Assignment 1:

1)Conclusion about the relationship between d, N and L

After running the code for 30 times, I could conclude that distance is approximately equal to the square root of number of steps taken.

L=d/sqrt(N)

Where: L=length of the steps taken

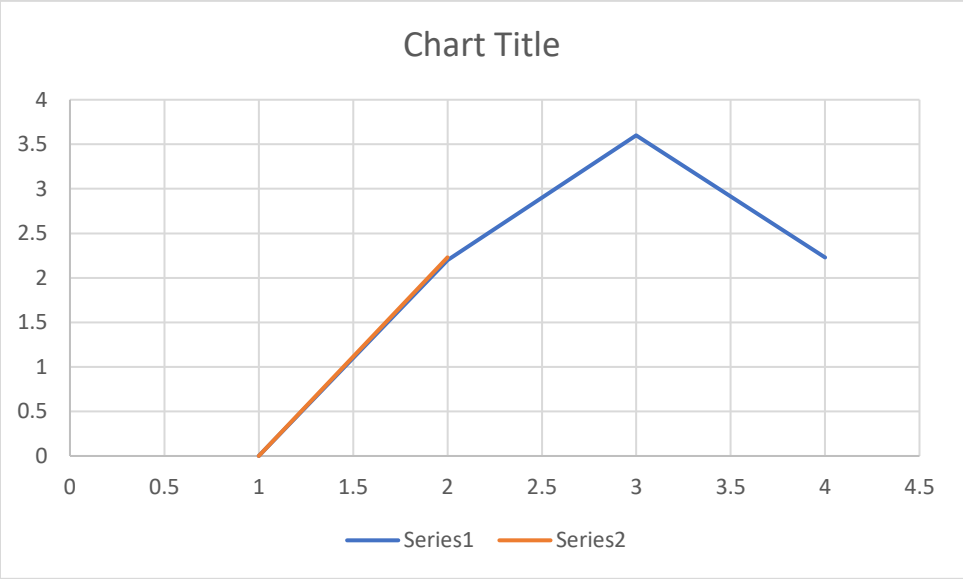
d=distance from the post

N=number of steps taken

2) Evidence to support the relationship

Steps(N)	Distance(d)	Sqrt(N)	Avg(d)
5	2.2	2.23	2.63
5	3.6		
5	2.23		
5	4.12		
5	1		
10	1.41	3.16	3.05
10	2		
10	4.24		
10	4.47		
10	3.16		
20	6.32	4.47	4.39
20	3.16		
20	5.09		
20	3.16		
20	4.24		
50	3.16	7.07	6.2
50	10.19		
50	1.41		
50	13.03		
50	2.82		
100	11.31	10	9.93
100	9.055		
100	11.4		
100	7.07		
100	10.77		
150	15.81	12.24	13.38
150	8.48		

150	9.48
150	16.12
150	17.02



3) Code

```
package Homework1;

import java.util.Random;

public class RandomWalk {
   private int x = 0;
   private int y = 0;

   private final Random random = new Random();

   public void move(int dx, int dy) {
           // TODO you need to implement this
       x += dx;
       y += dy;
   }

   private void randomWalk(int n) {
       for (int i = 0; i < n; i++)
           randomMove(n);
   }

   private void randomMove(int var) {
       // TODO you need to implement this
           double num = Math.random();
           //System.out.println("Random number:"+r);
```

```
            if(num<0.25)
            {
                y++;
                System.out.println("North"+" "+"Random number:"+num);

            }
            else if (num<0.5)
            {
                x++;
                System.out.println("East"+" "+"Random number:"+num);

            }
            else if (num<0.75)
            {
                x--;
                System.out.println("West"+" "+"Random number:"+num);

            }
            else
            {
                y--;
                System.out.println("South"+" "+"Random number:"+num);

            }


    }

    public double distance() {
            // TODO you need to implement this
        return Math.sqrt(x*x + y*y);

    }

    public static void main(String[] args) {
        int n = 5;
        RandomWalk walk = new RandomWalk();
        walk.randomWalk(n);
        System.out.println(n + " steps: " + "distance--" + walk.distance());

    }
}
```

4) Evidence (screen shot) of the unit tests all passing.