

## PROJECT #2 : GOSSIP SIMULATOR

### README FILE

Team Members –

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#### How to run the file?

**dotnet fsi --langversion:preview Project2DOS.fsx totNodes topology algorithm**

**example -**

**dotnet fsi --langversion:preview Project2DOS.fsx 100 Imperfect3D Gossip**

**You can choose Algorithm between-**

- **Gossip**
- **Pushsum**

**You can choose Topologies between-**

- **Line**
  - **FullNetwork**
  - **3D**
  - **Imperfect3D**
- 

1. What is working ?

The network using all the topologies are created.

The Gossip Algorithm is working.

The Push Sum algorithm is working.

2. What is the largest network you managed to deal with for each type of topology and algorithm?

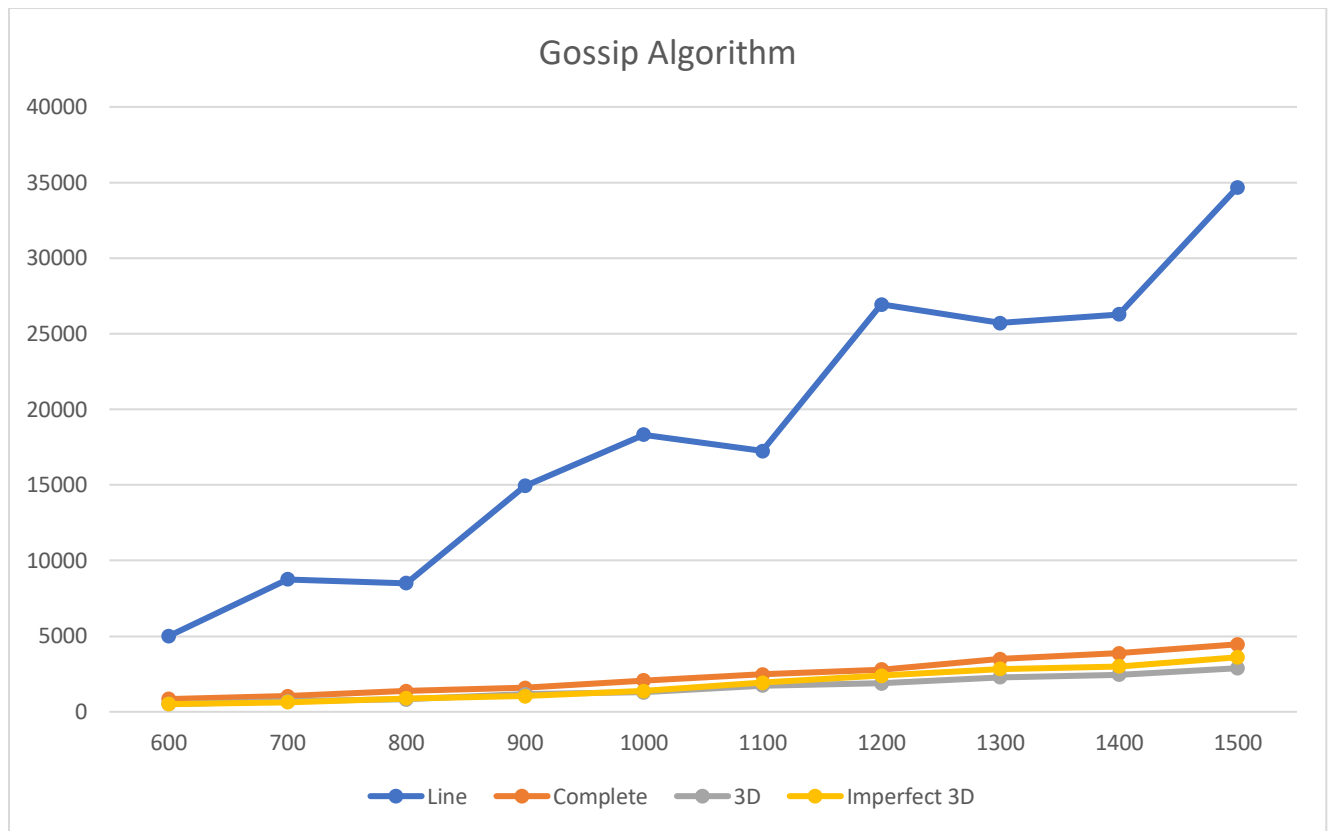
|          | Number of Nodes |          |
|----------|-----------------|----------|
|          | Gossip          | Push Sum |
| Line     | 10000           | 1500     |
| Complete | 20000           | 10000    |
| 3D       | 20000           | 1500     |
| Imp3D    | 20000           | 10000    |

3. For each type of topology and algorithm, draw the dependency of convergence time as a function of the size of the network.

For Gossip Algorithm –

For this Algorithm, I tested the outputs for 10 values of number of Nodes – 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500.

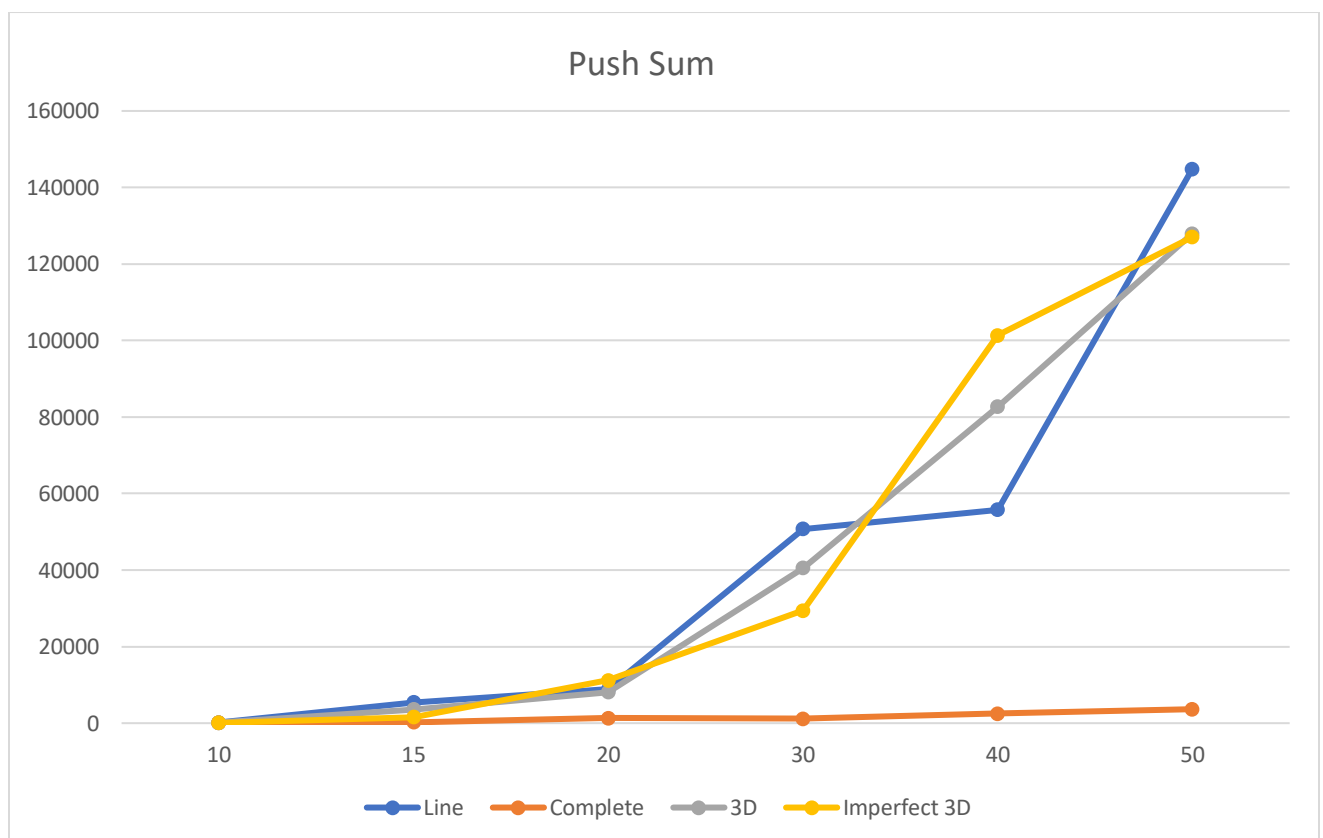
After I received the time it took for all the nodes to converge, I plotted the graph between number of input nodes and the time (in ms).



For Push Sum –

For this Algorithm, I tested the outputs for 6 values of number of Nodes – 10, 15, 20, 30, 40, 50.

After I received the time it took for all the nodes to converge, I plotted the graph between number of input nodes and the time (in ms).



4. Write about any interesting finding of your experiments.

For Gossip Algorithm ->

- The line graph took the longest time to converge any 'n' number of nodes. This shows that because in a Line Network, nodes have only two neighbors, the time it takes to complete the program is very high because there are very few neighbors to select from.
- Initially, as the number of nodes are low, the time taken by each topology is almost the same. The graph seems to be overlapping. However, as the number of nodes start to rise, the time rises linearly for Complete, 3D and Imperfect 3D and exponential for Line Graph.

For Push Sum Algorithm ->

- The time it takes to converge the nodes does not follow a particular pattern. For Line, 3D and Imperfect3D, the graph follows an exponential graph. But for Complete network, it is a linear pattern.
- For less number of nodes, the time it takes for the nodes to converge is overlapping.
- The more connectivity there is, the less time it takes to complete the passing.