Shrusti Rajesh Chheda

NUID : 002196756

Program Structures and Algorithms

Fall 2021

Assignment No. 1 – Random Walk Experiment

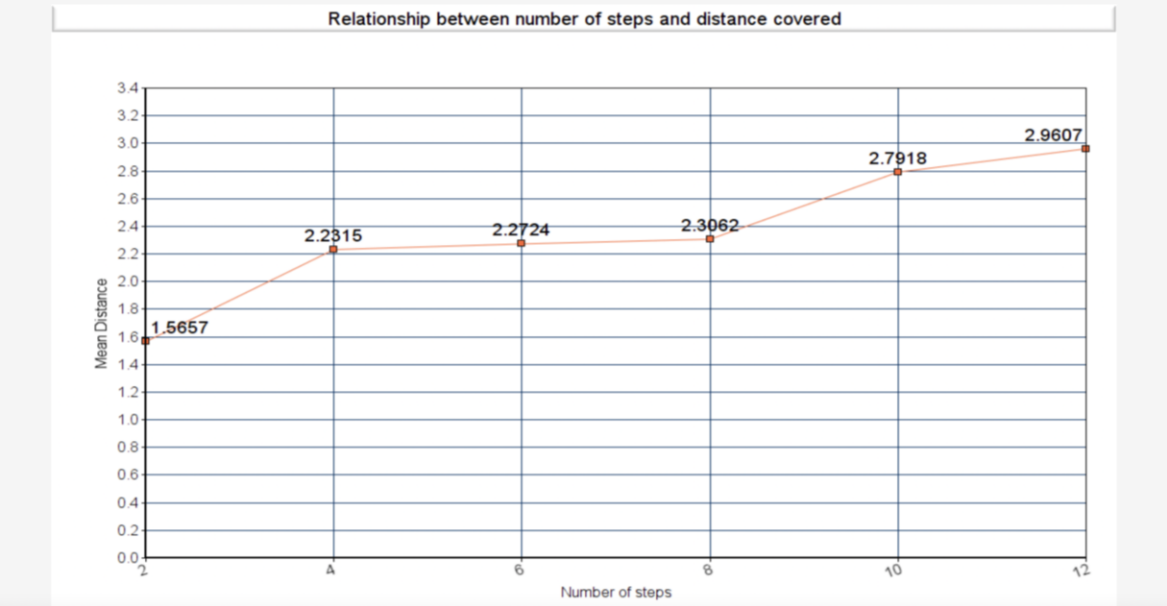
1.Tasks in the assignment:

1. Generate random values for steps taken in any of the 4 directions creating a random walk.
2. Here one move may be (+-1, 0) or (0, +-1).
3. Determining the final position after m steps.
4. Calculating the distance from the origin for m steps. Origin is considered from where the drunkard starts moving).
5. Calculating the mean distance for n ie the number of times the experiment is performed.
6. Running the experiment for 6 different values of m each taken n number of times.
7. Here m=6 ; n=10 thus the experiment was run 60 times.

2. Relationship between ‘n’ ie the number of steps taken and ‘d’ ie. the distance covered is

d=sqrt(n)

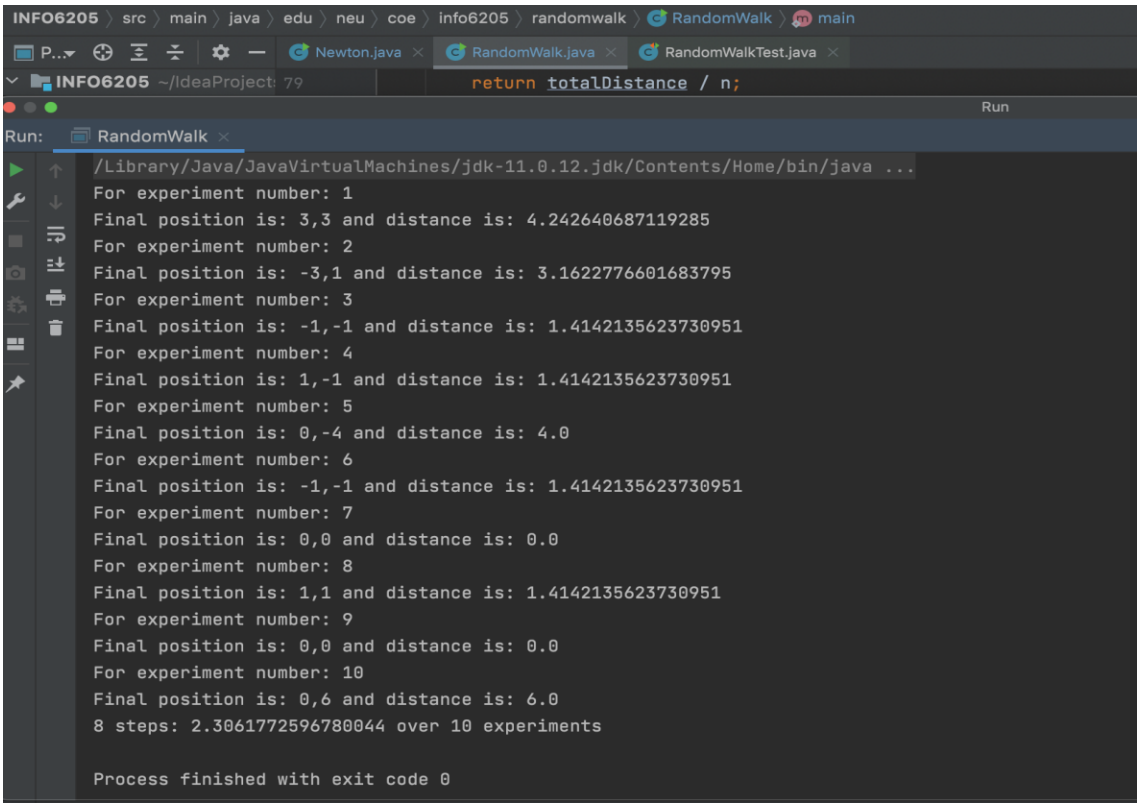
3. After running the experiment for 6 different values of number of steps for 10 times each the below graph of mean distance and number of steps is generated.



We notice that sqrt(2) = 1.414 , sqrt(4) = 2, sqrt(6)= 2.44, sqrt(10)=3.16 etc.

The values of mean distance obtained are close to the square root of the number of steps taken by the drunk man which verifies the relationship **d= sqrt(n).**

4. Code output



5. All test cases passed successfully.