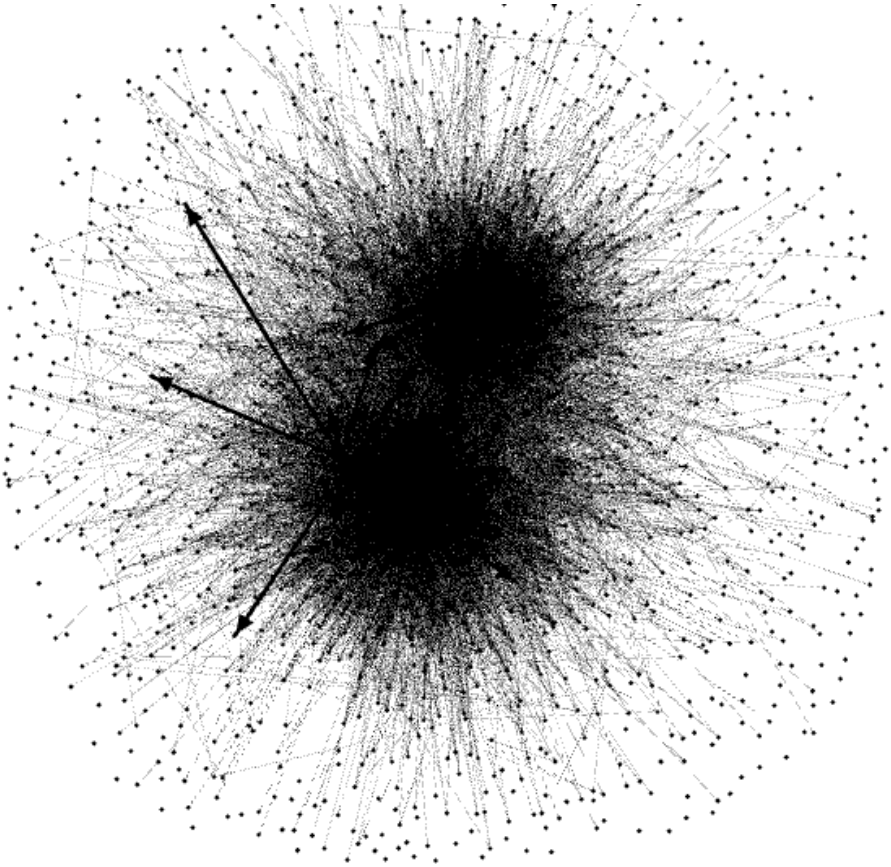
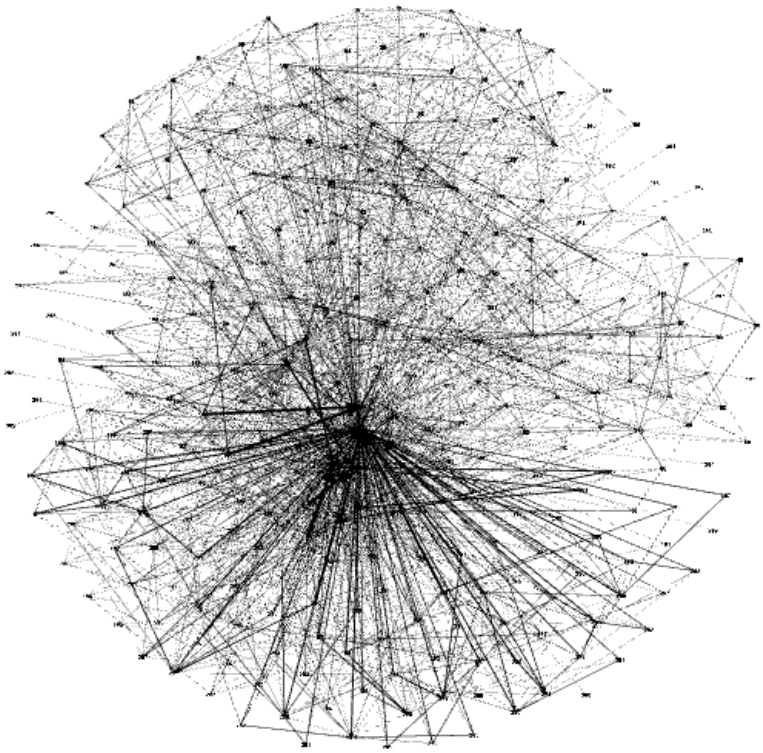
1. Plots of 6 networks
    a. Plot of Political Blogs Network

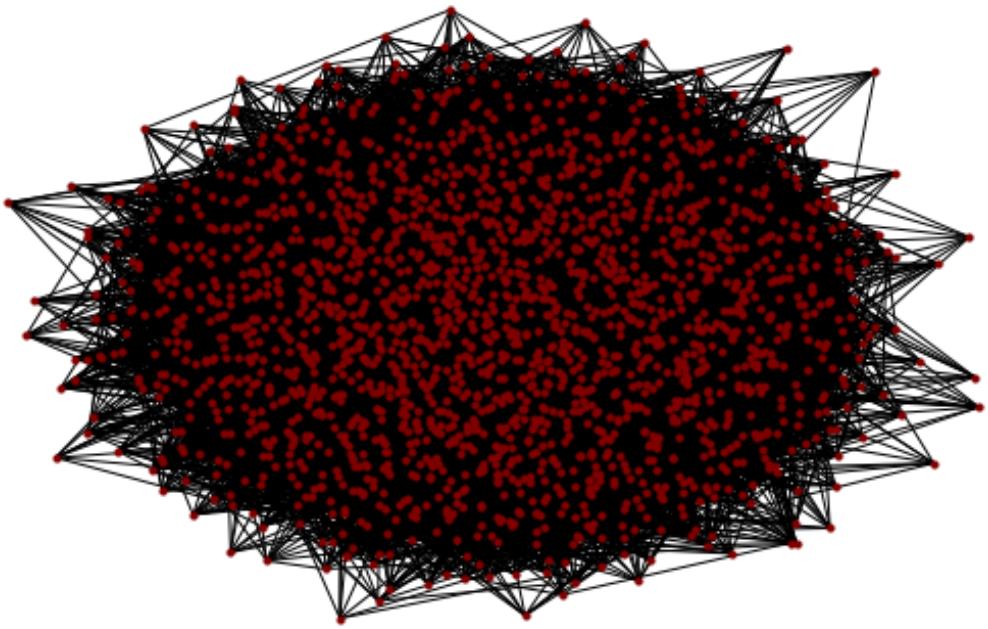


    b. Plot of Neural Network



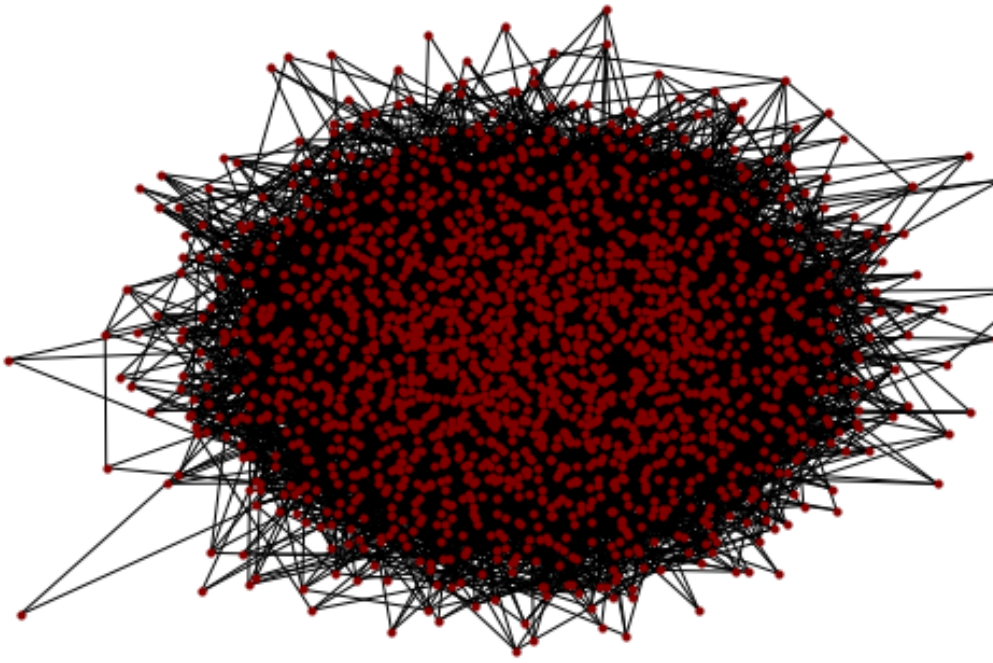
        i.
    c. Plot of Internet network
        i. Both Colab and Giphy crashed on plotting this graph.

d. Plot of Erdos-Renyi random network where N=2000, p=0.01



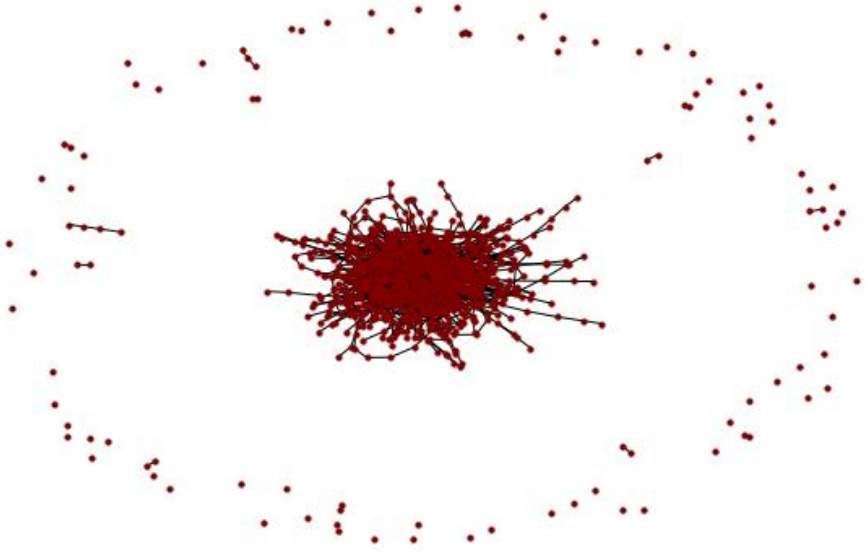
i.

e. Plot of Erdos-Renyi random network where N=2000, p=0.005



i.

f. Plot of Erdos-Renyi random network where N=1000, p=0.0025



i.

2. Number of connected components in each network
    a. In political blogs network: Networkx failed as this is a directed network. So, I used giphy. So,

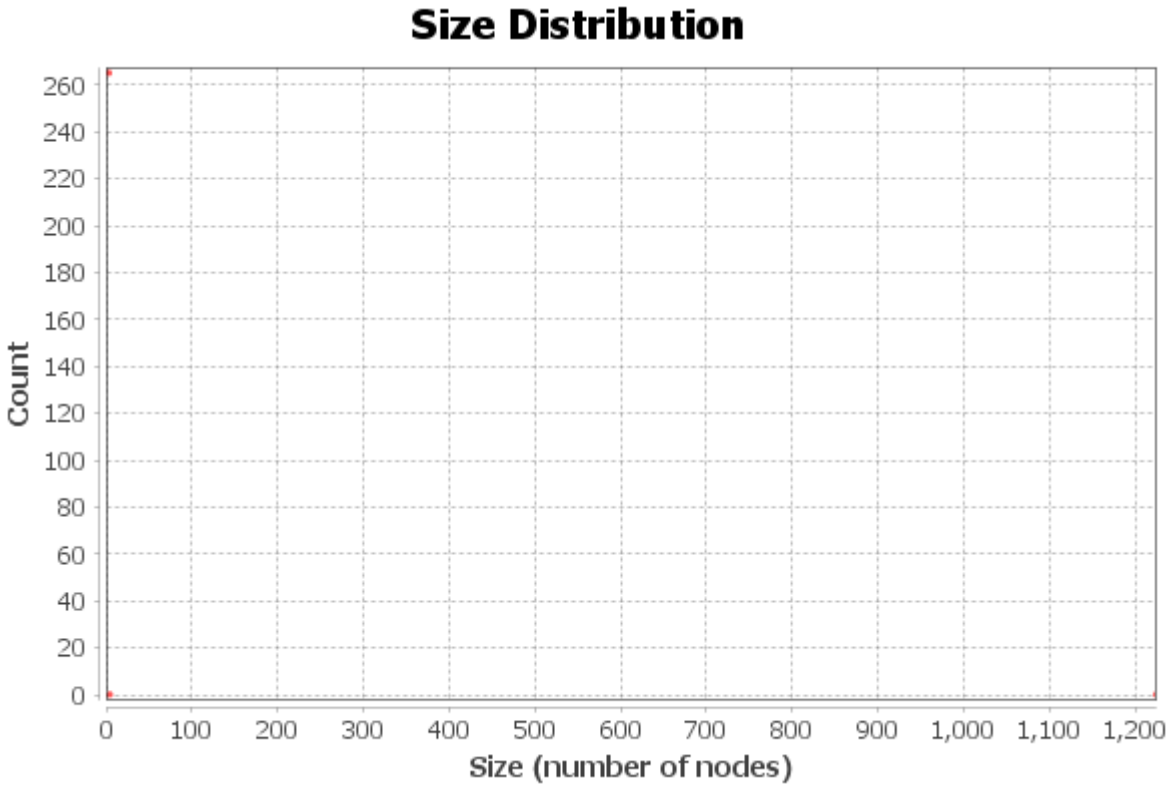
Connected Components Report

Parameters:

Network Interpretation: directed

Results:

Number of Weakly Connected Components: 268
Number of Strongly Connected Components: 688



Algorithm:

Robert Tarjan, *Depth-First Search and Linear Graph Algorithms*, in SIAM Journal on Computing 1 (2): 146–160 (1972)

b. <u>In neural network:</u>

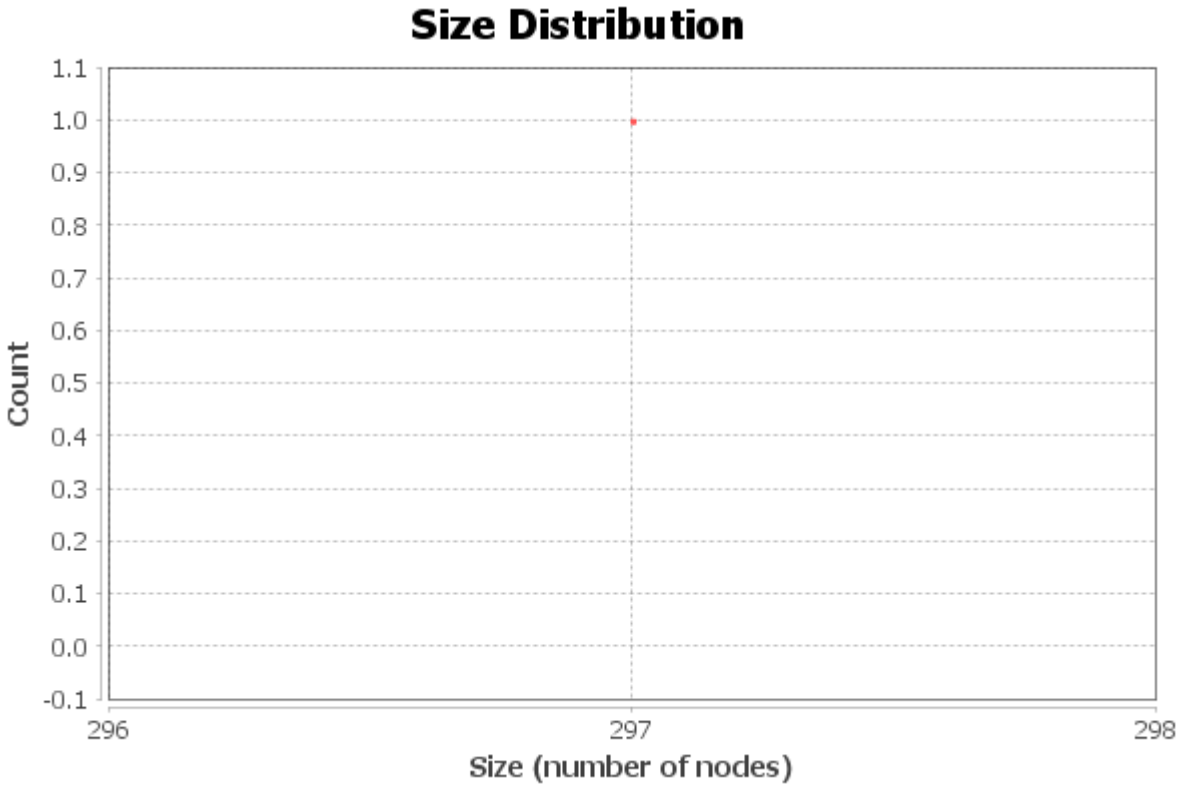
Connected Components Report

Parameters:

Network Interpretation: directed

Results:

Number of Weakly Connected Components: 1
Number of Strongly Connected Components: 57



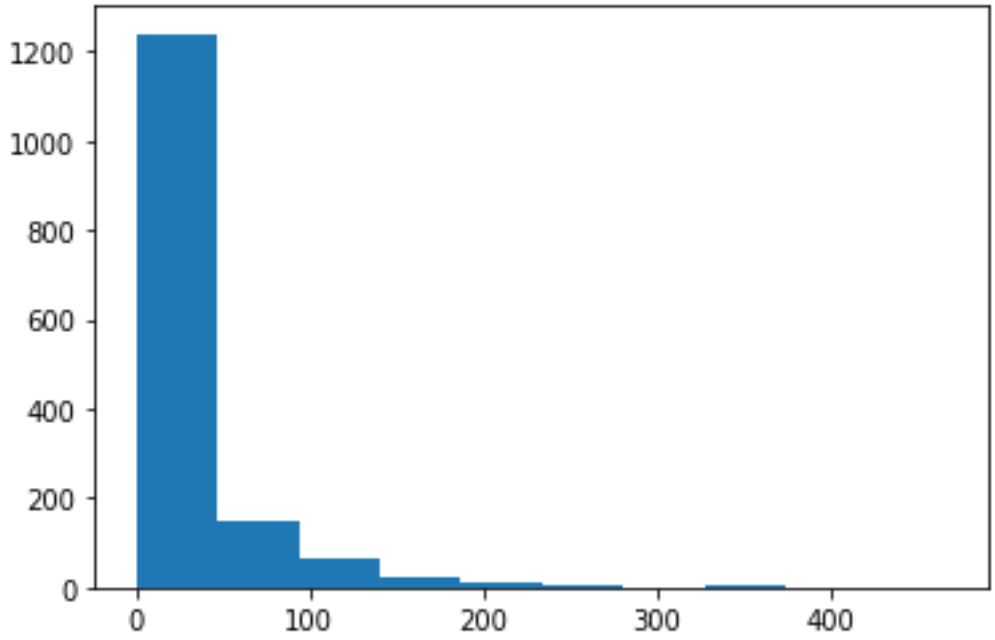
Algorithm:

Robert Tarjan, *Depth-First Search and Linear Graph Algorithms*, in SIAM Journal on Computing 1 (2): 146–160 (1972)

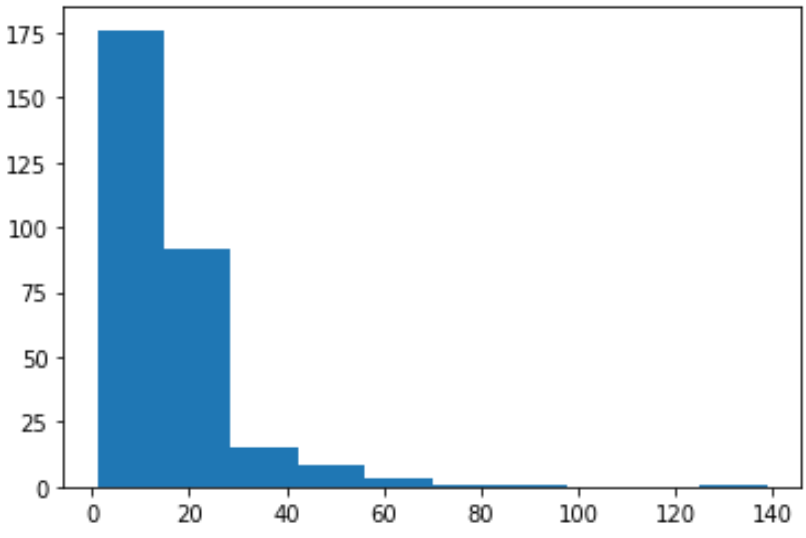
   c. In internet network: 1
   d. In Erdos-Renyi random network where N=2000, p=0.01 : 1
   e. In Erdos-Renyi random network where N=2000, p=0.005: 1
   f. In Erdos-Renyi random network where N=2000, p=0.0025: 90
3. Maximum degree in each of the 6 networks
   a. In political network: d = 468
   b. In neural network: d = 139
   c. In internet network: d = 2390
   d. In Erdos-Renyi random network where N=2000, p=0.01 : d = 37
   e. In Erdos-Renyi random network where N=2000, p=0.005: d = 22
   f. In Erdos-Renyi random network where N=2000, p=0.0025: d = 10
4. Diameter in each of the 6 networks
   a. In political network: L = Infinity since it is not a strongly connected graph.
   b. In neural network: L = Infinity since it is not a strongly connected graph.
   c. In internet network: L = 11
      i. Using Gephi
   d. In Erdos-Renyi random network where N=2000, p=0.01 : L = 4
   e. In Erdos-Renyi random network where N=2000, p=0.005: L = 6

f. In Erdos-Renyi random network where N=2000, p=0.0025: L = Infinity since it is disconnected graph.

5. Average local clustering coefficient of the 6 networks
   a. In political network: ccl =
   b. In neural network: ccl =
   c. In internet network: ccl = ccl = 0.22 approximately. 0.23 by another algorithm
   d. In Erdos-Renyi random network where N=2000, p=0.01 : ccl = 0.007 approximately. 0.009 by another algorithm
   e. In Erdos-Renyi random network where N=2000, p=0.005: ccl = 0.005 approximately.
   f. In Erdos-Renyi random network where N=2000, p=0.0025: ccl = 0 approximately. 0.0005355 by another algorithm.
6. Plots for degree distribution for each of the 6 networks
   a. Political network. This is a scale free network

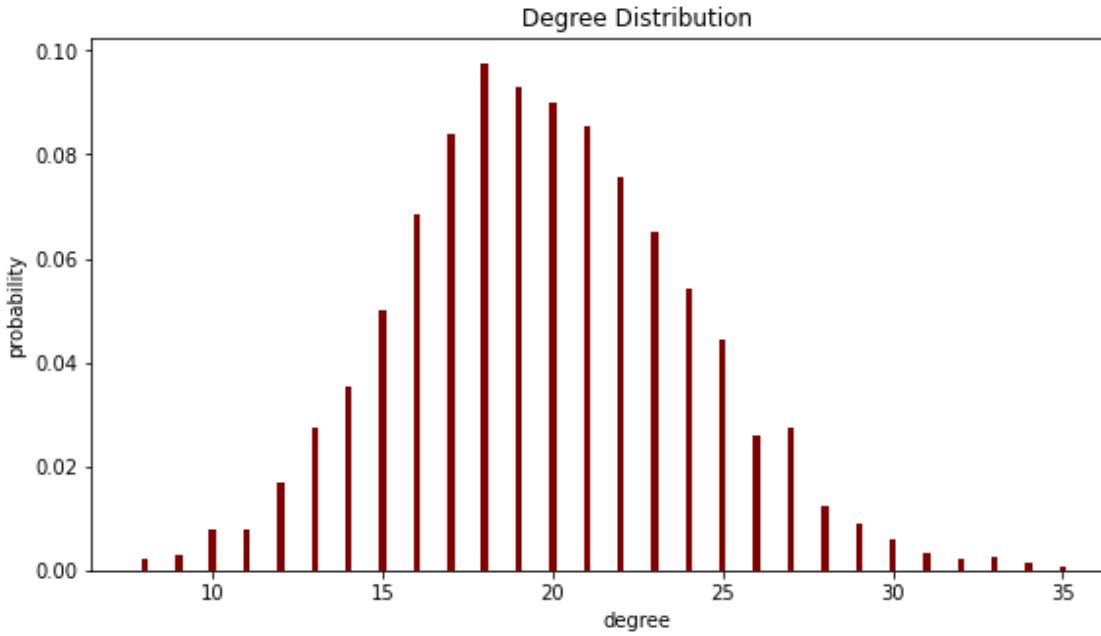


   i.
   b. Neural Network. This is also a scale free network.



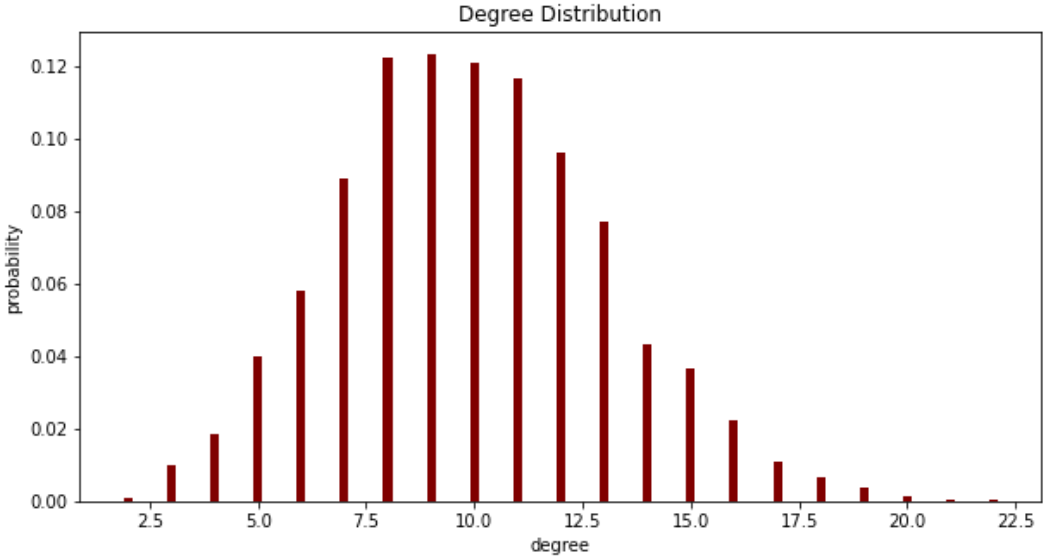
   i.
   c. Internet Network
   d. Erdos-Renyi random network where N=2000, p=0.01 .

i.



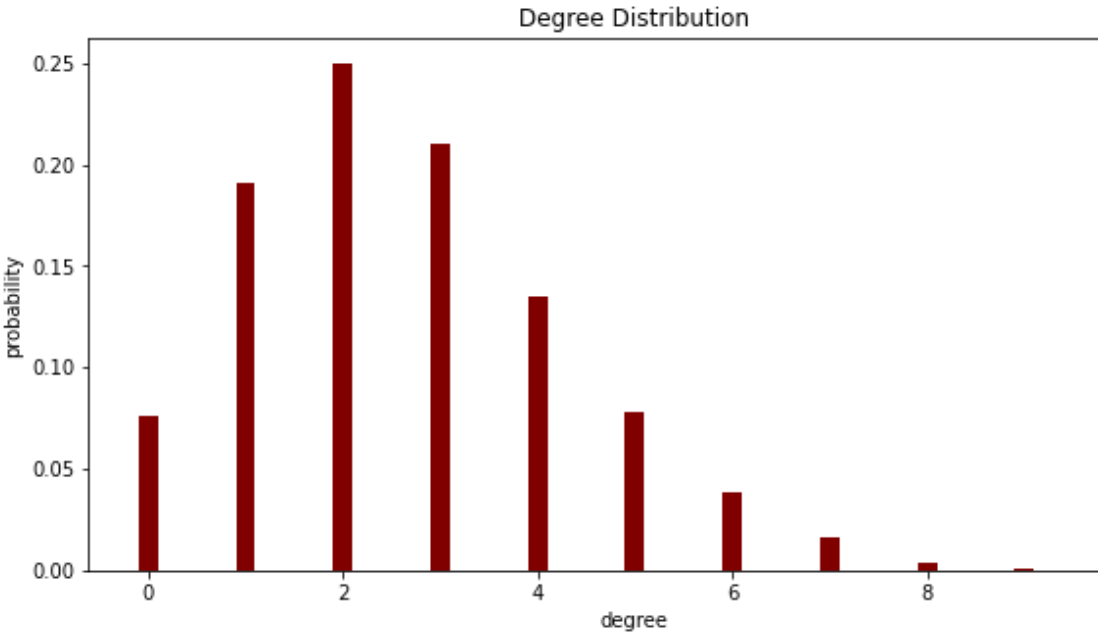
e. Erdos-Renyi random network where N=2000, p=0.005

i.



f. Erdos-Renyi random network where N=2000, p=0.0025

i.


Degree Distribution
probability
0.25
0.20
0.15
0.10
0.05
0.00
0
2
4
6
8
degree