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Program Structure and Algorithms 6205 Section 6.

ASSIGNMENT 1: Random walk

Task: - It is to find the distance from origin to the final position of a drunk man where his steps can be in any direction like north, south, east and west using Euclidean Distance. The final position of his steps is being calculated by creating randomized numbers who walks 1 point in the 2D graph. And we are running this experiment for at least 10 times so that we get we calculate the mean to get a bit more accuracy. We try to find a relation between N and D.

Relation Conclusion: - **D = Sqrt of N**

**(Where D =** Euclidean distance of man from the lamp to final position

And **N** = is the number of steps)

Evidence: - By looking at the experiment we can see that the mean of 10 experiments(D) of a particular step is approximately the square root of (N).

Output of Random walk: -

Graphical user interface, text, application, email

Description automatically generated

Conclusion: -

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| |  |  |  | | --- | --- | --- | | Number of Steps (n) | Expected (Sqrt of N) | Mean from 10 Experiments | | 26 | 4.898979 | 2.919076 | | 48 | 6.928203 | 5.341986 | | 71 | 8.42615 | 8.005473 | | 98 | 9.899495 | 8.291626 | | 121 | 11 | 8.820555 | | 150 | 12.24745 | 11.26888 | | |  |
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Unit Test Result: -

Text, application

Description automatically generated