ADBI – Project: Network Properties with Apache Spark

Abhishek Pareek
apareek2
200262220

Degree Distribution

Question 1:
Generate a few random graphs. You can do this using networkx's random graph generators. Do the random graphs you tested appear to be scale free? (Include degree distribution with your answer).
Answer:

γ for gnm1: 2.8875448675 - This is scale free
γ for gnm2: 9.62066376561 - This is not scale free
γ for gnp2: 54.582261311 - This is not scale free
γ for gnp1: 4.93908112886 - This is not scale free

Question 2: Do the Stanford graphs provided to you appear to be scale free?
Answer:
amazon.graph.large
γ = 1.3255773303
This is not scale free

amazon.graph.small
2.3948604146303003
This is scale free

dblp.graph.large
gamma: 1.31439172507
This is not scale free

dblp.graph.small
gamma: 1.60778667232
This is not scale free

youtube.graph.large
gamma: 1.56051101344
This is not scale free

youtube.graph.small
gamma: 1.36744176161
This is not scale free

Centrality

Question 1: Rank the nodes from highest to lowest closeness centrality.
Answer:

1. C
2. F
3. D
4. H
5. B
6. E
7. A
8. G
9. I
10. J

Question 2:
Suppose we had some centralized data that would sit on one machine but would be shared with all computers on the network. Which two machines would be the best candidates to hold this data based on other machines having few hops to access this data?
Answer: C, F

Articulation Points

Question 1: In this example, which members should have been targeted to best disrupt communication in the organization?
Answer:
These members should be targeted to best disrupt the communication:

1. Mohamed Atta
2. Usman Bandukra
3. Mamoun Darkazanli
4. Essid Sami Ben Khemais
5. Djamal Beghal
6. Nawaf Alhazmi
7. Raed Hijazi