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PROGRAM STRUCTURES AND ALGORITHMS
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ASSIGNMENT NO. 1

Task

A drunk man when walking from a point of origin can take a step at random in any of the four directions; North, South, East and West. Assuming that the steps are of the same length, how far would the man be (d) after n steps?

Task List:

1. A program to perform a random walk and record the euclidean distance (d) for certain values of n was successfully executed.
2. Upon completion of step1, the values of n and d were tabulated and mapped onto a graph in order to ascertain the relationship between them.
3. The relationship between **d** and **n** was deduced.

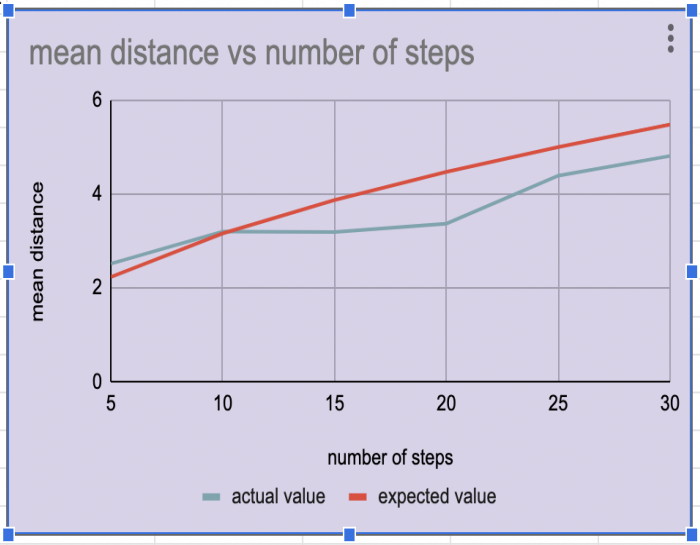
Relationship Conclusion

It can be concluded from the experiments that the Euclidean Distance between the last position and the first position of a drunk man in a random walk scenario is approximately equal to the square root of the number of steps taken.

$$\mathbf{D} = \sqrt{n}$$

Evidence:

number of steps	mean distance	expected value
5	2.518255116	2.23606
10	3.199522761	3.1622
15	3.190783134	3.8729
20	3.370214045	4.4721
25	4.391078499	5
30	4.808905551	5.4772



Unit Tests Result