THE UNIVERSITY OF SYDNEY

INFO1113 Week 11 Tutorial

Question 1: Sum Numbers

A simple introduction into Wildcards, you will need to write a function which will allow a list of `Integer` or `Double` (in this case, any type that extends from `Number`) to be summed by the method `sumNumbers`.

Complete the method signature and body. Test your solution against the data given.

```
import java.util.Arrays;

public class SumNumbers {
    public static double sumNumbers(...) {
        return 0.0;
    }

    public static void main(String[] args) {
        System.out.println(sumNumbers(
                Arrays.asList(
                        new Integer[] { 1, 2, 3, 4, 5, 6 }
                )
            ));
        System.out.println(sumNumbers(
                Arrays.asList(
                        new Double[] {1.0, 5.0, -10.0, 2.0 }
                )
            ));
    }

}
```

Question 2: Finding the two closest points

You have been given a large set of points scattered around a two-dimensional space. You will need to find a pair of points which distance is the smallest than any other pair of points.

```
import java.util.List;
import java.util.ArrayList;
import java.util.Random;

class Point {
    private double x;
    private double y;
    public Point(double x, double y) { this.x = x; this.y = y; }

    public double x() { return x; }
    public double y() { return y; }
    public String toString() { return "(" + x + "," + y + ")"; }
}

public class ClosestPair {

    public static List<? extends Point> generatePoints(int n) {
        List<Point> points = new ArrayList<Point>
        Random r = new Random();
        for(int i = 0; i < n; i++) {
            points.add(new Point(r.nextDouble(), r.nextDouble()));
        }
        return points;
    }

    public static Point[] closestPair(List<? extends Point> points) {
        Point[] pair = new Point[2];
        //Your code here
        return pair;
    }
}
```

After succesfully testing your algorithm, ensure your method can accept multiple types that extend from type `Point`. Create a type called `LocationPoint` which will contain a string associated with the coordinate.

Extension: Can you find the two closest points faster than brute forcing? Consider a divide and conquer approach.

Question 3: Unfinished Business

Any question you have not finished over the semester, take some time to complete them during this session. You can attempt questions under the Lessons section on Ed and attempt the challenge questions as well.

Question 4: Assessed Task: Quiz 2

Remember you are required to complete the quiz within the due date. Go to Canvas page of this unit and click on Quizzes to find out the quiz and the due d ate. This is a marked assessment.