Project for SNA

Deadline to submit: April 28, 2023
Submission only through Moodle.

1. Implement the BA Algorithm to generate the scale-free network S over 100,000 nodes. You may assume the initialization (for BA) as per your wish but adhering to the characteristics laid about by the BA Model. State your initialization clearly.

2. Plot the degree distribution of the above scale-free network S. Find the node with the highest degree and find at what time interval this node came into the network when you generated the network S.

3. Generate a plot where the x-axis is the node degree, and the y-axis is the time interval in which that node entered the network.

4. Find all the centrality measures of all the nodes in S and through proper visualization depict the values. (note: visualization is MUST)

5. Find the giant component in S as G and find the ratio of the nodes in G to S

6. Take a random node in S and assume that it has an information I and it passes this to its neighbor with probability p. Find how many steps are required to pass this information to the maximum number of nodes in S.
   a. Do the above for all the probability values p=.25, 0.5, 0.75, 1
   b. For each value of p mentioned above repeat the experiment at least 10 times and take the average number of steps required
   c. What is your conclusion? Does this number of steps depend on the probability value?