Faculty of Computing

Year 1 Semester 2 (2025)

SE1020 – Object Oriented Programming Lab Sheet 03

Question 1 (From Tutorial 01)

1. 01) Develop a system to manage bank accounts for a banking application.

   Scenario:

   A bank wants to create a simple system to manage its customers' savings accounts. Each customer has a savings account with details such as account number, account holder's name, and account balance. The bank also needs to ensure that account details like balance are secure and cannot be accessed directly. The bank requires that the system:

   - Protects the account balance by restricting direct access to it.
   - Provides methods (getters and setters) to retrieve the balance and allow deposits and withdrawals, ensuring the balance cannot become negative.

   (a) Create a class **SavingsAccount** with necessary attributes.

   (b) Implement getters and setters for **accountNumber** and **accountHolderName**.

   (c) Create a getter for **balance** (No setter for balance).

   (d) Implement a method called **deposit(double amount)** that adds amount to balance (amount should be positive).

   (e) Implement a method called **withdraw(double amount)** that deducts amount from balance only if there are sufficient funds.

   (f) Create a **displayAccountDetails()** to print account details.

   Sample Output:

```
Enter Account Number: 1002003
Enter Account Holder Name: Kamal Senevirathne
Enter Initial Deposit: 50000
Deposited 50000.0. New Balance: 50000.0
Enter Deposit Amount: 250
Deposited 250.0. New Balance: 50250.0
Enter Withdrawal Amount: 1000
Withdrawn 1000.0. New Balance: 49250.0

Final Account Details:
Account Number: 1002003
Account Holder: Kamal Senevirathne
Balance: 49250.0
```

Question 02

You have been assigned to create a system to manage products in a retail store.

Create a class called Product with the productId (int), productName (String), price (double), and quantity (int) as attributes.

(a) Create Getters and Setters for each attribute. Apply the below validation in the setters:

- price should always be greater than 0.
- quantity should not be negative.

(b) Implement a method called displayDetails() to print the product information.

(c) Implement a method called calculateTotalValue() to calculate and return the total value of the stock.

Total Value = price * quantity

Create another class named **ProductApp** containing the main method to do followings:

(a) Create a Product object.

(b) Accept user input to set values for each attribute using setters.

(c) Display the product details using displayDetails().

(d) Display the total value of the product stock using calculateTotalValue().

Question 03

Please submit your answer to the question below to Git. When committing the file, ensure that you include a meaningful commit message (e.g., "Lab03 - Question03").

You have been hired as a software developer by a company to build a system that helps manage **employee performance evaluations and salary bonuses**. At the end of each year, the company assesses each employee's performance and awards a bonus based on their **performance rating**. The **bonus** is calculated as a percentage of the **employee's basic salary**, with higher performance ratings leading to higher bonuses.

As part of this system, you need to **design a class** to represent an **employee** and ensure that the employee's **details and performance evaluations are handled securely**. The system should allow for proper **salary calculations based on performance**, while also **ensuring that performance ratings are within a valid range (1 to 5)**. You should also **display the final salary after adding the bonus**.

The company gives a **bonus based on the employee's performance rating**, as shown below:

Performance Rating	Bonus Percentage
5	20% of Basic Salary
4	15% of Basic Salary
3	10% of Basic Salary
2	5% of Basic Salary
1	No Bonus (0%)

You are required to implement:

- calculateBonus() method – to calculate the bonus amount based on the performance rating using the policy above.
- calculateTotalSalary() method – to calculate the total salary as:

$$\text{Total Salary} = \text{Basic Salary} + \text{Bonus}$$

Sample Output:

```
Enter Employee ID: 130
Enter Employee Name: Kalhari Perera
Enter Basic Salary: 20000
Enter Performance Rating (1-5): 3

Employee Details:
Employee ID: 130
Name: Kalhari Perera
Basic Salary: 20000.0
Performance Rating: 3
Bonus: 2000.0
Total Salary: 22000.0
```