**Name:**

**Advanced Programming in C++**

**Lab Exercise 2/15/2023**

In this exercise, you will design a variety of classes. Each class that you design should have a test program to thoroughly test the class. Create separate class definition and implementation files. Run your test program to make sure your class meets all specifications. Submit a sample of your output.

1. Design a class called Date that has integer data members to store month, day, and year. The class should have a three-parameter constructor that allows the date to be set at the time a new Date is created. If the user creates a Date object without passing any arguments, the default values of 1, 1, 2001 should be used. The class should have the member functions to print the date in the following formats:

3/15/08

March 15, 2008

15 March 2008

1. Design a class named Car that has the following member variables:
   * year – an int that holds the cars 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 member functions:

* Constructor – the constructor should accept the car’s year and make as arguments and assign these values to the objects year and make member variables. The constructor should initialize the speed member to 0
* Accessors – appropriate accessor functions should be created to allow values to be retrieved from an object’s year, make, and speed member variables.
* accelerate – should add 5 to the speed member variable
* brake – should subtract 5 from the speed member variable
* display – should display all fields of the Car object
* toString – returns a string that represents the object.

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

1. Create a DragRace class that simulates a one-quarter mile drag race. Your class should have two Car objects that are initialized to some random value from 60 to 80 miles/hour. Your time step for your simulation should be 0.1 seconds. Modify the accelerate method so that it adds a speed of 5 to 10 mph for each time step. Add a checkFinish member function to determine if the Car object has passed the quarter mile finish line. Add a popChute member function that should be executed when the car passes the finish line. Consider adding data members to improve your simulation. Write a main program to run your DragRace.