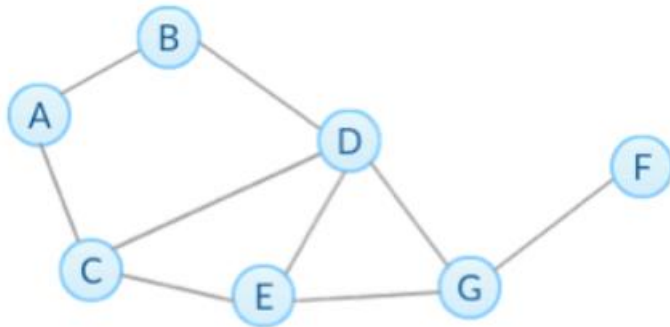


## Module 3 Quiz

1.

Based on the network below, what is the degree centrality of node D?

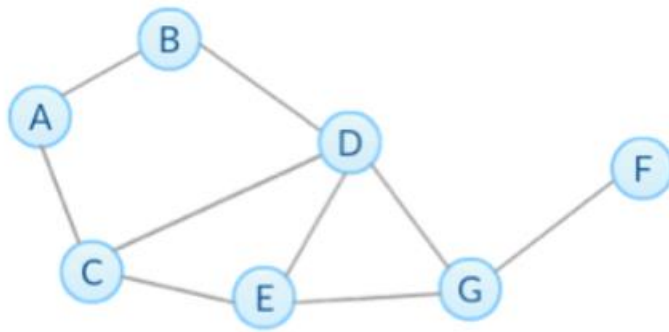


1 point

- ☒ 0.67
- ☐ 0.42
- ☐ 0.50
- ☐ 0.57

2.

Based on the network below, what is the closeness centrality of node G?

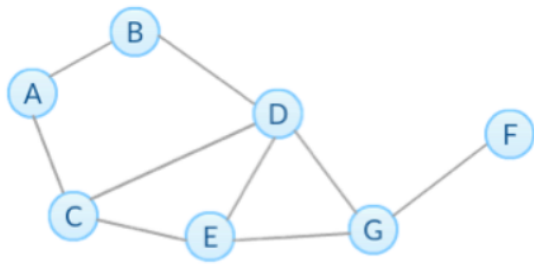


1 point

- ☐ 0.75
- ☒ 0.6
- ☐ 0.7
- ☐ 0.875

3.

Based on the network below, what is the normalized betweenness centrality (excluding endpoints) of node G?

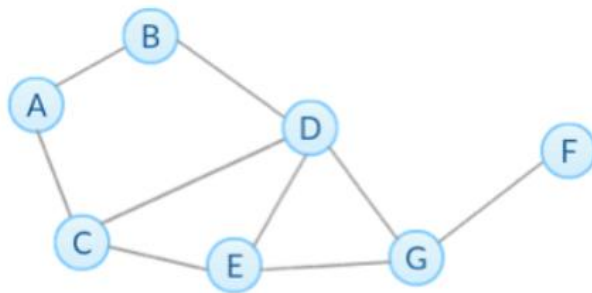


1 point

- ☐ 0.47
- ☐ 0.24
- ☐ 0.67
- ☒ 0.33

4.

Based on the network below, what is the betweenness centrality without normalization of edge (G,F)?



1 point

- ☐ 4
- ☐ 5
- ☒ 6
- ☐ 7

5.

Select all True statements.

1 point

- ☒ The closeness centrality of a node describes how far the node is from others.
- ☐ In directed networks, in-degree and out-degree centrality of a node are always the same.
- ☒ We can use subsets of node-pairs to approximate betweenness centrality.
- ☐ The node with highest betweenness centrality in a network also has the highest closeness centrality.
- ☒ The assumption of degree centrality is that important nodes have more connections.

6.

Select all True statements about Page Rank (PR) and HITS in directed networks.

1 point

- ☐ Nodes that have outgoing edges to good hubs are good authorities, and nodes that have incoming edges from good authorities are good hubs.
- ☐ Adding in-links of a node will never decrease its PR.
- ☐ Nodes with high in-degree centrality have higher PRs than nodes with low in-degree centrality.
- ☒ The authority and hub score of each node is obtained by computing multiple iterations of HITS algorithm and both scores of most networks are convergent.
- ☒ Adding out-links of a node will always decrease its PR.

**WRONG**

7.

Given the network below, which value of alpha (damping parameter) listed below in the NetworkX function pagerank maximizes the PageRank of node D?

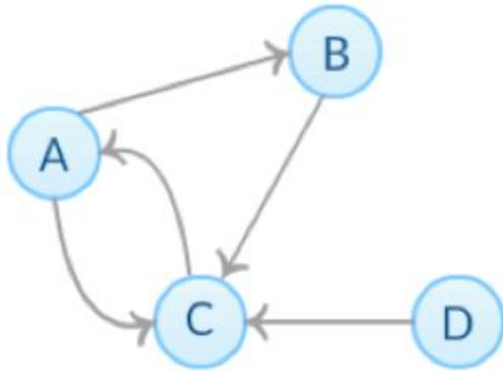


1 point

- ☐ 0.5
- ☒ 0.95
- ☐ 0.9
- ☐ 0.8

8.

Based on the network below, what is the basic PR of node C at step  $k = 1$ ?

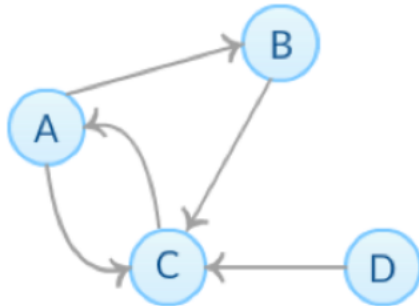


1 point

- ☐ 0.25
- ☒ 0.625
- ☐ 0.125
- ☐ 0.5
- ☐ 0.375

9.

Based on the network below, what are the corresponding normalized authority and hub scores of node C correspondingly after two iterations of HITS algorithm?



1 point

☐ 0.33, 0.33

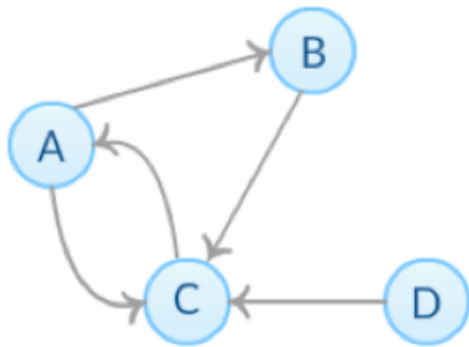
☒ 0.57, 0.09

☐ 0.4, 0.4

☐ 0.8, 0.2

10.

Based on the network below, which of the following is NOT True? Check all that apply.



1 point

- ☐ At step  $k$  ( $k \geq 1$ ), node A's basic PR is always the same as node C's basic PR at step  $k-1$ .
- ☒ Node D's authority and hub score after  $k$  iterations ( $k \geq 1$ ) are always 0.
- ☐ At each step, the sum of all nodes' basic PR is always 1.
- ☐ Node D's basic PR at step  $k$  ( $k \geq 1$ ) is always 0.