PROJECT 2 – GOSSIP SIMULATOR

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Working of Algorithm:

Line Topology- The actors are arranged in a line and each actor has two neighbours except the last and the 1st ones.

Full Topology- Any actor can talk to any other actor as all are neighbours.

2DGrid Topology- A 2DGrid is formed with the number of actors and if the number of actors is not a perfect square then the value is increased to make it a perfect square.

Imperfect 2DGrid-This works similarly as 2DGrid with the addition that an actor has a different random neighbour also along with its usual neighbours in a 2DGrid.

An actor upon receiving a gossip message sends it to its random neighbours and when an actor has heard a gossip message 10 times, the actor is terminated. An actor upon receiving a pushsum message, performs a computation and sends it to its random neighbours and when the value of computation for a specific actor doesn't change by more than 10^(-10) in 3 consecutive rounds, the actor is terminated. If a terminated actor receives a message in between transmissions sometime later, then that actor would not send any messages.

When more than 90% of the total numbers of nodes have heard a message at least once, the system shuts down.

Largest networks dealt with:

Maximum number of nodes for which the Gossip Algorithm converged:

Gossip Algorithm:

Line topology- 10,000 nodes

Full – 6000 nodes

2DGrid – 10^6 nodes [# of nodes can be more than 10^6 but it is taking up a lot of time]

Imperfect 2DGrid- 10^6 nodes [# of nodes can be more than 10^6 but it is taking up a lot of time]

Maximum number of nodes for which the PushSum Algorithm converged:

PushSum Algorithm:

Line topology- 110 nodes

Full – 5000 nodes

2DGrid – 10^5 nodes [# of nodes can be more than 10^5 but it is taking up a lot of time]

Imperfect 2DGrid- 10^5 nodes [# of nodes can be more than 10^5 but it is taking up a lot of time]