

Module 2 Network

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1. Consider the given network. What is the value of node F's local clustering coefficient?

☐ 0.5
☐ 0.6
☒ 0.7
☐ 0.8

2. Given the following two networks, which of the following is True?

☐ Network (A) has higher average local clustering coefficient and higher transitivity than (B).
☒ Network (A) has higher average local clustering coefficient but lower transitivity than (B).
☐ Network (B) has lower average local clustering coefficient and lower transitivity than (B).
☐ Network (A) has lower average local clustering coefficient but higher transitivity than (B).

3. Consider the network shown below and select all that apply.

☒ The radius of this network is half of its diameter.
☒ The diameter of this network is 3.
☒ If we perform Breadth-First Search (BFS) from node A, the BFS tree we obtain will have a depth of 4.
☐ Node G and E are in the center of the network.
☐ E is the only node in the periphery of the network.
☒ The eccentricity of node B and C are equal.

4. Select all that apply for the network below.

☒ It is a disconnected graph with 2 connected components.
☒ If edge (E,G) is removed, the number of connected components will not change.
☐ The local clustering coefficient of node I is higher than node J and K.
☒ We can make the graph connected by adding edge (J,K).

5. Consider three networks (A), (B) and (C) below and select all that apply.

☒ Only network (B) is a strongly connected graph.
☐ We can change network (A) from a weakly connected graph to a strongly connected graph by adding a directed edge from node C to node A.
☐ All edges in network (B) are needed for the network to be strongly connected.
☒ We only need to add one directed edge in order to change network (C) to a strongly connected graph.

6. Which of the following is true about network robustness and connectivity? Select all that apply.

☒ The degree of an agent and the combination of a right route are examples of two different levels of network robustness in the real world.

☒ Adding more edges to a network always makes it more robust.

☒ A network that has a high average local clustering coefficient always has a high node connectivity.

☒ Network robustness measures a network's ability to maintain its connectivity.

☒ Adding edges to a network can never make the network less robust.

7. Consider the network given below.

What is the node connectivity of this network?

☒ 1
☐ 2
☐ 3
☐ 4

8. Consider the network given below.

What is the edge connectivity of this network?

☐ 1
☒ 2
☐ 3
☐ 4

9. The directed network below shows how information can be transferred between nodes. For example, node A can pass the information to node C. Clearly, but not vice versa. If node C wants to send messages to node A, all data must be forwarded by node B.

What is the total number of simple paths from node D to node G?

☐ 5
☐ 6
☐ 7
☒ 8
☐ 9

10. The directed network below shows how information can be transferred between nodes. For example, node A can pass the information to node C. Clearly, but not vice versa. If node C wants to send messages to node A, all data must be forwarded by node B.

Suppose we want to block all information channels from node A to node K. Which of the following actions achieve this goal? Select all that apply.

☐ Removing node K only.

☐ Removing node G and H.

☒ Removing node F and H.

☐ Removing edge (A,K).

☒ Removing edges (A,K) and (G,K).

☐ Removing edges (A,K) and (H,K).

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