Xinlei Bian(002197091)

**Program Structures & Algorithms**

**Fall 2021**

**Assignment No. 1**

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

1. Complete the program and run the code; (Available at https://github.com/Nacrow/INFO6205-Assignments)
2. Deduce the relationship between d and n;
3. Provide evidence to support that relationship;

* **Relationship Conclusion:**
* **Evidence to support the conclusion:**

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

**Text

Description automatically generated`**

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

**Chart, line chart

Description automatically generated**

**Line chart with d and n**

The line chart shows how d(distance) grows with n(steps). It is difficult to figure out the relationship between d and n through this graph, so I plot a log-log graph.

**Chart, line chart

Description automatically generated**

**Log-log graph with d and n**

The log-log graph shows the relationship between log(d) and log(n). It is nearly a line. The slope of this line is about 0.5. So the relationship is log(d) = 0.5 \* log(n). That means .

Then I draw in this log-log graph to verify (purple line). Two lines (blue line and purple line) are similar. So my conclusion is .

**Chart, line chart

Description automatically generated**

**Log-log graph with random walk data and**

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

Text

Description automatically generated