# Graph Analytics Applications

17 questions

**1.** A graph representing tweets would have only "one type" (e.g. label) of node.

- ○ True
- ● False

**2.** In a network representing the world wide web <u>nodes</u> would likely represent:

- ○ Hyperlinks
- ● Webpages
- ○ Google search terms
- ○ Individual computers

**3.** In a network representing the world wide web <u>edges</u> (or links) would likely represent

- ● Hyperlinks
- ○ Webpages
- ○ Google search terms
- ○ Individual computers

**4.** In an email network, which might reasonably be represented by weight on edges?

- ○ the total number of people who sent an email in a week
- ● average number of emails sent from one user to another in a week
- ○ the total number of emails sent by one user in a week

**5.** A loop in a graph is where:

- ○ when there is a edge from A->B, there is also an edge from B->A.
- ○ where there is a path in some way from a node, through 1 or more other nodes, back to the original node.
- ● where there is an edge from a node to itself.

**6.** An example of a loop in a graph could occur when:

- ● Someone emails themself
- ○ Someone emails a friend who replies

○   Someone emails a friend, who emails another friend, who then replies to you

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**7.** When trying to represent a relationship between Maria and Julio who have more than one relationship to each other (e.g., tennis partner, co-worker, emergency contact) which of the following would be needed in a graph representing those relationships

○   Separate graphs for each kind of relationship

◉   Multiple edges between Maria and Julio

○   Multiple nodes for each of Maria and Julio, to capture the various relationships

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**8.** In many applications paths (where we go from one node to another without repeating nodes) are more useful than walks (where we can repeat a node when going from one node to another).

◉   True

○   False

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**9.** Trails (paths without repeated _edges_) can be interesting in which of the following problem applications?

○   An email network tracing frequency of emails from one person to another.

○   An email network tracing email replies.

◉   Routing to avoid using the same bridge or road.

○   Routing to avoid visiting the same city.

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**10.** Suppose we have an email network where the edges of a graph represent the number of emails from one user to another.

If I was going to ask if Maria had sent any emails that (either directly or through forwarding from others) reached Julio, I would ask if:

◉   Julio's node was reachable from Maria node

○   Maria's node was reachable from Julio's node

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**11.** If I want to find the diameter of a graph, I should start by finding the shortest path between each set of nodes.

◉   True

○   False

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**12.** What is the diameter of this graph?
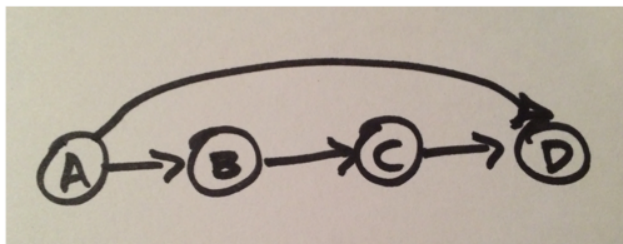
○ 1

● 2

○ 3

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**13.** This question is about "best paths". To find the most discussed email in an email network, would we be looking to minimize a function or maximize a function?

● Maximize

○ Minimize

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**14.** Which are the two kinds of constraints on paths discussed in the video on basic path analytics? (check 2) Hint: remember the example of Amarnath needing to get to work by taking his son to school.

☐ Directionality

☑ Inclusion of nodes and/or edges

☑ Exclusion of nodes and/or edges

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**15.** What are examples of **preference** constraints in the Google Maps application?

☑ Avoid roads under construction

☑ Avoid highways

☐ Include son's school

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**16.** Which of the statements below is true?

○ Dijsktra's algorithm is computationally efficient (has low computational complexity).

● Dijsktra's algorithm is computationally inefficient (has high computational complexity).

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**17.** In the video on "Inclusion and Exclusion Constraints" we learn that adding constraints can actually make our analysis job easier. For example, when we require that a given node be included on a path, which of the following impacts now make the analysis job easier? (Choose 2)

☑ Splitting the task into 2 independent shortest path problems

☐ Changing the weights on the edges of the graph and/or subgraphs

☑ Reduction of the size of the graph

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