COP 5615

Project - II

**Group Members:**

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**Working of Algorithm:**

**Line Topology:** The Actors are arranged in a Line and each actor has two neighbors except the first and last one.

**Full Topology**: An Actor can talk to any other Actor and can treat as Neighbor.

***Example for Line and Full***

If there are 6 nodes, the nodes are named as “1.0, 2.0, 3.0, 4.0, and 5.0”

**2D Grid Topology**: Actors are arranged in 2D Grid form. If the given number of actors is not perfect square, we increase that value to the nearest Perfect Square.

**Imperfect 2D Grid Topology**: It is similar to the 2D-Grid. In addition to that, an actor can select any other node and can treat as neighbor along with normal neighbors in 2D Grid.

***Example for Grid and Imperfect 2D Grid***

If there are 6 nodes, the nodes are rounded off to the nearest square to maintain grid property and named as “0.0, 1.0, 2.0, 0.1, 1.1, 2.1, 0.2, 1.2 and 2.2”.

**Gossip:** An Actor upon receiving the message sends the message to any of its random neighbor and that Neighbor Actor will in turn do the same. If an Actor receives the message more than 10 times, then that particular actor will get terminated. And if all the actors receives that message at least once, then the whole system get shutdown.

In addition to this, every actor which is not terminated wakes up after a specified amount of time if it doesn’t receive any message for that time.

**Push Sum:** An Actor(i) upon receiving its message stores S(i) and W(i) value and Selects any of its random neighbor(j) and sends the message. Upon receiving the message, the Actor(j) should add received pair of its values to its corresponding Values (S(i) + S(j)) and (W(i) + W(j)). This Actor Again Selects it’s Random Neighbor and sends half the value of above sum to that Random Actor. This process has to be done Recursively. If an Actors ratio (S/W) did not change more than 10^ (-10) in 3 Consecutive rounds, then Actor terminates. The Terminated Actor doesn’t transmit any message hereafter even after receiving messages from any Actor.

When more than 80% of the nodes converge to the ratio, then the System Shuts down.

**Largest Network to deal with:**

Maximum number of nodes for which Gossip Algorithm Converged:

**Gossip Algorithm:**

Line Topology : 65536

Full Topology : 65536

2D Grid : 65536

Imperfect 2D Grid : 65536

Maximum number of nodes for which Push Sum Algorithm Converged:

**Push Sum Algorithm:**

Line Topology : 65536

Full Topology : 65536

2D Grid : 65536

Imperfect 2D Grid : 65536