**DOSP Project 3**

**P2P Chord Protocol - Report**

**Team members:**

Tushar Ranjan – 45562694

Sankalp Pandey – 92878142

**Observations:**

1. Time to find the average number of hops in a chord of size N is *log(N)*, as each node has a finger table containing nodes at 2k-1 intervals where 1<=k<=m and each node forwards a request at least halfway around the chord circle.
2. Stabilizer is periodically called to fix the node properties such as predecessor, successor, and finger table. If any node joins/leaves the chord, it is taken care of by the stabilizer function.
3. Failure handling:
   1. For bonus part, we ask user to enter a failure probability percentage, where 0 – no failures and 100 – all nodes will be killed.
   2. We assume that our network may face node failures equal to the percentage entered by the user. To handle this failure, we have implemented a method that will re-distribute the keys of the nodes that were killed, along with this the stabilizer will update the finger table.
   3. We observed that the node failure causes only a slight increase in average number of hops as the failed node is no longer present in the finger table of the searching node.
4. This shows that the P2P chord protocol is very fault tolerant and resilient to network failures, as even with high failure probability percentage the running time to search a random key is still in the range of *log(N).*

Below is a graph for average hops by number of nodes, for simplicity we have kept number of requests as 5 for all the entries:

Chart, line chart

Description automatically generated