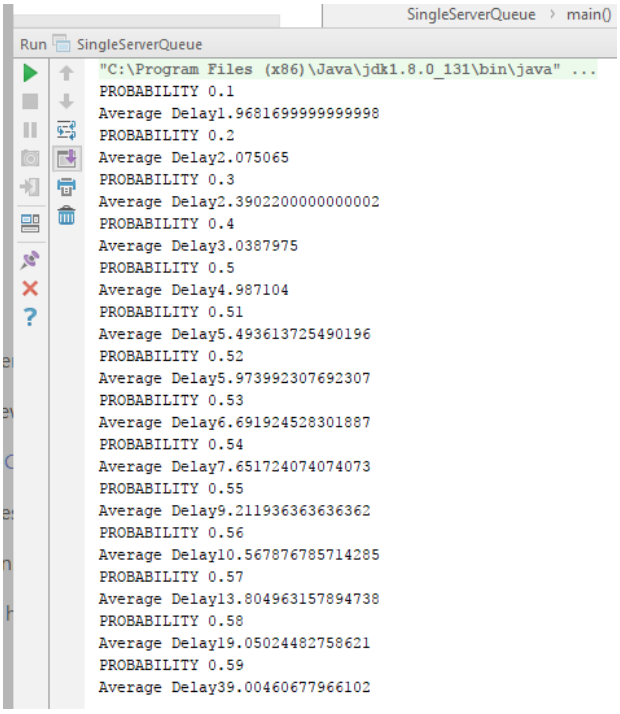
T00533766 – Jagjit Singh Bilkhu

CODE OUTPUT



Probability Of Arrival	Probability of Departure	Delay
0.1	0.6	1.9681699999999998
0.2	0.6	2.075065
0.3	0.6	2.3902200000000002
0.4	0.6	3.0387975
0.5	0.6	4.987104
0.51	0.6	5.493613725490196
0.52	0.6	5.973992307692307
0.53	0.6	6.691924528301887
0.54	0.6	7.651724074074073
0.55	0.6	9.211936363636362
0.56	0.6	10.567876785714285
0.57	0.6	13.804963157894738
0.58	0.6	19.05024482758621
0.59	0.6	39.00460677966102

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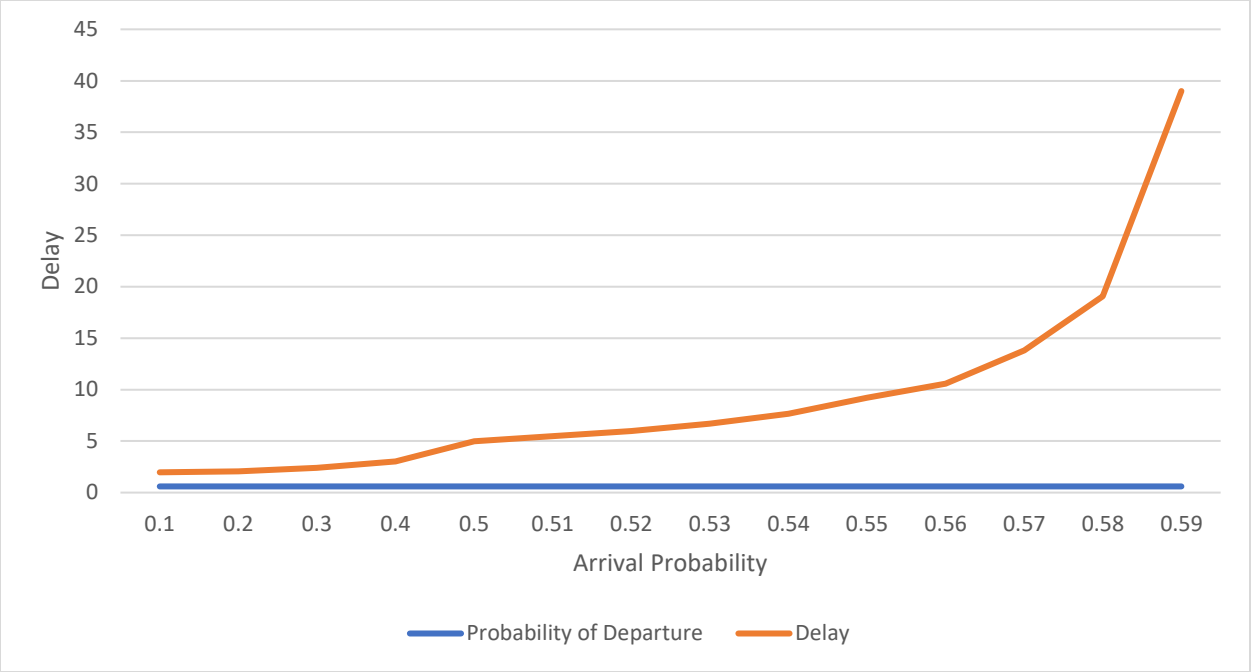

```
import com.sun.xml.internal.ws.api.message.Packet;

import javax.xml.transform.sax.SAXSource;
import java.util.ArrayList;
import java.util.LinkedList;
import java.util.Random;

public class SingleServerQueue {

    static final double departProbability = 0.6;

    public static void main(String[] args) {

        Random arrivalGenerator = new Random();

        double arrivalProbs[] = {0.1, 0.2, 0.3, 0.4, 0.5,0.51, 0.52,0.53, 0.54, 0.55,
0.56, 0.57, 0.58,0.59};

        int[] lengths = new int[1000000];

        for (double probability : arrivalProbs) {
            System.out.println("PROBABILITY " + probability);

            lengths[0] = runSimulation(probability, arrivalGenerator,0);
            for (int i = 1; i < lengths.length; i++) {
                int change =   runSimulation(probability, arrivalGenerator,lengths[i-
1]);

                lengths[i] = lengths[i-1]+change;
            }
            double sum = 0;
            for (int x : lengths) {
                sum+=x;
            }
            System.out.println("Average Delay"+(sum/lengths.length)/probability);

            for (int i = 0; i <lengths.length; i++) {
                lengths[i] = 0;
            }
        }
    }


    private static int runSimulation(double p, Random arrivalGenerator,int prev) {
        int length = 0;
        double token = arrivalGenerator.nextInt(100);
        double arrivalProb = token/100;
        token = arrivalGenerator.nextInt(100);
        double departProb = token/100;

        if(arrivalProb<=p){
            //System.out.println("ARRIVED");
            length++;
        }
        if (departProb <=departProbability&& prev>0) {
            //System.out.println("DEPARTED");
            length--;
        }
        return length;
    }

}
```