CSC 2100 Test 4
Trip Application

The goal of the application is to manage the means of transportation of a traveller and the cost of a trip. The traveller will start his trip at point **A** and he will change his transportation method at three points **B**, **C** and **D**.
1) At point A, he will use a **Car** and the cost is $70**.**
2) At point B, he will use a **Bike** and the cost is $30**.**
2) At point C, he will use a **Plane** and the cost is $200**.**
2) At point D, he will use a **Car** to reach his destination **E** and the cost will be the same $70**.**
You need to code a procedural version and an object-oriented version of the program.
In the procedural version, you need to do the following tasks:

1) Code a **struct type Transportation** for the means of transportation. The structured data type will contain two members: **float cost**, **string transportationName**.
2) Code a **struct type Path** that contains two members: **points: Point startPoint and Point endpoint.**
3) Code a **struct type Point** that contains three members: **double x, double y** and **string name.**
4) Code a **struct type Trip** that contains two members: Transportation t and Path p.

You need to code the following functions:

1) void displayPathInfo(Point x, Point y, Transportation t): the function will display a message like the following: the trip was from the point A(2,0) to the point B(-4,5), A car was used and it cost $70.
2) void displayPathInfo will be overloaded by using the parameter list Path p, Transportation t.
3) float getTotalCost(Trip *t, int length): the function will return the total cost.

In the main function, you will create two arrays: the first contains the trip points and the second contains the means of transportation. The user will be asked to enter the coordinates of each point. After that you will create and populate an array of type Trip that will be used to show the information of all the trips and the total cost.

In the object-oriented version, you will create the following classes:

1) An **abstract class Transport** containing the following members:
    - **a.** protected string name
    - **b.** protected float cost
    - **c.** pure virtual function float getCost()
    - **d.** pure virtual function string getName()
2) Three derived classes Car, Bike and Plane of Transport. Each class will inherit the members of Transport and implement the pure virtual functions.
3) A class Point containing the following members:
    - **a.** private: double x, double y, string name
    - **b.** public double getX(), double getY(), void setX(double a), void setY(double b), void setName(string n)
    - **c.** private static int pointsTotal: the constructor will increment pointsTotal by one whenever an instance is created and the destructor will decrement pointsTotal by one whenever an instance was destroyed.
    - **d.** public int getPointsTotal(): will return the number of created points.
4) A class Trip containing the following members:
    a. public: Point startPoint, Point endPoint
    b. private: Transport t.
    c. public: Transport getTransport(), setTransport(Transport & trnsprt)
    d. public: getTripCost(), the function will return the cost of a trip

In the main function, you will create an array of Points and an array of means of transportation. The user will be asked to enter the coordinates

of the trip points. You will create a Trip array and you will populate it by using the two previous arrays. The trip array will be used to display the means of transportation used from point A to point E and the total cost.