Object Oriented Programming – Fall 22

(BS-CS-F22)

Lab-2

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Instructions:

- **Indent your code properly.**
- **Use meaningful variable and function names.**
- **Use the camelCase notation.**
- **Use meaningful prompt lines/labels for all input/output.**
- **Do NOT use any GLOBAL variable(s). However, global named constants may be used.**
- **This is an individual lab, you are strictly NOT allowed to discuss your solution with fellow colleagues, even not allowed to ask how is he/she is doing, it may result in negative marking. You can ONLY discuss with your TAs or with me. • Anyone caught in an act of plagiarism wouldbe awarded an "F" grade in this Lab.**

TASK-1:

Create a class Date that has 3 private member variables to store following three attributes:

- Day (an integer)
- Month (an integer)
- Year (an integer)

Note: All member functions of the Date class, which are not supposed to change data stored in the calling object, should be declared as const member functions.

a) Implement the getter and setter functions for each of the above three member variables. Names of these functions should be: setDay, setMonth, setYear, getDay, getMonth, getYear.

b) Implement a public member function displayDate of the Date class. This function should display the date in the dd/mm/yyyy format. For example, the date 9th October 2020 should be displayed on screen like 09/10/2020.

c) Write a main function (driver program) to test the working of Date class and its member functions.

d) In the main function, allocate an array of 5 Date objects. Store these five dates in these Date objects: 25th December 1876, 9th November 1877, 21st April 1938, 14th August 1947, and 11th September 1948. Now, print these five dates by calling the appropriate member function of the Date class.

e) Proceed as in part (d) above, but now the array of dates should be allocated dynamically. Your program should ask the user about the size of the array and then allocate the array dynamically. The program should then ask the user to enter those many dates and store them into the array. Finally, your program should display all dates on screen.

TASK-2

Write a Circle class that has the following private member variables:

- radius: a double
- pi: a double initialized with the value 3.14159

The class should have the following public member functions:

- **Default Constructor.** A default constructor that sets radius to 0.0.
- **Constructor.** Accepts the radius of the circle as an argument.
- **setRadius.** A mutator function for the radius variable.
- **getRadius.** An accessor function for the radius variable.
- **getArea.** Returns the area of the circle, which is calculated as area = pi * radius * radius
- **getDiameter.** Returns the diameter of the circle, which is calculated as diameter = radius * 2
- **getCircumference.** Returns the circumference of the circle, which is calculated as circumference = 2 * pi * radius.

Write a program that demonstrates the Circle class by asking the user for the circle's radius, creating a Circle object, and then displaying the circle's area, diameter, and circumference.

TASK-3

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

- yearModel. An int that holds the car's year model.
- 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 constructor and other public member functions.

- **Constructor.** The constructor should accept the car's year model and make as arguments. These values should be assigned to the object's yearModel and make member variables. The constructor should also assign 0 to the speed member variables.

- **Getters and Setters.** Appropriate getter and setter functions to get the values stored in an object's yearModel, make, and speed member variables.

- **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 dynamically, 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 five times. After each call to the brake function, get the current speed of the car and display it.