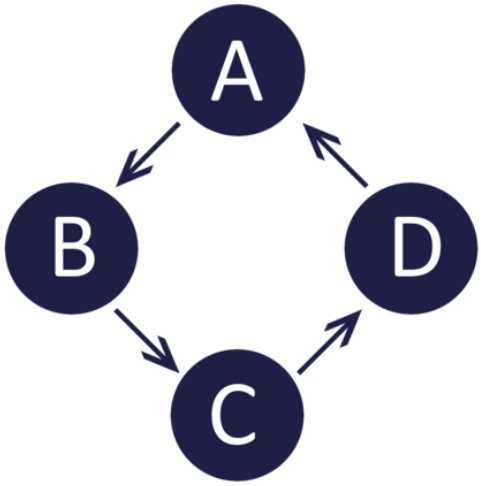
Connectivity, Community, and Centrality Analytics

19 questions

1. The example given in the lectures of when a power network loses power in large portions of its service area was an example of what?

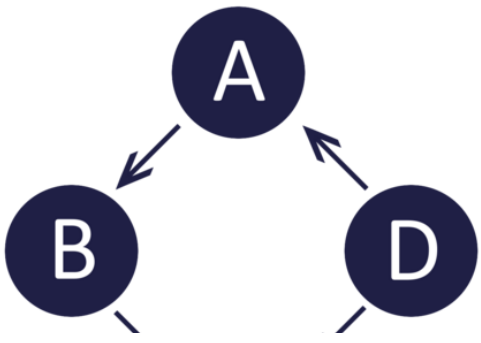
   - (●) an attack which causes disconnection of the graph
   - ( ) high levels of connectivity which make it easy to bring a network down
   - ( ) a problem that can occur when centrality is too high

2. Is the following graph strongly connected, weakly connected or neither?



   - ( ) weakly connected
   - ( ) neither
   - (●) strongly connected

3. Is the following graph strongly connected, weakly connected or neither?



- [x] weakly connected
- [ ] neither
- [ ] strongly connected

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4. If you were going to look for a node which would be most likely to be the target of an attack to disconnect a network, what would be the best characteristic to look for?

- [ ] nodes that, if they were removed, would cause the graph to go from strongly connected to weakly connected
- [x] high degree nodes
- [ ] low degree nodes

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5. What is the out-degree of node B?

- [x] 0
- [ ] 1
- [ ] 2
- [ ] 3

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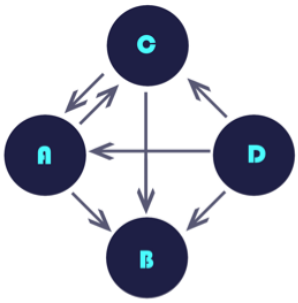
6. In the graph below, which node is the greatest talker?



- [ ] A
- [ ] B
- [ ] C
- [x] D

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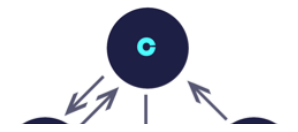
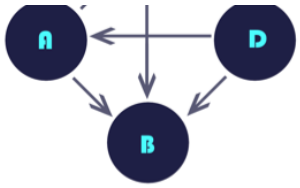
7. In the graph below, which nodes are the greatest communicators? (Hint: there's a tie)





- [x] A
- [ ] B
- [x] C
- [ ] D

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8. What would we be looking for if we followed the steps below? Note: we have 2 graphs.

1. Create a table for each graph where, for each node, you list the degree of the node.
2. For each graph, create a histogram indicating how many nodes in that graph have a specific degree (e.g., how many nodes have degree 1? 2? etc.).
3. Use advanced approaches (e.g. Euclidean distances) to compare these two histograms.

- ( ) Centrality
- (•) Similarity
- ( ) Community
- ( ) Connectivity

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9. Which of the following are the three type of analytics questions asked about communities?

- [x] Static
- [x] Evolution
- [x] Prediction
- [ ] Connection

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10. What type of community analytics question is the following?

Did a community form on twitter around the 2014 World Cup in Brazil?

- ( ) Static
- ( ) Connection
- (•) Evolution
- ( ) Prediction

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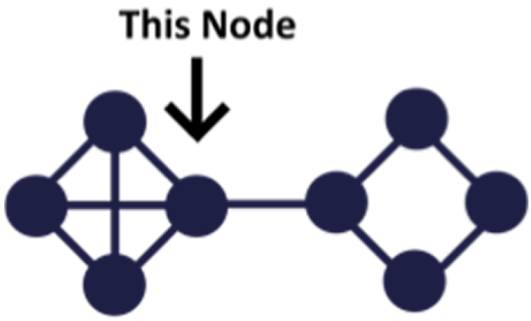
11. Which type of community analytics question is the following?

How tightly knit was the 2014 World Cup twitter community on July 13, 2014 (the day of the finals)?

- ( ) Evolution
- (•) Static
- ( ) Prediction
- ( ) Connection

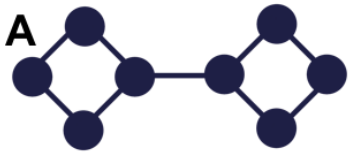
12.

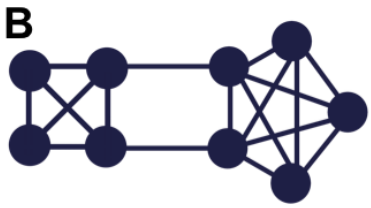
12. What is the internal degree of the node indicated in the graph below?



- 1
- 2
- 3
- 4

13. Which of the two graphs below is more modular?





- A
- B

14. Which of the following community tracking phases usually occurs when a company spins off a start-up?

- Birth
- Split
- Merge
- Grow
- Death
- Contract

15. An influencer in a network is defined as:

- a node which has heavy weight edges to at least 1/2 of the nodes in the network

- [ ] a node which has heavy weight edges to at least 1/2 of the nodes in the network
- [x] a node which can reach all other nodes quickly
- [ ] the biggest gossip in the network

16. Which of the following are the 2 core "key player" problems that centrality analytics can address?

- [x] A set of nodes which can reach (almost) all other nodes
- [ ] What is the shortest path through a network
- [ ] Which nodes have the highest ratio of out-degree nodes to in-degree nodes
- [x] Which nodes' removal will maximally disrupt the network

17. What kind of centrality would you want to analyze in a graph if you wanted to inject information that flows through the shortest path in a network and have it spread quickly?

- [ ] Between-ness
- [ ] Group
- [ ] Degree
- [x] Closeness

18. What kind of centrality would you want to analyze in a graph if you wanted maximize commodity flow in a network?

- [ ] Group
- [ ] Closeness
- [ ] Degree
- [x] Between-ness

19. What kind of centrality identifies "hubness"?

- [ ] Group
- [x] Degree
- [ ] Between-ness
- [ ] Closeness

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