

# COP5615: Distributed Operating Systems

## Project -2 Bonus part

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### **Failure model implementation of gossip protocol and push sum:**

We implemented the failure model of gossip protocol and push sum algorithm as follows:

We take in a user given parameter, failure nodes and check if the rest of the nodes converge. When choosing a random node from adjacency list, it checks if the node is alive, if alive then it picks it. Else, it chooses another node. This implementation is same for both push sum and gossip algorithms

### **Our observations are as follows:**

For line, this never converges even If one node is removed since, removing a node would break the flow at the place of removal. The list would be divided into 2 parts and the gossip never propagates.

For imperfect line, it converges if small number of nodes are removed, since even after removing the node, the gossip continues through the picked random node. The convergence time varies, since few nodes would be propagating with single node only, and few nodes with many.

For the rest of the topologies, the other nodes converge no matter how many nodes are removed since the flow of network is continuous.

The most interesting observation was, for other topologies like rand2D, torus, full 3D, no matter how many nodes are removed, they convergence is achieved. This is because of the connectivity of the network.

Percentage of nodes killed	3D	full	torus	rand2D
0	4029	21456	8870	19065
10	3555	17074	10246	15725
20	3210	13608	22742	13108
30	3449	10947		10411

percentage of nodes killed	3D	full	torus	rand2D
0	1795	1668	2955	2233
10	2727	1632	5372	1490
20	2815	1380	3756	1429
30		1255		940
40				1178
50				990

