COMSATS University Islamabad, Lahore Campus

Assignment No. 01

Course: Object Oriented Programming **Class: BCS**

Due Date: 26-02-2020 **Max. Marks: 20**

Q No. 1 Write a program that prints Electricity bill for a customer. The program should get customer's information such as customer name, customer number, address and previous meter reading and current meter reading as input. After that program should calculate the amount according to number of units consumed by the customer and print a bill. The sample bill and rate per unit are given below.

Unit range	Rate per unit
1--100	15.00
101--300	30.00
301--500	45.00
501 and above	60.00

For Example, a customer consumes 300 units; first hundred units would be charged at the rate of Rs. 15, and remaining at Rs.30 respectively as per rate given above.

Q. No. 2 Write a program that inputs five numbers and determines and prints the number of negative numbers input, the number of positive numbers input and the number of zeros input. [Hint: use conditional statement "if" and the increment operator]

Q. No. 3 Create a (Body Mass Index Calculator) BMI calculator that reads the user's weight in kilograms and height in meters (or take in inches or feet and convert it into meters), then calculate and display the user's BMI using the formula

$$BMI = \frac{\text{Weight in Kilograms}}{\text{height in meters} * \text{height in meters}}$$

Also, display the following information from the department of health and human service/National institutes of Health so the user can evaluate his/her BMI

BMI Values

Underweight:	less than 18.5
Normal:	between 18.5 and 24.9
Overweight	between 25 and 29.9

Obese: 30 or greater

Q. No. 4 Write a program that accepts decimal number as input from the user and returns equivalent binary number and vice versa.

Example:

Input : 20

Output : 10100

Input : 10100

Output : 20

Q. No. 5 A parking garage charges a Rs. 100 minimum fee to park for up to three hours. The garage charges an additional Rs. 50 per hour for each hour or part thereof in excess of three hours. The maximum charge for any given 24-hour period is 200. Assume that no car parks for longer than 24 hours at a time. Write an application that calculates and displays the parking charges for each customer who parked in the garage yesterday. You should enter the hours parked for each customer. The application should display the charge for the current customer and should calculate and display the running total of yesterday's receipts. The application should Calculate Charges for each customer.

Q. No. 6. Create a class named **RandomNumbers** which contains a method called **randomNumberGenerator**. This method generates a random number between 1 and 10. Now the user gets three guesses. As soon as the user enters the correct number the program writes a winning message and exits. If the user fails to enter the correct number in three guesses, the program writes a failure message and exits.

You will need Math.random(), which produces a random double between 0.0 and 1.0. For example:

```
int someValue =  Math.random() ;   // someValue is between 0.0 and 1.0
```

You will need to use some other methods of the Math class along with some arithmetic to convert this into a random integer in the desired range. Then, write a **RandomTest** class, and create an object of **RandomNumbers** class to call the **randomNumberGenerator** method.

Here are two example runs of the program:

Sample execution 1

```
I am thinking of a number from 1 to 10.
You must guess what it is in three tries.
Enter a guess:
4
wrong
8
RIGHT!
You have won the game.
```

Sample execution 2

I am thinking of a number from 1 to 10.
You must guess what it is in three tries.
Enter a guess:
1
wrong
5
wrong
9
wrong
The correct number was 7.
You have lost the game.

Q. No. 7. It is difficult to make a budget that spans several years, because prices are not stable. If your company needs 200 pencils per year, you cannot simply use this year's price as the cost of pencils two years from now. Because of inflation, the cost is likely to be higher than it is today. Write a program to gauge the expected cost of an item in a specified number of years. The program asks for the cost of the item, the number of years from now that the item will be purchased, and the rate of inflation. The program then outputs the estimated cost of the item after the specified period. Have the user enter the inflation rate as a percentage, such as 5.6 (percent). Your program should then convert the percent to a fraction, such as 0.056, and should use a loop to estimate the price adjusted for inflation.

Q. No. 8. Define a class called Odometer that will be used to track fuel and mileage for an automobile. The class should have instance variables to track the miles driven and the fuel efficiency of the vehicle in miles per gallon. Include a mutator method to reset the odometer to zero miles, a mutator method to set the fuel efficiency, a mutator method that accepts miles driven for a trip and adds it to the odometer's total, and an accessor method that returns the number of gallons of gasoline that the vehicle has consumed since the odometer was last reset. Use your class with a test program that creates several trips with different fuel efficiencies. You should decide which variables should be public, if any.

Q. No. 9. Write a grading program for a class with the following grading policies:

a. There are three quizzes, each graded on the basis of 10 points.
b. There is one midterm exam, graded on the basis of 100 points.
c. There is one final exam, graded on the basis of 100 points.

The final exam counts for 40% of the grade. The midterm counts for 35% of the grade. The three quizzes together count for a total of 25% of the grade. (Do not forget to convert the quiz scores to percentages before they are averaged in.)

Any grade of 90 or more is an A, any grade of 80 or more (but less than 90) is a B, any grade of 70 or more (but less than 80) is a C, any grade of 60 or more (but less than 70) is a D, and any grade below 60 is an F. The program should read in the student's scores and output the student's record, which consists of three quiz scores and two exam scores, as well as the student's overall numeric score for the entire course and final letter grade.

Q. No. 10. Define a class whose objects are records on animal species. The class should have instance variables for the species name, population, and growth rate. The growth rate is a percentage that can be positive or negative and can exceed 100%. Include a suitable collection of constructors, mutator methods, and accessor methods. Include a toString method and an equals method. Include a boolean valued method named endangered that returns true when the growth rate is negative and returns false otherwise. Write a test program (or programs) that tests each method in your class definition.