Gossip Push-Sum Simulator

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Execution Instructions:

1) Scroll to directory: **"\GossipSimulation_PushSumProtocol"** in the Windows Command Prompt or Ubuntu Terminal
2) Type **sbt clean**
3) After clean, type **sbt**
4) Type **compile**
5) Run command: type "***run num_of_nodes topology algorithm***"
   e.g.: "***run 1000 3D push-sum***"
   a. ***Topologies Names***: "line", "full", "3D" & "Imp3D"   (cases exactly as mentioned)
   b. ***Algorithms***:   gossip, push-sum   (all small with "-" in push-sum)

What is Working:

The system is an implementation of the gossip and push-sum protocol with line, full, 3D and imperfect 3D topologies.

The Gossip algorithm works for the number of nodes and spreads the rumor until all nodes have received the rumor 10 times. If due to the topology, the number of nodes transmitting are finished and all nodes are not received, the gossip terminates and tells how many nodes the rumor didn't spread to. Lastly, if the neighbors of a node reduce to zero, the node terminates. With Imperfect 3D, each node gets a random neighbor. The link between the two nodes is bi directional which makes Imperfect 3D close to a full network (with possibility of some redundant links). As nodes receive messages, they remove themselves from their neighbor's neighbors list so that there is no retransmission.

The push sum algorithm works for the number of nodes and spreads the sum and weight to all nodes. The algorithm runs until a nodes ratio sum/weight does not change by 10^{-10} three consecutive times. When the average is received by the master. It displays the sum and stops itself.

The screen shots folder shows the screen shots with running times for few of the gossip and push-sum runs.

Maximum Nodes
(Tested System Config - OS: Windows 10, **Processor**: Intel Core i7, **RAM:** 6 GB**)**

Gossip		
Topology	**Num of Nodes**	**Time (in secs)**
Line	10,000	1077
Full	5,000	19
3D	500,000	27
Improper 3D	500,000	138
Push-Sum		
Topology	**Num of Nodes**	**Time (in secs)**
Line	10,000	142
Full	7,000	10
3D	5,000	26
Improper 3D	100,000	69