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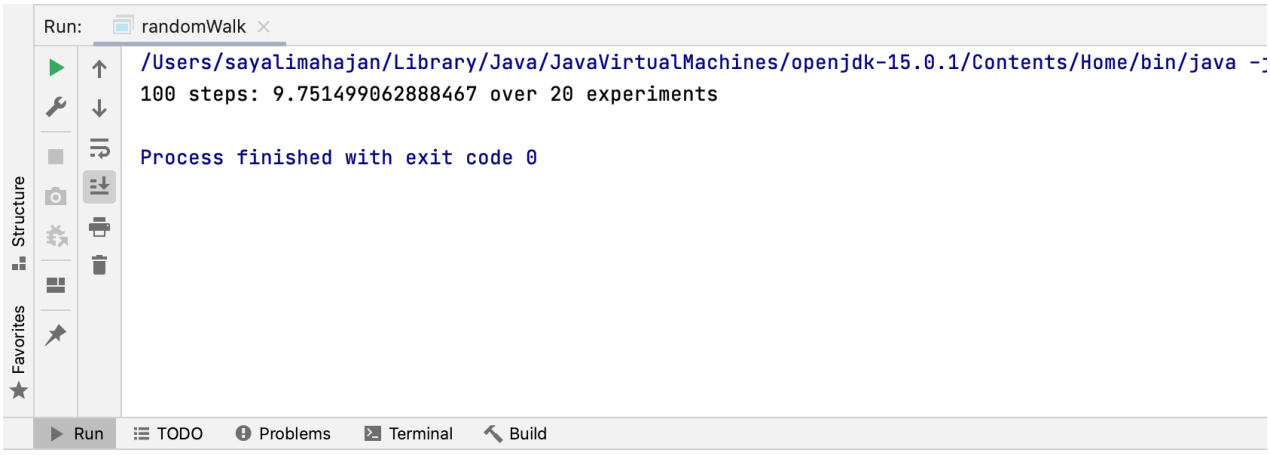
Program Structures & Algorithms
Summer 2021
Assignment No. 1

- ## Task

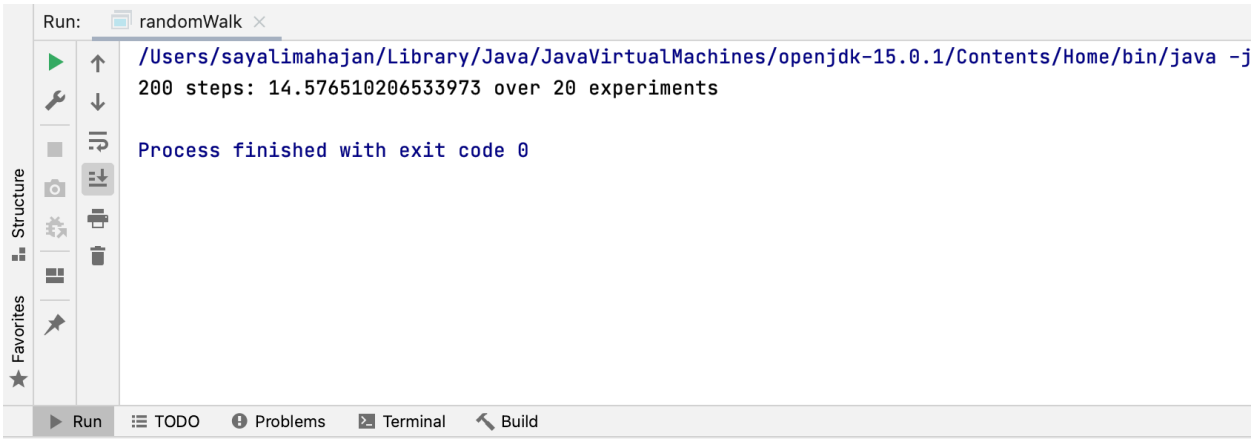
Task is to deduce the relationship between Euclidean distance (d) and number of steps person has covered from original position (lamp post) to current position. Need to demonstrate this relationship using image or graph. Need to run the experiment for at least six values of *n* and will run each of these at least ten times.

- ## Output

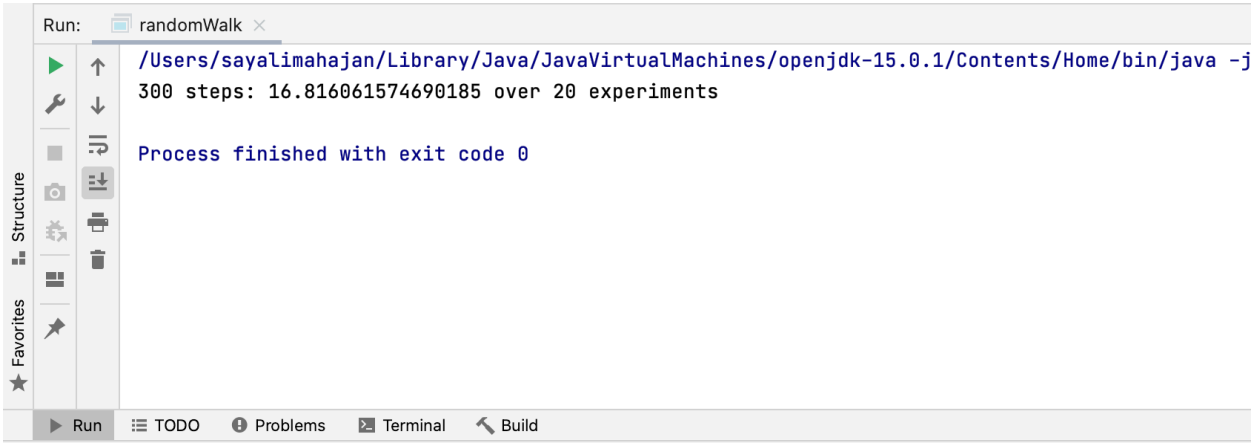
100 Steps 20 Experiments:



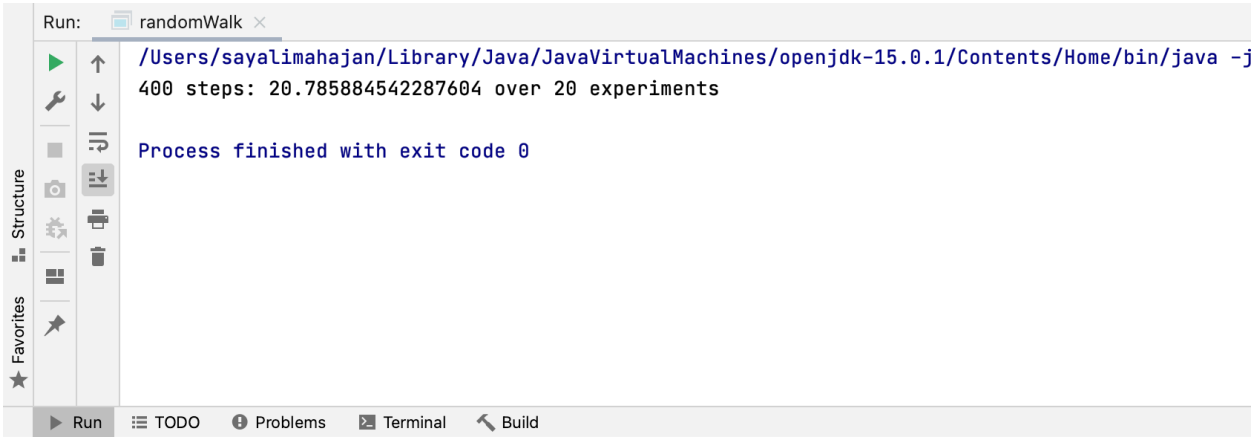
200 Steps 20 Experiments:



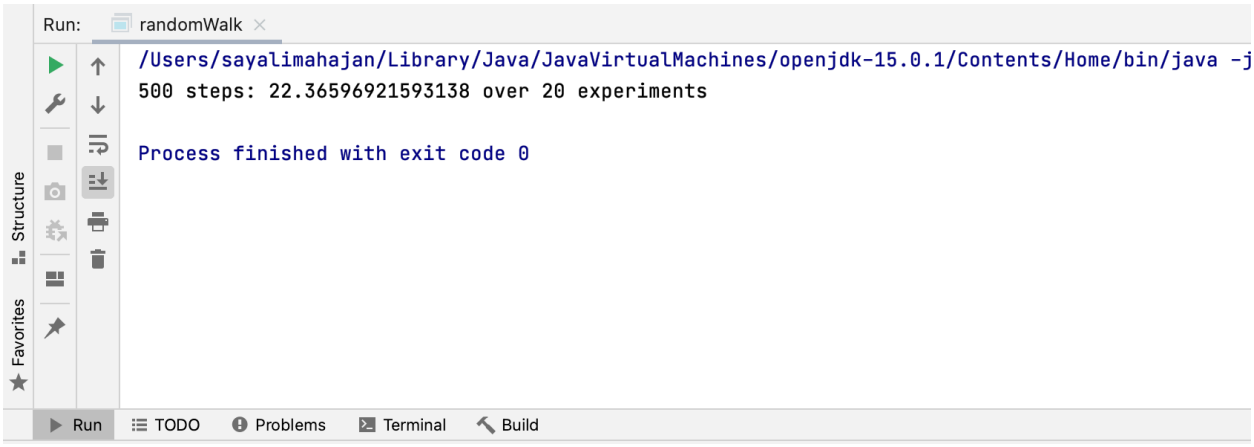
300 Steps 20 Experiments:



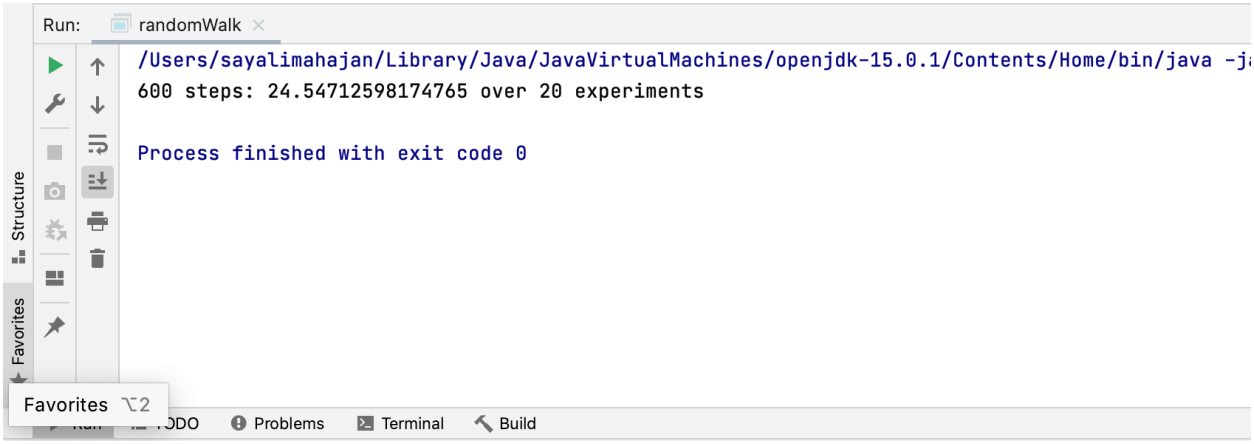
400 Steps 20 Experiments:



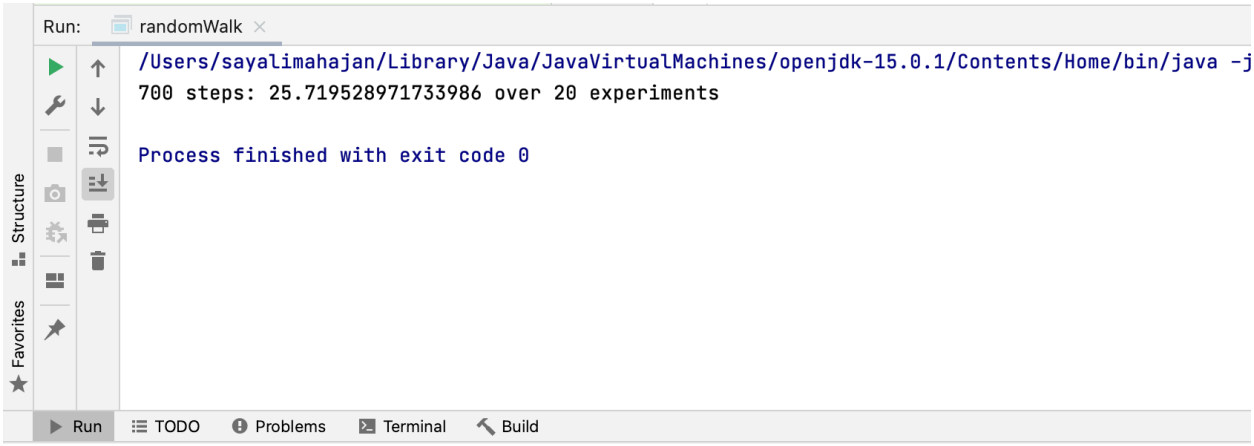
500 Steps 20 Experiments:



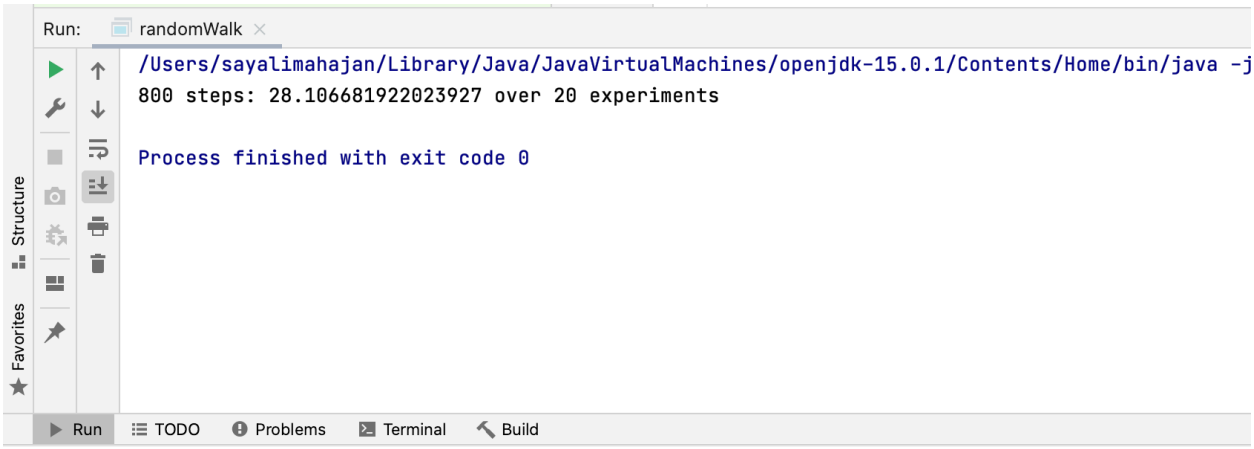
600 Steps 20 Experiments:



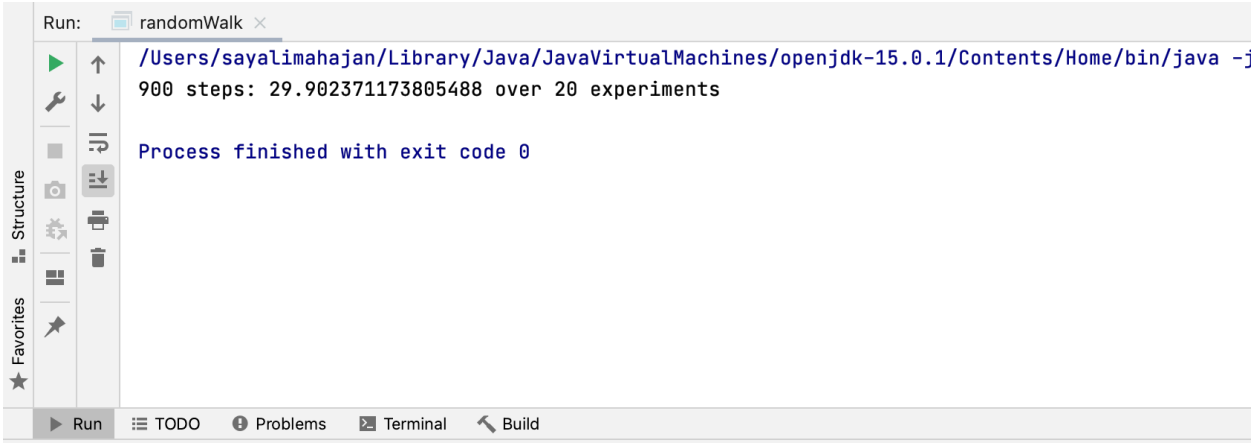
700 Steps 20 Experiments:



800 Steps 20 Experiments:



900 Steps 20 Experiments:



- # Relationship Conclusion

Above experiments indicates that the distance (d) from origin to current position calculated is approximately square root of number of steps taken (n)

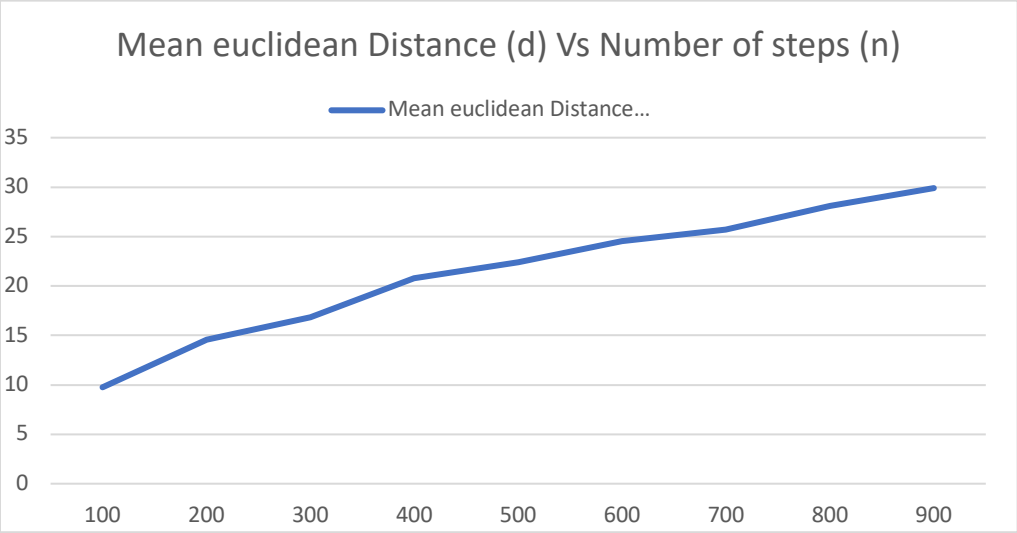
$$d=\sqrt{n}$$

where d is mean Euclidean distance & n is number of steps.

- Evidence to support the conclusion

Number of steps(n)	Number of experiments	Mean of Euclidean distance (d)
100	20	9.75
200	20	14.57
300	20	16.82
400	20	20.79
500	20	22.37
600	20	24.55
700	20	25.72
800	20	28.11
900	20	29.90

- Graphical representation



- Unit tests result