University of Colombo School of Computing
SCS 2208 - Rapid Application Development

Lab Sheet 05

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1. Read the following scenarios and implement suitable codes following the encapsulation concept in object-oriented programming.

Scenario 1

A student has an index number, name, date of birth, address, contact number and email address.

Each student is assigned to a group depending on the following logic.

Index number is divided by 4 and consider the remainder.

- If the remainder is 0 – Group 1
- If the remainder is 1 – Group 2
- If the remainder is 2 – Group 3
- If the remainder is 3 – Group 4

Implement suitable codes to

➔ Set details of the student
➔ Show details of the student
➔ Set the group number
➔ Show the group number

Scenario 2

In an examination there are two papers; MCQ paper and an Essay paper. Final marks of the examination is calculated using the total of both types of papers. If the total marks are greater than or equals to 50, it is considered as a “Pass”. Otherwise it will be considered a “Fail”.

Depending on the marks, it is categorized to grades as follows.

- If marks are greater than or equals to 75 - Grade A
- If marks are greater than or equals to 65 and less than 75 - Grade B
- If marks are greater than or equals to 55 and less than 65 - Grade C
- If marks are greater than or equals to 35 and less than 55 - Grade S
- If marks less than 35 – Grade W

When marks are entered, consider the following details.

- Students' index number
- MCQ marks
- Essay marks

Implement suitable codes to

- ➢ Insert index number, MCQ marks and Essay marks
- ➢ Calculate total marks
- ➢ Display total marks
- ➢ Display whether "Pass" or "Fail"
- ➢ Display the grade

2. Implement suitable code segments according to following instructions to calculate surface area and the volume of following solids.

a. Identify the superclass and define it as an abstract class

b. Define the methods which are used to calculate the surface area and volume asn abstract methods.

c. Implement subclasses with an appropriate method implementation for the abstract methods in the superclass.

    - Cube
    - Cuboid
    - Cylinder
    - Sphere
    - Cone

3 . Consider the given scenario and implement suitable code segments using Abstraction and other object oriented concepts.

Within a bookstore there are novels, short stories, biographies and educational books. Each book has a name, price, author and a publisher.

It is decided to give discounts for each category. For educational books 20%, for novels and short stories it is 15% and for biographies it is 10%.

Display details of each book (name, price, author and publisher) with the discount.

4. Read the following scenario about different kinds of games and build suitable code segments using abstraction and other object oriented concepts.

Internet café provide three types of games. They are ‘Car Games’, ‘Shooting Games’ and ‘Puzzle Games’. All games have three levels: beginner, intermediate and advanced. Every game displays a message when the player reaches the winning score/winning state. If the player loses the game, is it also mentioned with a message.

For any game, players can select the theme and the game avatar as they prefer. Players can pause, resume or cancel the game at any time.

For ‘Car Games’ the winning score is 100. For ‘Puzzle Games’ the winning score depends on the time. Time can be set at the beginning of the game and if the player is able to rearrange the puzzle within the time, he is considered as the ‘Winner’. For ‘Shooting Games’ players can select the mission. If he is able to complete the selected mission, it is considered as the winning state