Program Structures and Algorithms
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GITHUB LINK: https://github.com/OmkarVaity/INFO6205-PSA-OmkarV

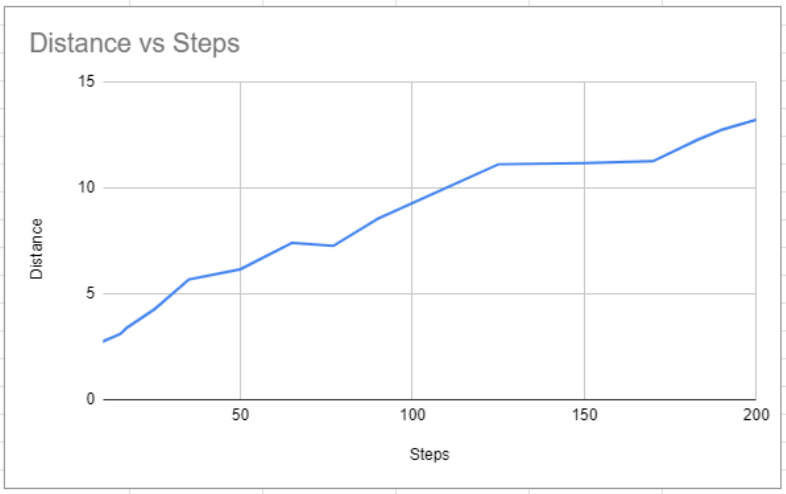
Task: An important example of a practical experiment is called the "random walk" experiment.
Imagine a drunken man who, starting out leaning against a lamp post in the middle of an open space, takes a series of steps of the same length: 1 meter. The direction of these steps is randomly chosen from North, South, East or West. After m steps, how far (d), generally speaking, is the man from the lamp post? Note that d is the Euclidean distance of the man from the lamp-post.
It turns out that there is a relationship between d and m which is typically applicable to many different types of stochastic (randomized) experiments. Your task is to implement the code for the experiment and, most importantly, to deduce the relationship.

Relationship Conclusion:
Based on the provided data, the relationship between the number of steps (x) and the distance from the lamp post (y) in the random walk experiment can be summarized as follows:
y = -0.000176x^2 + 0.0886x + 2.0976
The relationship is quadratic, as indicated by the presence of x^2 in the equation. The graph plotted based on the output values of the program shows a curve opening in the first quadrant.
A curving line will depict how the distance varies as the person takes more steps as shown when we graph this relationship. The quadratic term causes the curve to rise, but not at a constant rate, meaning, while the distance increases with increasing steps, the effect of each step decreases, producing a curved effect. The linear term increases steadily and at a constant distance. The initial distance from the light post is represented by a constant term.
Hence, the relationship between d and m will be as: **d = -0.000176m^2 + 0.0886m + 2.0976**

Evidence to support that conclusion:

As we can see in the graph below, the relationship between both components is quadratic.

Steps	Distance
10	2.764425507
15	3.114446119
17	3.414075133
25	4.281058145
35	5.686948425
50	6.164139346
65	7.401774925
77	7.265390322
90	8.559473269
125	11.11138261
150	11.17320069
170	11.25167845
183	12.2709016
190	12.74313723
200	13.20723792



Unit Test Screenshots: