PROJECT REPORT

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The project simulates both Gossip as well as Push-sum algorithms, which covers the following topologies: Line, Fully Connected, Random-2D, 3D Torus, Honeycomb and Random Honeycomb.

TABLE:

GOSSIP (Time in milliseconds)

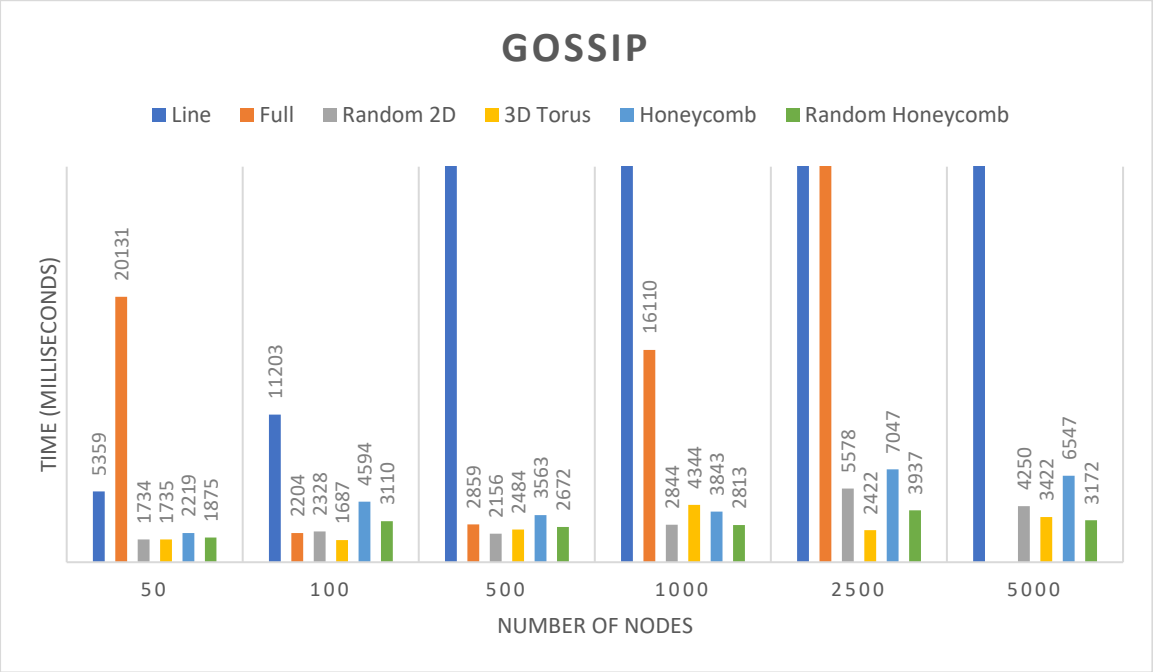
Inputs	LINE	FULL	Rand2D	3DTorus	Honeycomb	Random Honeycomb
50	5359	2031	1734	1735	2219	1875
100	11203	2204	2328	1687	4594	3110
500	58422	2859	2156	2484	3563	2672
1000	81218	16110	2844	4344	3843	2813
2500	17319	50625	5578	2422	7047	3937
5000	38937	---	4250	3422	6547	3172

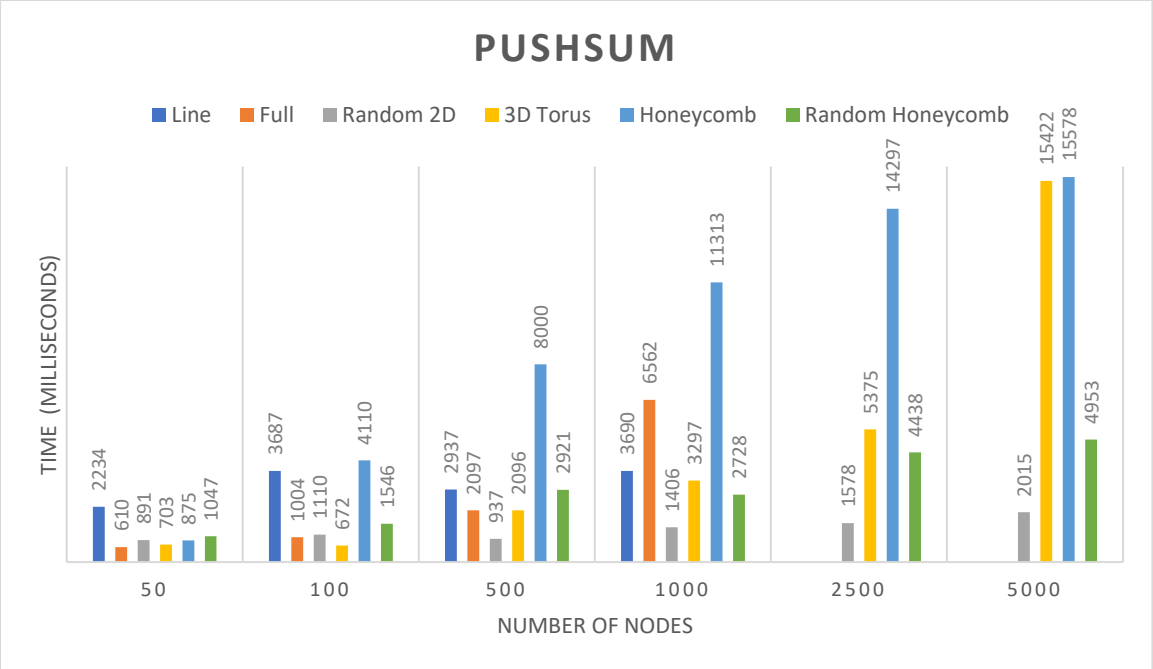
TABLE:

PUSH-SUM (Time in milliseconds)

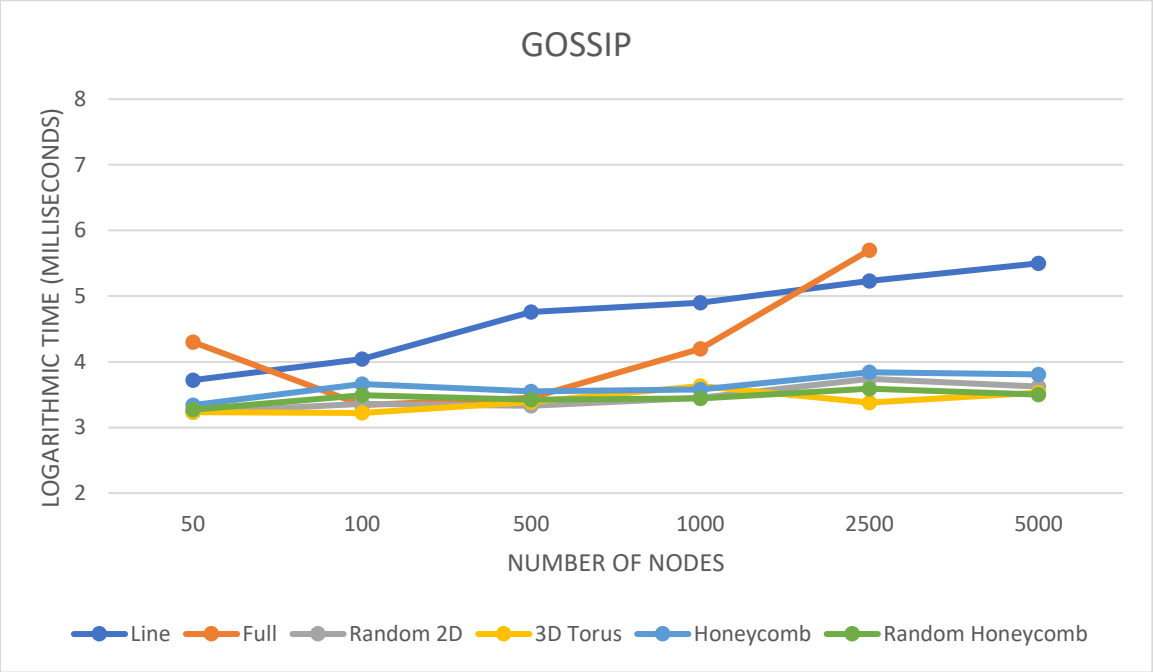
Inputs	LINE	FULL	Rand2D	3DTorus	Honeycomb	RandomHoneycomb
50	2234	610	881	703	875	1047
100	3687	1094	1110	672	4110	1546
500	2937	2097	937	2094	8000	2921
1000	3690	6562	1406	3297	11313	2728
2500	---	---	1578	5375	14297	4438
5000	---	---	2015	15422	15578	4953

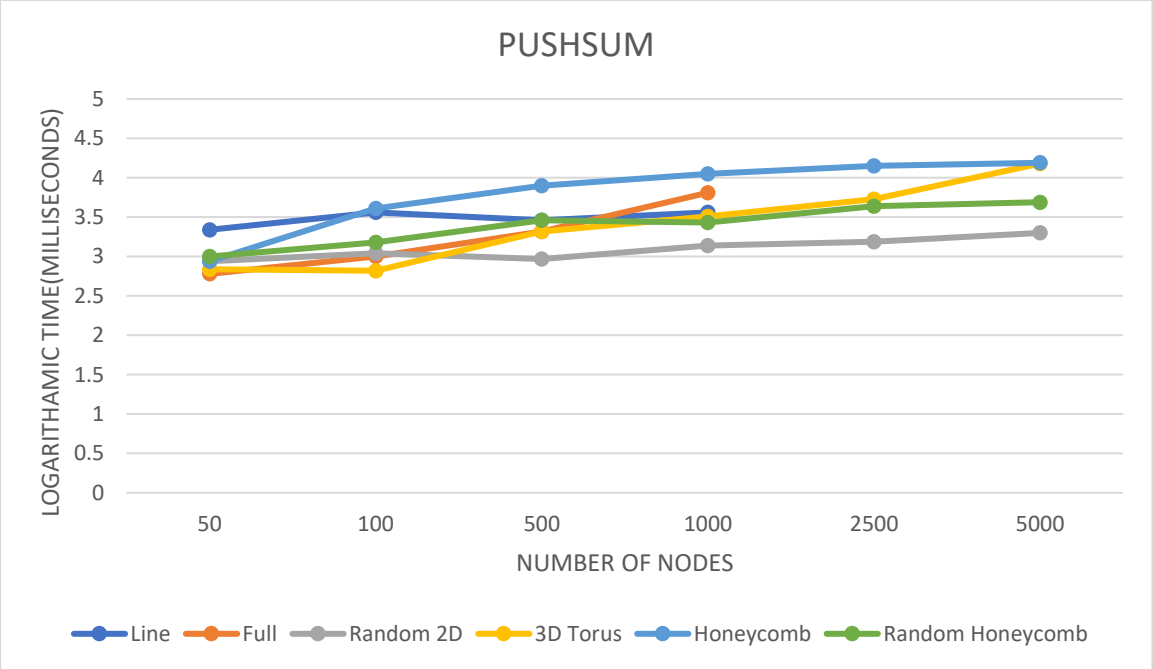
NORMAL SCALE-





LOGARITHMIC SCALE-





OBSERVATIONS-

- The algorithms implemented in this project work with all the topologies.
- For push-sum algorithm, the topology which converged the fastest was random2d. It converges faster than others for higher number of nodes. The highest number of nodes that converged without any failure were: 5000.
- The random honeycomb algorithm used in this project has four nodes instead of three where three nodes are adjacent, and one node is a random one. Because of randomization, this topology works quite better than the other topologies used. It works better than the fully connected topology when higher number of nodes are taken for both gossip and push-sum algorithm.
- For the push-sum algorithm, the fully connected topology does not work beyond 2500 nodes. The maximum number of nodes that were converged were 1200 nodes.
- The most-time consuming algorithm for both gossip as well as the push-sum was the line topology. It was the slowest in convergence when compared with other topologies. The reason was in the process of its implementation.
- For the push-sum algorithm, the line topology when compared to other topologies performed badly, as the convergence failure occurred from the 800th node itself. Thus, it could provide convergence for 800 nodes.
- In gossip algorithm, when considering higher number of nodes, the fully connected topology performs the worst and provides the highest convergence time when compared to the other topologies.