***Exercise Lab 04***

***Question #01:***

Write a program in which a class named **student** has member variables name, roll\_no, semester and section. Use a parameterized constructor to initialize the variables with your name, roll no, semester and section. Print all data calling some public method.

***Question #02:***

Create a class distance that stores distance in feet and inches. Add a constructor that initializes the object with default values. There must be a function that ask user to enter distance in meters and stores accordingly. Add two functions to display the distance in meters and in feet. Add a destructor that will notify the user when an object is killed.

***Question #03:***

Write a class named **Car** that has the following member variables:

* **year.** An int that holds the car’s model year.
* **make.** A string that holds the make of the car.
* **speed.** An int that holds the car’s current speed.

In addition, the class should have the following member functions.

* **Constructor.** The constructor should accept the car’s year and make as arguments and assign these values to the object’s year and make member variables. The constructor should initialize the speed member variable to 0.
* **accelerate.** The accelerate function should add 5 to the speed member variable each time it is called.
* **brake.** The brake function should subtract 5 from the speed member variable each time it is called.

Demonstrate the class in a program that creates a **Car** object, and then calls the accelerate function five times. After each call to the accelerate function, get the current speed of the car and display it. Then, call the brake function two times. After each call to the brake function, get the current speed of the car and display it.

***Question #04:***

In a population, the birth rate and death rate are calculated as follows:

Birth Rate = Number of Births ÷ Population

Death Rate = Number of Deaths ÷ Population

For example, in a population of 100,000 that has 8,000 births and 6,000 deaths per year,

Birth Rate = 8,000 ÷ 100,000 = 0.08

Death Rate = 6,000 ÷ 100,000 = 0.06

Design a **Population** class that stores a current population, annual number of births, and annual number of deaths for some geographic area. The class should allow these three values to be set in either of two ways:

* by passing arguments to a three-parameter constructor when a new Population object is created or
* by calling the setPopulation, setBirths, and setDeaths class member functions.

The class should also have getBirthRate and getDeathRate functions that compute and return the birth and death rates. Write a short program that uses the **Population** class and illustrates its capabilities.

***Question #05:***

Design an **Inventory** class for **Imtiaz Super Market, Gulshan-e-Iqbal** that can hold information for an item in a retail store’s inventory. The class should have the following private member variables. The class should have the following public member functions.

**Variable Name Description**

itemNumber An int that holds the item’s number.

quantity An int that holds the quantity of the item on hand.

cost A double that holds the wholesale per-unit cost of the item

totalCost A double that holds the total inventory cost of the item (calculated as quantity times cost).

**Member Function Description**

default constructor Sets all the member variables to 0.

constructor #2 Accepts an item’s number, quantity, and cost as arguments. The function should call other class functions to copy these values to the appropriate member variables and then call the setTotalCost function.

setItemNumber Accepts an int argument that is copied to the itemNumber member variable.

setQuantity Accepts an int argument that is copied to the quantity member variable.

setCost Accepts a double argument that is copied to the cost member variable.

setTotalCost Calculates the total inventory cost for the item (quantity times cost) and stores the result in totalCost.

getItemNumber Returns the value in itemNumber.

getQuantity Returns the value in quantity.

getCost Returns the value in cost.

getTotalCost Returns the value in totalCost.

Demonstrate the class by writing a simple program that uses it.

***Input Validation: Do not accept negative values for item number, quantity, or cost.***

Extra Question:

Q1:

Write a program that uses a class named **MovieData** to store the following information about a movie:

* Title
* Director
* Year Released
* Running time (in minutes)

Include a constructor that allows all four of these member data values to be specified at the time a **MovieData** object is created. The program should create two **MovieData** variables and pass each one in turn to a function that displays the information about the movie in a clearly formatted manner.

Q2:

Modify the Movie Data program in **Q1** to include two additional members that hold the movie’s production costs and first-year revenues. The constructor should be modified so that all six member values can be specified when a **MovieData** object is created. Modify the function that displays the movie data to display the title, director, release year, running time, and first year’s profit or loss.