Sheet 5 – Classes

1. Define a class Country that stores the name of the country, its population, and its area. Using that class, write a program that reads in four countries and prints
    a. The country with the largest area
    b. The country with the largest population
    c. The country with the largest population density (people per square kilometer)

2. Design a class called person that contains members to store data and a member function to print out the data members. Instructions Include the following data members for storing data:
    a. name
    b. age
    c. gender

3. Imagine a tollbooth at a bridge. Cars passing by the booth are expected to pay a 5 L.E toll. Mostly they do, but sometimes a car goes by without paying. The tollbooth keeps track of the number of cars that have gone by, and of the total amount of money collected. Model this tollbooth with a class called `TollBooth`. The two data items are a type int to hold the total number of cars, and a type double to hold the total amount of money collected.
    - A constructor initializes both of them to 0.
    - A member function called `payingCar`() increments the car total and adds 5 to the cash total.
    - Another function, called `nopayCar`(), increments the car total but adds nothing to the cash total.
    - Finally, a member function called display() displays the two totals.

4. Create a class called time that has separate int member data for hours, minutes, and seconds.
    a. Create this class which should contain:
        - One constructor should initialize this data to 0 , and another should initialize it to fixed values.
        - Member function to display time, in 11:59:59 format.
        - Member function to add two objects of type time passed as argument and return the result in an object of type time
    b. Create a main() function to test the class created in (a), the main function should create two initialized time objects and one that isn't initialized. Then it should add

the two initialized values together, leaving the result in the third time variable. Finally, it should display the value of this third variable.

5. Write a C++ class that represents 2d circles. Each circle has **x, y**, and **radius** all are float values.
   a. Create member functions/methods for the following:
      - Constructing the circle objects (taking either three, two, one or no parameters).
      - Printing a circle data of the form "circle at (**x,y**) radius is **radius**"
      - Compute the distance between two circles (distance is the square root of the sum of the squares of differences of x, and y)
      - Hint: Include `<cmath>` file to use `sqrt` function to calculate square root.
   b. Based on part (a), write a C++ main program that defines two circles of values: (1,2,1) and (3,5,4). Your program should find and print the distance between the two circles.