

Assignment 2 (due on September 7, 2014)

Notes: You can use any programming language to solve the assignment.

All outputs should be written in .txt file.

Solution of assignment should not be copied .

Source code also be submitted.

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1. Draw the **Random Network $G(n,p)$** with 2000 nodes and take edge probability, 0.1, 0.5, 0.9 respectively. Store the networks in the form adjacency matrix. Plot the degree distributions of the random networks for each given probability. Also calculate geodesic distance, diameter and clustering coefficient of the Random network for each given probability.
2. Draw the **Small World Network** with 2000 number of nodes. First create a regular ring network with 2000 nodes each node is connected to its two direct neighbors (e.g., node 199 is connected to nodes 198 and 200), it gives 2000 edges. Next, connect each node to the neighbors of its neighbors (e.g., node 199 is also connected to nodes 197 and 201). This gives us another 2000 edges. Finally randomly rewire the edges with rewiring probability, 0.1, 0.5 and 0.9 respectively. Plot the degree distributions of the Small World networks for each given probability. Also calculate geodesic distance, diameter and clustering coefficient of the Small World network for each given rewiring probability. (Consider Watts Strogatz model)
3. Download the **real network** data set from <https://snap.stanford.edu/data/ca-GrQc.txt.gz>. Create and store the Adjacency matrix into a file and plot the degree distribution of the network. Also calculate geodesic distance, diameter and clustering coefficient of the real network.

Finally, what you have observed after analyzing the different structural properties (degree distribution, diameter, average geodesic distance and clustering coefficient) of the above three networks. Give the comparative analysis.