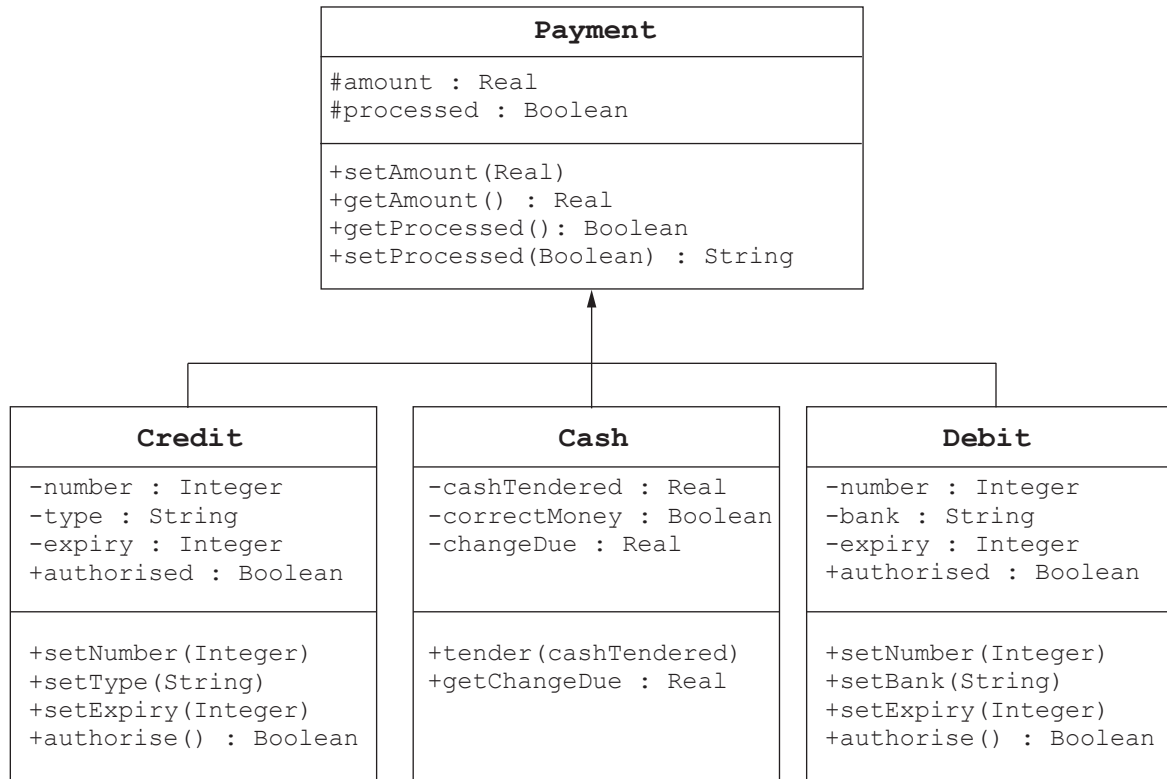
```
1    output "Please enter the booking length:"
2    input bookingLength
3
4    bookingPrice = costArray[bookingLength,2]
5
6    discount = bookingLength * 0.2
7
8    output "Discount applied:"
9    output discount
10
11   bookingPrice = bookingPrice - discount
12
13   output "Cost for booking is:"
14   output bookingPrice
```

Changes are required to the algorithm so that:

- the discount multiplier is decreased from 0.2 to 0.1
- a flat fee of 2 is added to the booking, applied after the discount.

Copy the algorithm to your document '**Section A Analysis and Design**' and complete these changes. Add annotation to the changes. [4]

4. The following partially complete class diagram represents the relationships between some of the classes that PVLP could use for its electronic payment system.



(a) State the name of an identifier for the superclass of *Credit*. [1]

(b) State the return data type for the method *setNumber*. [1]

- (c) State the name of the most appropriate identifier for a variable that is used to store the following:
- (i) FALSE [1]
 - (ii) 5.99 [1]
- (d) Explain the significance of the # symbol in the attribute `#amount` in the class `Payment`. [2]
- (e) An object called `transaction1` is instantiated from the class `Debit`.
Applying the concept of inheritance, list **all** of the methods that would be contained within the object `transaction1`. [2]
- (f) An object called `transaction2` is instantiated from the class `Credit`.
Applying the concept of inheritance, list **all** of the attributes that would be accessible within the object `transaction2`. [2]
- (g) Explain why the attribute `amount` is situated within the class `Payment`. [2]

Select the programming language of your choice from **VB, Python or Java** and answer **all** parts of question 5.

5. PVLP wants a computer system to be developed that can:

- store customer appointment details
- search customer appointment details
- store pharmaceutical stock details
- count the number of items in stock with particular attributes, for example the total number of stock items that expire on that date.

(a) Open the file **PVstock**

- Read through the code and familiarise yourself with its contents.
- The file contains incomplete code, which is intended to save stock details and return the number of items that match the search criteria entered.

Complete this code.

[4]

Save the changes made to the file PVstock.

(b) Create a new form that will allow **PVLP** to:

- input customer details including next appointment
- validate customer details ensuring the next appointment date is in **DD/MM/YYYY** format
- store customer details in a text file called **PVbookings.txt**
- confirm storage of the details
- retrieve specified customer details.

[12]

Save your work as PVBookings

(c) Using the internal facility of your language, add annotated listings to your code from question **5(b)** that would clearly explain the design of your program to another software developer.

Save the changes made to the file PVBookings

[4]

END OF PAPER