**Bonus :**
To Simulate the failure model, after initializing the nodes we randomly shutdown few nodes based on the user input.
We analyzed the Gossip protocol for failure scenario :

| Algorithm | Topology | Size of network | convergence time(in s) | FailureNodeCount |
|---|---|---|---|---|
| gossip | full | 100 | 15 | 5 |
| gossip | full | 100 | 14 | 10 |
| gossip | full | 100 | 15 | 12 |
| gossip | full | 100 | 15 | 14 |
| gossip | full | 100 | 17 | 16 |
| gossip | full | 100 | 16 | 18 |
| gossip | full | 100 | 16 | 20 |
| gossip | full | 100 | 16 | 30 |
| gossip | full | 100 | 16 | 50 |
| gossip | full | 1000 | 30 | 100 |
| gossip | full | 1000 | 31 | 300 |
| gossip | full | 1000 | 16 | 500 |
| gossip | full | 1000 | 29 | 800 |
| gossip | 2D | 100 | 18 | 10 |
| gossip | 2D | 100 | 5 | 20 |
| gossip | 2D | 100 | NA | 30 |
| gossip | 2D | 100 | NA | 50 |
| gossip | line | 100 | NA | 30 |
| gossip | line | 100 | NA | 5 |
| gossip | line | 100 | NA | 1 |
| gossip | imp2D | 100 | 3 | 1 |
| gossip | imp2D | 100 | 14 | 5 |
| gossip | imp2D | 100 | 17 | 10 |
| gossip | imp2D | 100 | 16 | 20 |
| gossip | imp2D | 400 | 17 | 30 |
| gossip | imp2D | 500 | 17 | 50 |
| gossip | imp2D | 1000 | 28 | 100 |
| gossip | imp2D | 1000 | 31 | 200 |
| gossip | imp2D | 1000 | 13 | 300 |
| gossip | imp2D | 1000 | NA | 300 |

In the cases where convergence time is NA we needed to kill the process.

**Interesting Observation:**
One interesting observation that we observed was that in case of failure scenarios imp2D seems to perform better than 2D topology.