

PROJECT 3: BONUS PART

Team Members:

Team 3

1. Anmol Khanna, UFID:65140549, anmolkhanna93@ufl.edu,
2. Akshay Singh Jetawat, UFID:22163183, akshayt80@ufl.edu,

Working:

To start the program:

```
./project3bonus numNodes numRequests numFailures
```

To start the failure model of the pastry protocol, we enter the number of failure nodes as a command line argument. Once the join step of the protocol is done, all the failures will get created and the other functionality of the protocol remains the same.

Whenever a failure occurs, to bring network back to the working state, we need to fix the dead node IDs that lies in the leafsets of other live nodes and also the dead node IDs that are present in the Routing table of other present nodes. To update the leafsets, the nodes present in the leafsets of the dead node will identify the node id after the failure is detected. Then the leafset is updated with the alive nodes. For performing the update on the leafset, the alive nodes ask the farthest nodes that are there either in the larger leafset or in the less leafset. For updating the routing table, we first need to remove the node ids of all the dead nodes from the table and then see the closest nodes to the dead nodes and add them to the routing tables.

The average number of hops increase first as some of the nodes may not get a proper replacement for the dead node ids. But the average hops will decrease when the failed nodes lead to a addition of few nodes in the network. Table shows the following observation:

numNodes	numRequests	numFailures	Average Hops
100	10	0	2.23
100	10	10	7.21
100	10	20	6.65
100	10	50	5.68
1000	10	0	3.54
1000	10	200	67.12
1000	10	500	49.48