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Program Structures & Algorithms

Fall 2021

Assignment No. 1

- ◉ **Task (List down the tasks performed in the Assignment)**

Random Walk

- 1. Implement all blanks.**
- 2. Draw the conclusion on the relation between the distance(d) and the steps(n).**
- 3. Give the evidence of the relation between d and n.**
- 4. Pass all the unit test.**

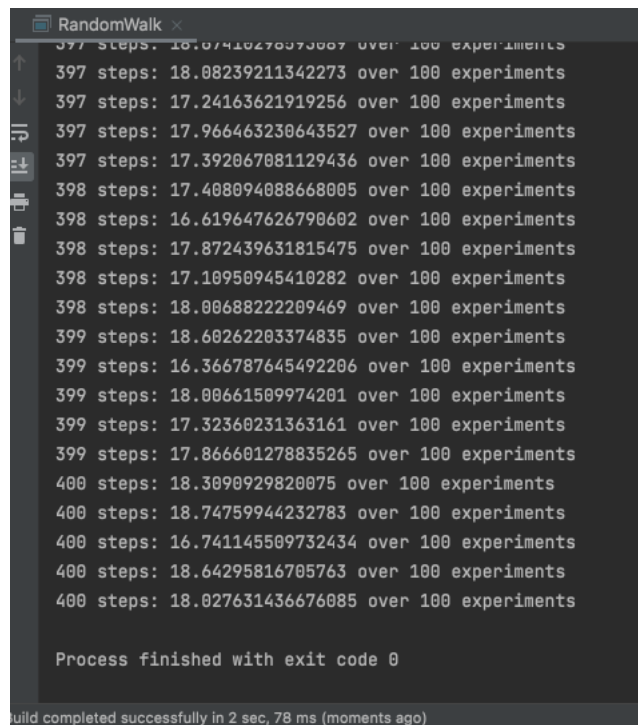
- ◉ **Relationship Conclusion: d**

According to the conclusion of test, $d = \sqrt{n}$

- ◉ **Evidence to support the conclusion:**

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

As there is 2000 series data of the result.

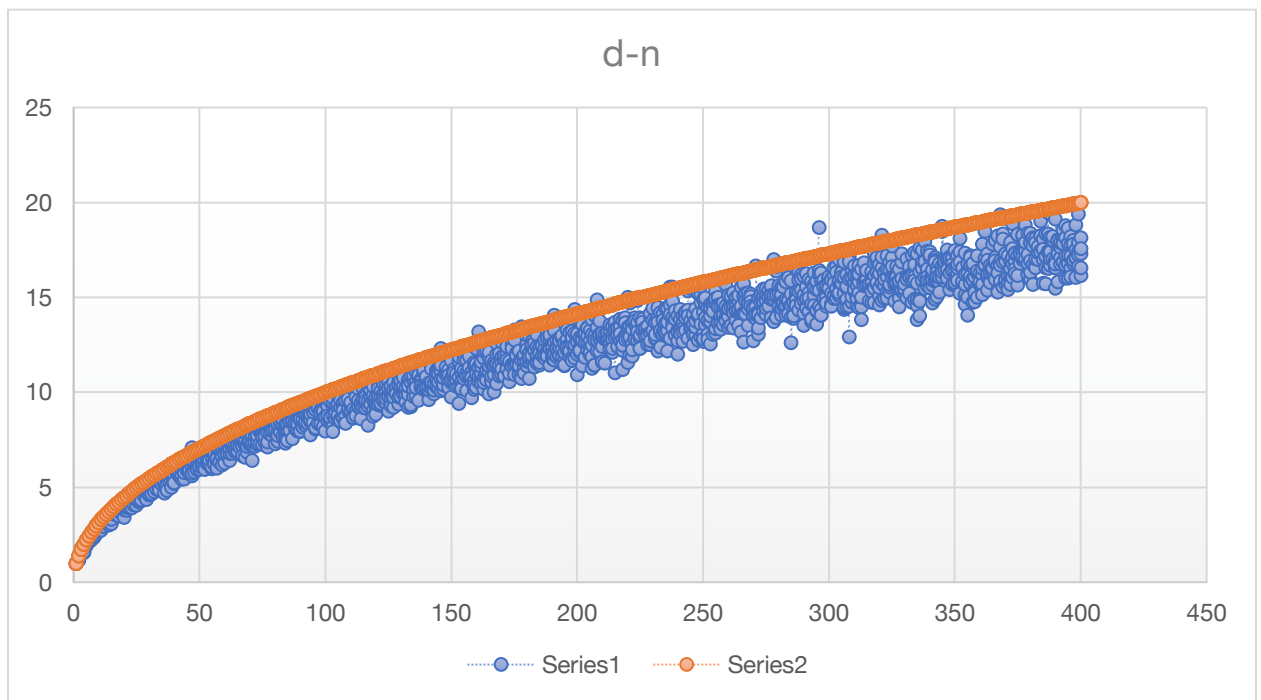


```
RandomWalk x
377 steps: 18.07410270573007 over 100 experiments
377 steps: 18.08239211342273 over 100 experiments
377 steps: 17.24163621919256 over 100 experiments
377 steps: 17.966463230643527 over 100 experiments
377 steps: 17.392067081129436 over 100 experiments
378 steps: 17.408094088668005 over 100 experiments
378 steps: 16.619647626790602 over 100 experiments
378 steps: 17.872439631815475 over 100 experiments
378 steps: 17.10950945410282 over 100 experiments
378 steps: 18.00688222209469 over 100 experiments
379 steps: 18.60262203374835 over 100 experiments
379 steps: 16.366787645492206 over 100 experiments
379 steps: 18.00661509974201 over 100 experiments
379 steps: 17.32360231363161 over 100 experiments
379 steps: 17.866601278835265 over 100 experiments
400 steps: 18.3090929820075 over 100 experiments
400 steps: 18.74759944232783 over 100 experiments
400 steps: 16.741145509732434 over 100 experiments
400 steps: 18.64295816705763 over 100 experiments
400 steps: 18.027631436676085 over 100 experiments

Process finished with exit code 0

Build completed successfully in 2 sec, 78 ms (moments ago)
```

2. **Graphical Representation**(Observations from experiments should be tabulated and analyzed by plotting graphs(usually in excel) to arrive on the relationship conclusion).
There is the dot graph. The series1 is the distance, and the series 2 is $d = \sqrt{n}$.



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

