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| **Started on** | Tuesday, March 23, 2021, 5:14 PM |
| **State** | Finished |
| **Completed on** | Tuesday, March 23, 2021, 5:59 PM |
| **Time taken** | 45 mins 30 secs |
| **Points** | 11.00/11.00 |
| **Grade** | **100.00** out of 100.00 |

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Question **1**

Correct

1.00 points out of 1.00

Flag question

Question text

One popular class of algorithms used to layout the vertices and edges in a network visualization is ...

Select one:

a. Clique-Drawing Algorithms

b. Force-Directed Drawing Algorithms

c. Skribbl.io

d. Clustering Layout Algorithms

e. Closeness and Centrality Heuristics

Feedback

Your answer is correct.

The correct answer is: Force-Directed Drawing Algorithms

Question **2**

Correct

1.00 points out of 1.00

Flag question

Question text

*Multiple Selection.* Choose the characteristics that most appropriately describe the following network:

An email network where the vertices represent employees and the edges represent the number of emails sent from one employee to the other.

Select one or more:

a. directed

b. undirected

c. unweighted

d. weighted

Feedback

Your answer is correct.

The correct answers are: directed, weighted

Question **3**

Correct

1.00 points out of 1.00

Flag question

Question text

*Multiple Selection.* Choose the characteristics that most appropriately describe the following network:

A managerial network that depicts employees of a large corporation with edges that represent the relationship "is the manager of".

Select one or more:

a. directed

b. weighted

c. undirected

d. unweighted

Feedback

Your answer is correct.

The correct answers are: directed, unweighted

Question **4**

Correct

1.00 points out of 1.00

Flag question

Question text

Which of the following words accurately describes the adjacency matrix for an undirected graph?

Select one:

a. identity

b. rectangular

c. negative

d. symmetric

e. diagonal

Feedback

Your answer is correct.

The correct answer is: symmetric

Question **5**

Correct

1.00 points out of 1.00

Flag question

Question text

Which of the following is an important consideration to make when applying statistical analysis to network data?

Select one:

a. Networks, by their definition, often imply a lack of independence between observations and thus most classical statistical analyses are ill-suited for this application.

b. Variance is undefined for network data, making the application of 90% of statistical tests futile.

c. Statistical analysis in larger networks is impossible because network visualizations take too long for large datasets

d. Networks always represent an entire population, so you can easily declare that whatever relationships you see are statistically significant

Feedback

Your answer is correct.

The correct answer is: Networks, by their definition, often imply a lack of independence between observations and thus most classical statistical analyses are ill-suited for this application.

Question **6**

Correct

1.00 points out of 1.00

Flag question

Question text

What is the clustering coefficient of the pink highlighted node in the small network shown below?

Answer:

Feedback

The correct answer is: 0.5

Question **7**

Correct

1.00 points out of 1.00

Flag question

Question text

*Multiple Selection.*A scale-free network is one where...

Select one or more:

a. The density of the network is 1.

b. There are a few "hubs" or highly connected points but the majority of nodes have very low degree.

c. All possible edges exist in the graph.

d. The degree distribution follows a power law.

e. All nodes in the network have the same degree.

Feedback

Your answer is correct.

The correct answers are: The degree distribution follows a power law., There are a few "hubs" or highly connected points but the majority of nodes have very low degree.

Question **8**

Correct

1.00 points out of 1.00

Flag question

Question text

Calculate the **betweenness centrality** of the pink colored node in the following network diagram.

Answer:

Feedback

The correct answer is: 2

Question **9**

Correct

1.00 points out of 1.00

Flag question

Question text

How is eigenvector centrality fundamentally different from other definitions of centrality?

Select one:

a. Eigenvector centrality is the only method that directly takes into account the centrality of neighboring nodes, measuring not only *how many* connections a node has, but *which* connections it has.

b. Eigenvector centrality is the only method that takes into account the diameter of the graph.

c. Eigenvector centrality is the only method that is able to be meaningfully compared across different networks

Feedback

Your answer is correct.

The correct answer is: Eigenvector centrality is the only method that directly takes into account the centrality of neighboring nodes, measuring not only *how many* connections a node has, but *which* connections it has.

Question **10**

Correct

1.00 points out of 1.00

Flag question

Question text

Match each type of centrality to the statement that most appropriately describes it's purpose:

|  |  |
| --- | --- |
| Eigenvector Centrality | Answer 1 |
| Closeness Centrality | Answer 2 |
| Degree Centrality | Answer 3 |
| Betweenness Centrality | Answer 4 |

Feedback

Your answer is correct.

The correct answer is:

* Eigenvector Centrality → A node is important if the nodes to which it is connected are important
* Closeness Centrality → A node is important if it is not far away from many nodes
* Degree Centrality → A node is important if it has many edges
* Betweenness Centrality → A node is important if most of the shortest paths between other nodes go through the node of interest

Question **11**

Correct

1.00 points out of 1.00

Flag question

Question text

Which eigenvector will provide a list of eigenvector centralities for your network?

Select one:

a. The dominant eigenvector. That is, the one associated with the largest eigenvalue.

b. The minimum eigenvector. That is, the one associated with the smallest eigenvalue.

c. Trick question! none! Eigenvector centralities do not come directly from an eigenvector

d. Any eigenvector! All the eigenvectors of an adjacency matrix will provide the same information.

Feedback

Your answer is correct.

The correct answer is: The dominant eigenvector. That is, the one associated with the largest eigenvalue.

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