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You need to give the reasoning of your answers for BOTH why you choose AND why you do not choose. Otherwise, there is no mark.

Question 1

Suppose you're working with a group of researchers studying social networks, with a particular focus on the distances between people in such networks, and the broader implications for the small-world phenomenon.

The research group is currently negotiating an agreement with a large mobile phone carrier to get a snapshot of their "who-calls-whom" graph. With agreement, the carrier provides a graph in which a node represents a customer, and an edge represents two people who have called each other in the past year. (The edges will be annotated with the number of calls and the time of each call.) Recently, the carrier proposes that they will only provide edges where two people have called each other at least once a week on average in the past year. (In other words, all nodes will be presented, but there will only be edges where two people talked at least 52 times.) The carrier understands that this is not the full network, but they argue that this is a good approximation to the full network.

Given such change, which of the following statement is true?

- 1) This will reduce the weak tie edges in the network
- 2) This will NOT reduce the weak tie edges in the network

Question 2

Consider the following graph. The distance is defined as the relative position traversing from node to another node. For instance, the distance of node 0 and node A is 6. What is the path outputted by decentralized search between node 0 and node 9, and why?

The decentralized output is:

0-C-8-9

Reason: Start from 0:

C or 4

C distance to 9: 3

4 distance to 9: 5

for C: choose 8. 8 → 9

- 1) 0-C-8-9
- 2) 0-1-D-9
- 3) 0-C-B-A-9
- 4) 0-4-9

∴ The output is:

0-C-8-9

