COP5615 – Fall 2014

Project 2 – Report for BONUS

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The failure model, which we implemented is a **_Permanent_** failure model. The user has to specify the number of failure nodes, as an input argument. The failure nodes will then be simulated and the Gossip message won't be passed to the failure nodes.

Running the Failure Model:

scala project2bonus numNodes topology algorithm numFailureNodes

- numNodes – Number of nodes in the network
- topology – Topology of the network (full, line, 2D, imp2D)
- algorithm – Algorithm to be used (gossip, push-sum)
- numFailureNodes – Number of failure nodes

Analysis:

We have experimented the permanent failure model with various network sizes and the observation is explained below:

Let Total Input Nodes = N		
Topology	**Minimum Number of Failure Nodes (for the network to converge)**	**Notes**
Full	Can be anything from 0 to (N-1)	Won't fail to converge unless all the Input nodes are dead initially
Line	1 or 2	Won't fail to converge when the failure node is the 1st node or last node or both
2D	N/A	Depends on how many neighbors are dead for a particular actor
imp2D	Can be anything from 0 to (N-1)	Won't fail to converge unless all the Input nodes are dead initially

Conclusion:

We can say that both Full and imp2D will converge successfully unless all the input nodes are dead.

The Line topology will converge only if the failure node is the 1st node or last node or both. Otherwise, there is no failure tolerance in Line topology.

The imp2D topology supports failure tolerance up to a certain level i.e., only if at least one of its neighbors is alive (for an actor). If all the neighbors are dead for a particular actor, the imp2D topology can't converge.