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Program Structures & Algorithms

Fall 2021

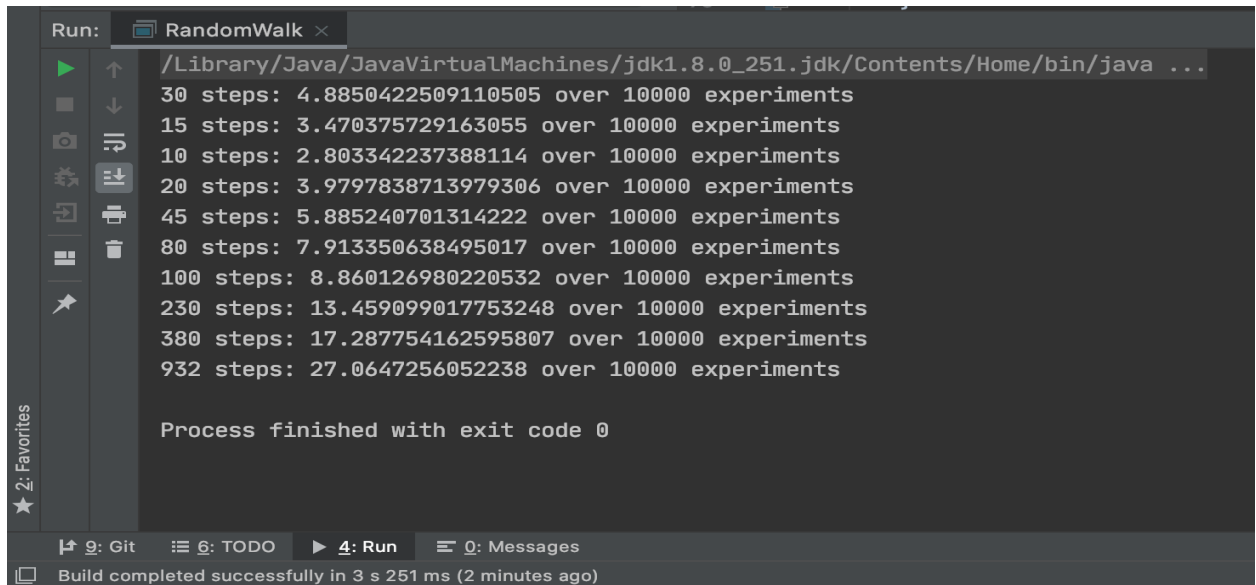
Assignment No. 1

- ◉ **Task (List down the tasks performed in the Assignment)**
 - 1. Your conclusion about the relationship between d and n**
 - 2. Your evidence to support that relationship (screen shot and/or graph and/or spreadsheet)**
 - 3. Your code (Random Walk.java plus anything else that you changed or created)**
 - 4. A screen shot of the unit tests all passing**
- ◉ **Relationship Conclusion:**

$$d = \sqrt{N}$$

◉ Evidence to support the conclusion:

1. Output (Snapshot of Code output in the terminal)



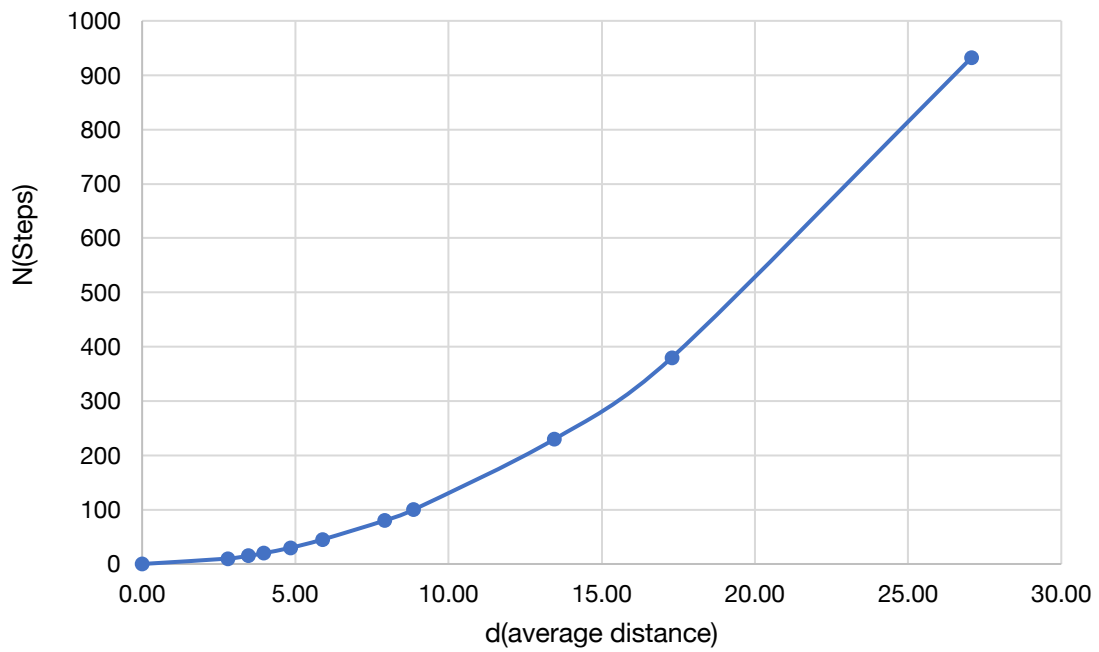
```
Run: RandomWalk x
/Library/Java/JavaVirtualMachines/jdk1.8.0_251.jdk/Contents/Home/bin/java ...
30 steps: 4.8850422509110505 over 10000 experiments
15 steps: 3.470375729163055 over 10000 experiments
10 steps: 2.803342237388114 over 10000 experiments
20 steps: 3.9797838713979306 over 10000 experiments
45 steps: 5.885240701314222 over 10000 experiments
80 steps: 7.913350638495017 over 10000 experiments
100 steps: 8.860126980220532 over 10000 experiments
230 steps: 13.459099017753248 over 10000 experiments
380 steps: 17.287754162595807 over 10000 experiments
932 steps: 27.0647256052238 over 10000 experiments

Process finished with exit code 0
```

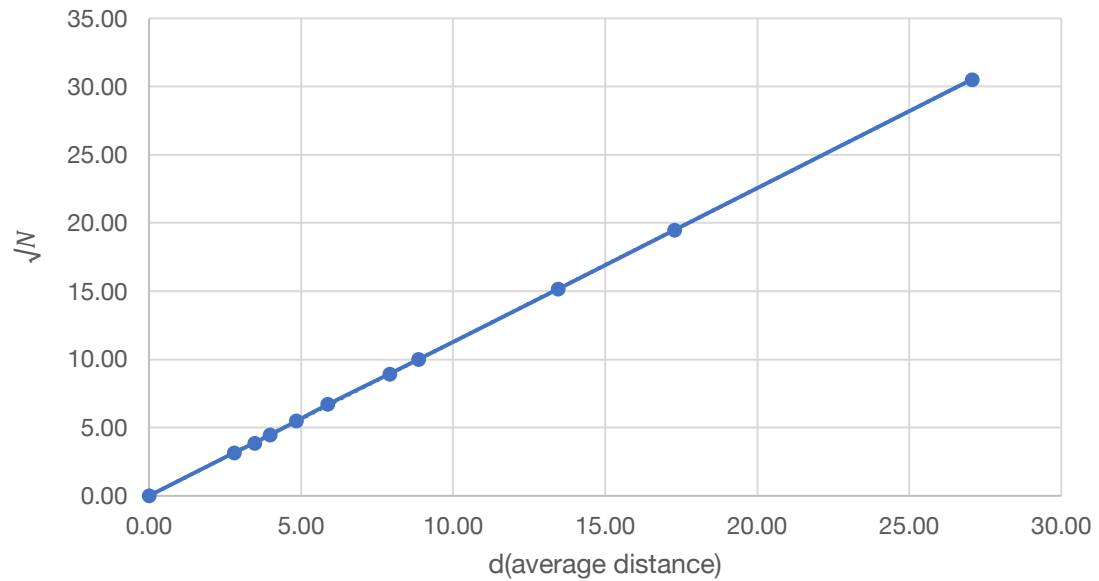
2. Graphical Representation(Observations from experiments should be tabulated and analyzed by plotting graphs(usually in excel) to arrive on the relationship conclusion)

Steps, Average Distance and \sqrt{N} Table											
N(Steps)	0	10	15	20	30	45	80	100	230	380	932
D(Average Distance)	0.00	2.80	3.47	3.98	4.86	5.89	7.91	8.86	13.46	17.29	27.06
\sqrt{N}	0.00	3.16	3.87	4.47	5.48	6.71	8.94	10.00	15.17	19.49	30.53

N(Steps) and D(Average Distance) Relationship Chart



\sqrt{N} and D(Average Distance) Relationship Chart



◦ Unit tests result:(Snapshot of successful unit test run)

