

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 killXnodes

example -

dotnet fsi --langversion:preview Project2DOS.fsx 100 Imperfect3D Gossip 10

You can choose Algorithm between-

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

You can choose Topologies between-

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

To implement a failure model, we chose to kill '**killXnodes**' number of nodes in the selected topology. We used the failure model in the Gossip Algorithm because Gossip Algorithm is easy to track.

We can observe the behavior of the network built using different topologies by varying the value of '**totNodes**'. The time of convergence should vary for different connectivity.

Also, because the nodes in the network have been killed, the passing of gossip between the nodes may come to a complete halt, if –

- Either the neighbor nodes have been killed or,
- The neighbor node has been terminated after it has heard the gossip 10 times.

Therefore, the program may come to a halt. To deal with the situation, a global clock is set. It terminates the program if the program has reached to a halt state for over 2 minutes.

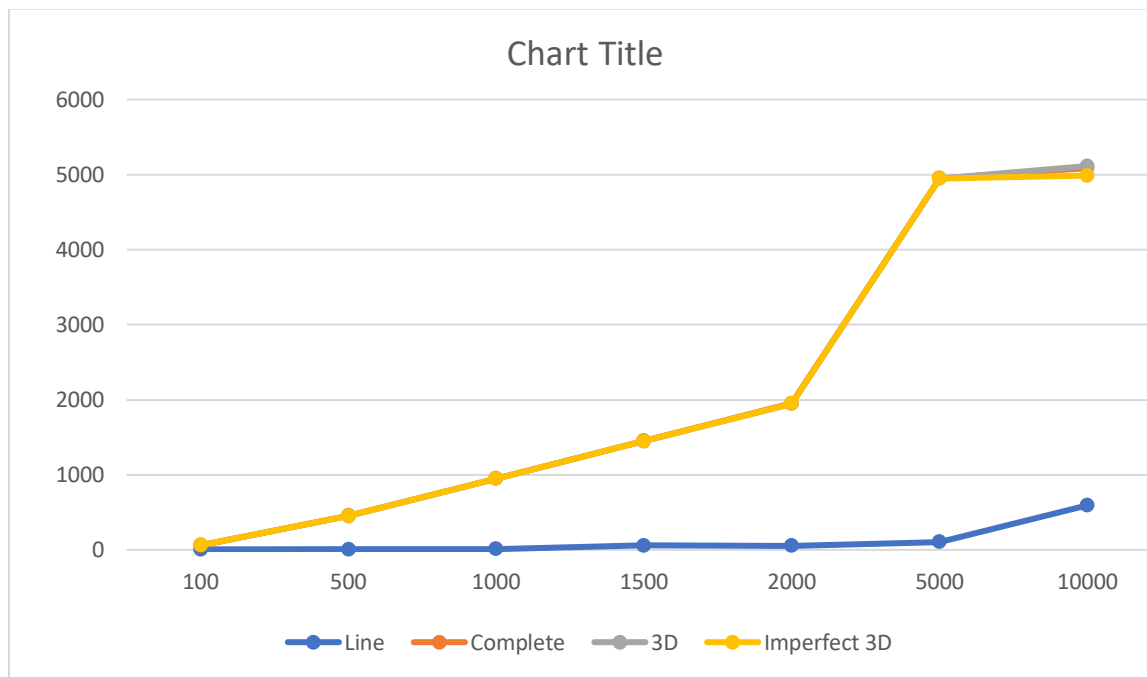
After 2 minutes, the program terminates by showing the number of nodes converged.

The information below shows the data after varying the value of '**totNodes**' one by one for each topology.

For this above experiment, we chose number of nodes to be killed to be 50. The total number of nodes input ranges from 100, 500, 1000, 1500, 2000, 5000 and 10,000. The information below shows the number of nodes converged –

	Line	Complete	3D	Imperfect 3D
100	6	58	61	61
500	7	453	452	452
1000	11	951	950	951
1500	59	1451	1450	1450
2000	54	1950	1949	1949
5000	105	4949	4950	4949
10000	592	5087	5115	4987

Keeping the number of killed nodes constant = 50, the graph is plotted between the number of nodes converged vs the total number of input nodes-



As we can see, the graph for number of nodes converged for Complete, 3D and Imperfect 3D overlap.

The data above shows that for Complete, 3D and Imperfect 3D, the number of nodes converged = total number of nodes – killed nodes.

The line graph has difficulty in communication because every node in a line network consists of only 2 neighbors. So, for any node, if both of its neighbors are killed, the node even though is alive, cannot take part in gossiping. Hence the total number of nodes converged is very less for a line network.

However, for the Complete Network, since the node is connected to every existing node, even if any of its neighbor dies, there are so many other neighbors available for it to pass the gossip that the gossip eventually reaches everyone alive.

There is hardly any difference seen between 3D and Imperfect 3D because there is a difference of one neighbor. Therefore, the number of nodes converged is quite congruent.