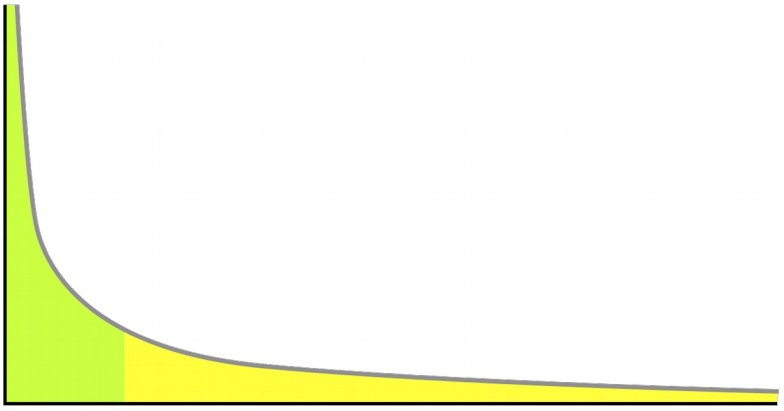
Name: Rutvik Kolhe
Unity Id: rkolhe

Degree Distribution

Question 1:

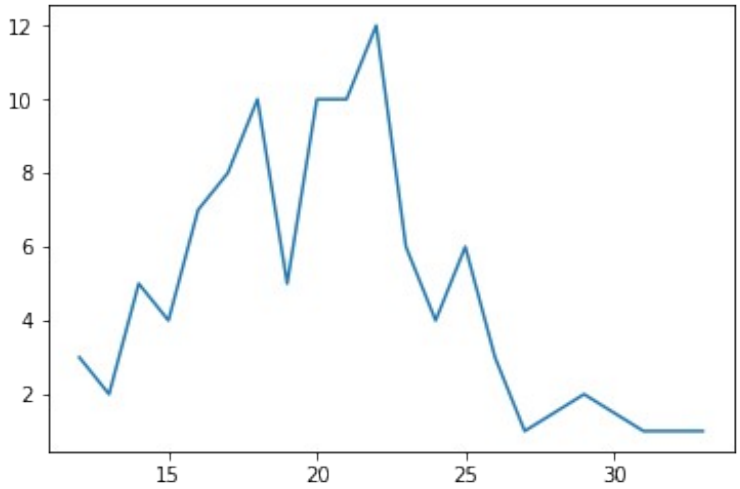
The distribution that follows the Power Law is as follows (src: Wikipedia):



To test whether the random graphs are scale free, we can observe the distribution of the values of particular graphs and conclude our result by comparing it with the above graph. To summarize, if the distribution of the given graph follows the power law (as above), it is said to be scale free.

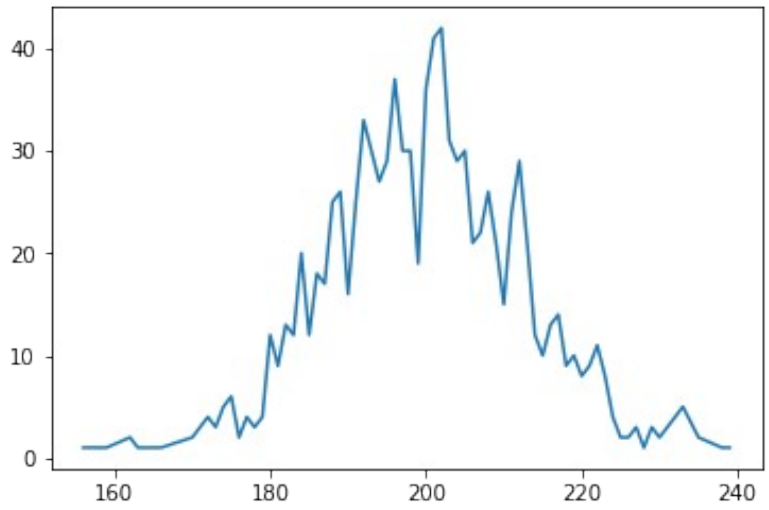
Random Graphs

gnm1.csv



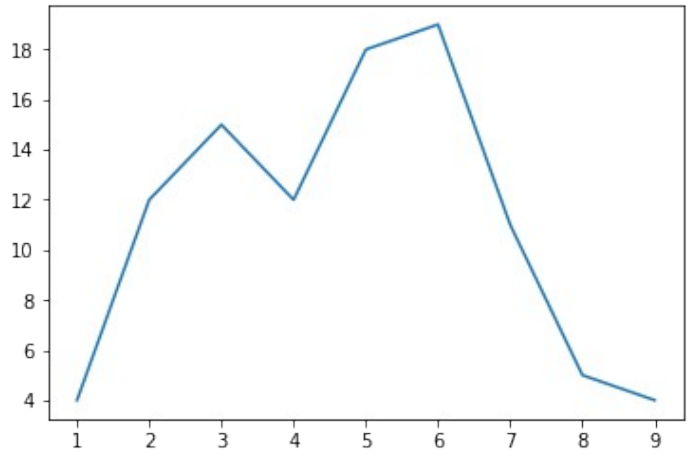
We can conclude that gnm1.csv is not scale free

gnm2.csv



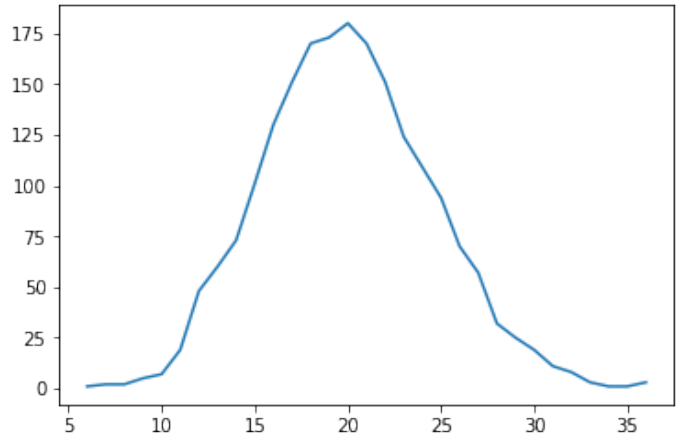
We can conclude that gnm2.csv is not scale free

gnp1.csv



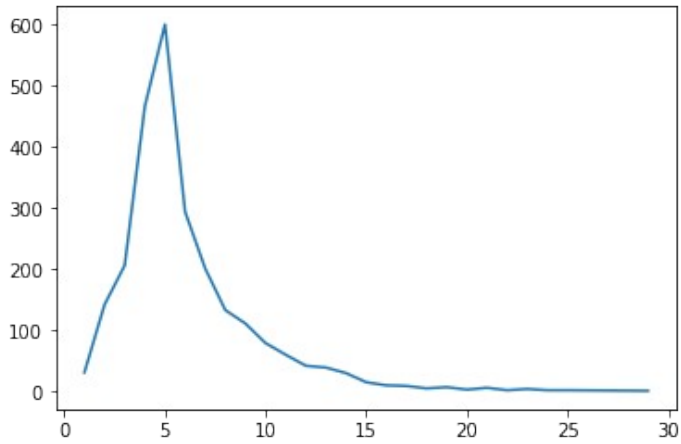
We can conclude that gnp1.csv is not scale free

gnp2.csv



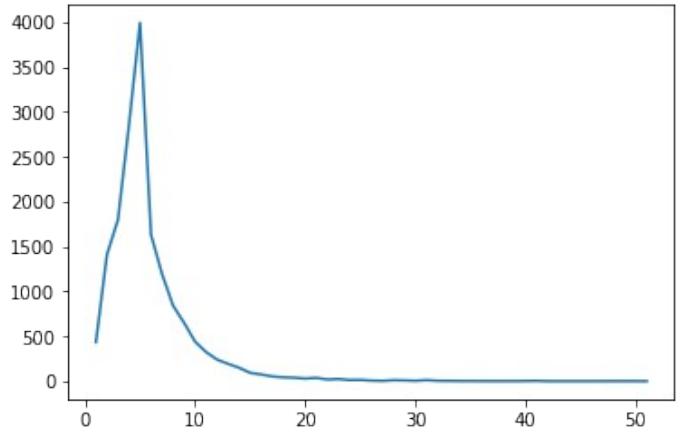
We can conclude that gnp2.csv is not scale free

Stanford Graphs
amazon.graph.small.csv



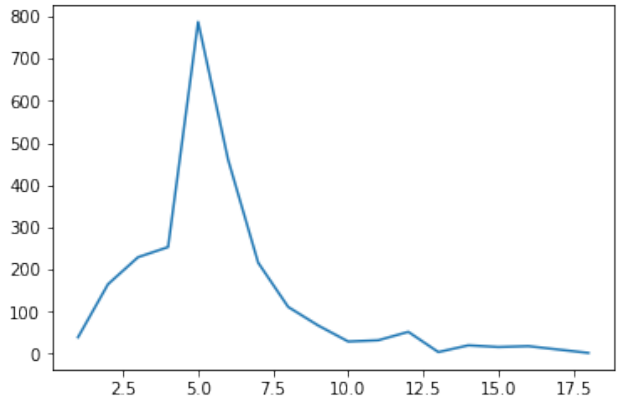
We can conclude that amazon.graph.small.csv is not scale free

amazon.graph.large.csv



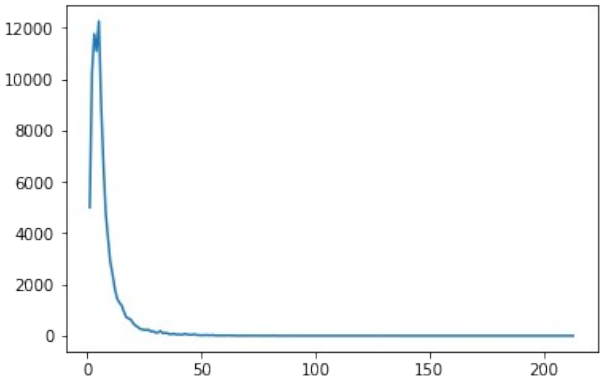
We can conclude that amazon.graph.large.csv is not scale free

dblp.graph.small.csv



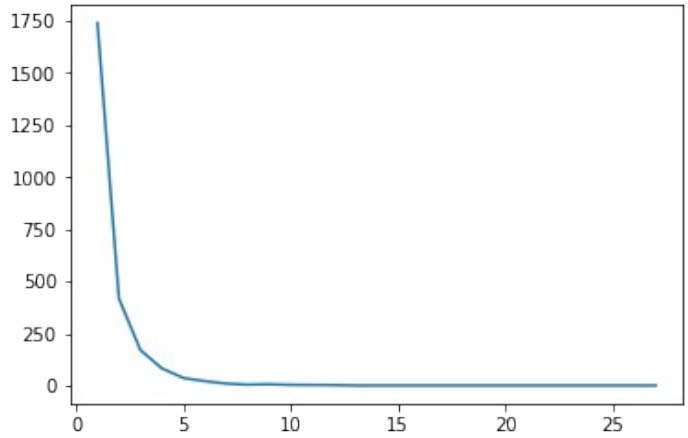
We can conclude that dblp.graph.small.csv is not scale free

dblp.graph.large.csv



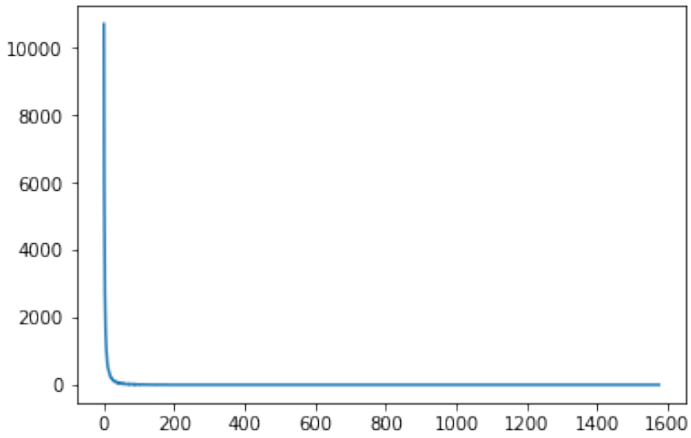
We can conclude that dblp.graph.large.csv is scale free

youtube.graph.small.csv



We can conclude that youtube.graph.small.csv is scale free

youtube.graph.large.csv



We can conclude that youtube.graph.small.csv is scale free

Centrality

Question 1:

CC(v) =1/ ∑ d(u,v)

Adjacency Matrix is as follows:

	A	B	C	D	E	F	G	H	I	J	Sum	Sum^{-1}
A	0	1	1	1	2	2	2	2	3	4	18	0.056
B	1	0	1	1	1	2	2	2	3	4	17	0.059
C	1	1	0	1	2	1	2	1	2	3	14	0.071
D	1	1	1	0	1	1	1	2	3	4	15	0.067
E	2	1	2	1	0	1	1	2	3	4	17	0.059
F	2	2	1	1	1	0	1	1	2	3	14	0.071
G	2	2	2	1	1	1	0	2	3	4	18	0.056
H	2	2	1	2	2	1	2	0	1	2	15	0.067
I	3	3	2	3	3	2	3	1	0	1	21	0.048
J	4	4	3	4	4	3	4	2	1	0	29	0.034

The ranking of the nodes from highest to lowest based on centrality is:

C
F
D
H
B
E
A
G
I
J

Question 2:

From the above rankings, we can conclude that machine **C and F** are the best candidates to hold the data

Articulation Points

The members who are the articulation points (articulation = 1) in the network should be targeted to disrupt the network. The members are:

Mohamed Atta
Usman Bandurka
Essid Sami Ben Khemais
Djmal Beghal
Nawaf Alhazmi
Raed Hijazi