

Object Oriented Programming

Time allowed: Three Hours

18th May 2022 | 9AM-12PM

INSTRUCTIONS TO CANDIDATES

- This paper contains 5 questions. Answer ALL questions.
- Marks for each question is indicated.
- This is a closed book examination.
- All calculators are not allowed.

Question 1 [20 Marks]

- A. Briefly explain why object-oriented programming is required. (3 Marks)
- B. Briefly Explain applications of private, public, and protected. (6 Marks)
- C. What is the main difference between static member and instance member?
Provide an example for each member. (4 Marks)
- D. Differentiate inheritance and overriding. (3 Marks)
- E. List out four features of a constructor. (4 Marks)

Question 2 [20 Marks]

A furniture shop began its business by selling various furniture for people islandwide through their network. The furniture is grouped into three categories based on the quality A, B and C. Each piece of furniture has a code, a group, and a selling price. The shop owner decided to provide discounts for furniture based on the group. The discount rate of each furniture group is stated in the table below. You are required to write an object-oriented program to fulfill the below tasks. The main method should be kept in a separate class.

<i>Furniture Group</i>	<i>Discount Rate</i>
<i>A</i>	<i>5% of the selling price</i>
<i>B</i>	<i>8% of the selling price</i>

<i>C</i>	<i>11% of the selling price</i>
<i>Table 2.1</i>	

- i. Assign data for codes, groups and selling prices of furniture A and B sold by the shop using a constructor.
- ii. Update the selling price of furniture A and B after the discount using a method.
- iii. Calculate income received from A and B if they sold 5 furniture from A and 8 furniture from B using the private method.
- iv. Output code, group, and income received from A and B furniture using a method.

Question 3 [20 Marks]

In the example given below, you should create two separate classes, Person and Mobile which are associated through their objects. A person can have many mobile numbers, so it defines the one-to-three relationship. The attributes of the classes are mentioned below. The relevant methods for the classes can be selected by the programmer. Write an object-oriented program for the scenario to produce the output given by class Person. Consider figure 3.1 and the output below.

Class: Person

Attribute: name

Class: Mobile

Attribute: mobile number

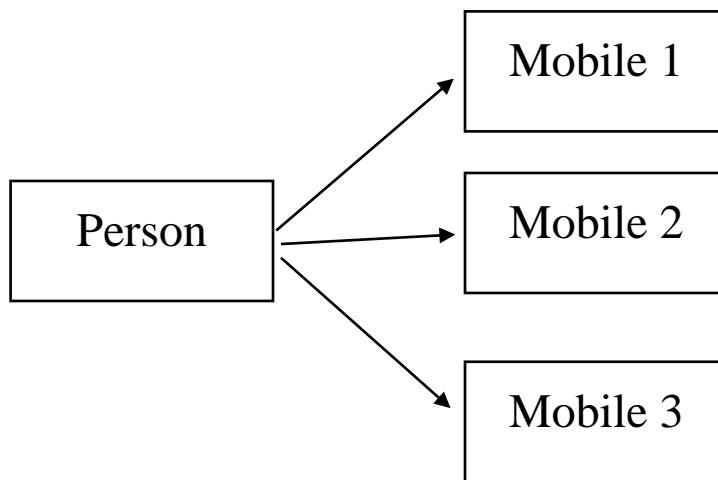


Figure 3.1

Sample Output

```
Name - Saman Perera  
Mobile Numbers -  
071123456  
076965874  
071896325
```

Question 4 [20 Marks]

ABC is among the world's largest furniture manufacturers offering a diverse range of modern and traditional furniture. More than 5000 employees work at ELCARDO company. All employees have employee id, names, and basic salary. But only Managers are given fuel allowance and incentive monthly in addition to basic salary. Write an object-oriented program to set details (employee id, name, basic Salary, fuel allowance and monthly incentive) of a manager and find and display total monthly income. You are required to identify super class/s and sub-class/s. Use appropriate methods to set data of a manager and calculate the total monthly income of a manager in the program. (20 Marks)

Question 5 [20 Marks]

Razor bank is a private bank that offers competitive interest rates to its customers. The system will store Account Holders' data and **Account Holder** has Account Number, Name, Age and Account Balance (Protected Data). The function **funCreateAccount()** is used to set data for account number, name, age and account balance. The current interest rate for the saving account is 10% and **funCallInterest()** function is used to calculate the updated account balance as follows.

$$\text{acc_balance} = \text{acc_balance} + (\text{acc_balance} * 10\%)$$

If the customer is 60 or above, He is eligible to obtain Razor Senior Citizen savings come with a higher interest rate. The **Senior Citizen Account Holder** will receive 15% interest rate and overrides **funCalInterest()** function to find the new account Balance.

```
acc_balance = acc_balance + (acc_balance * 15%)
```

Write an Object-Oriented program to set data, calculate interest and print the updated account balance of the senior citizen account holder. You are required to identify superclass, subclass, data members, and methods. (20 marks)