

Answers to Week-6, Assignment-1: Link Analysis

The correct answers and their explanations have been highlighted in the blue color. We have not provided the explanation for the very straightforward questions. If there is any doubt, please leave a query on the discussion forum.

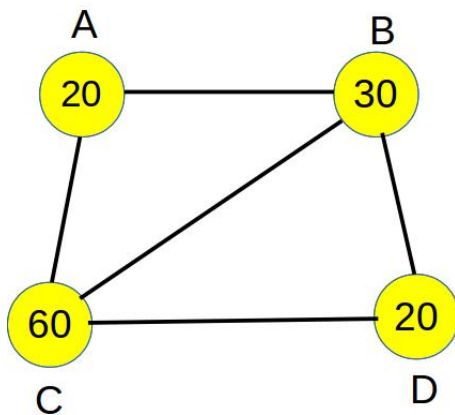
1. The nodes and the edges in the web graph are
 - A. IP addresses and the network connection
 - B. Web pages and the URLs
 - C. Web pages and the hyperlinks
 - D. A person and the web pages h/she is browsing

Explanation:In a web graph, each node denotes a web page and there is an edge from page A to page B if page A has a hyperlink to page B .

2. Choose the correct options corresponding to equal sharing gold coins' distribution game
 - A. The game might not converge
 - B. The game always converges with everybody having the same number of gold coins
 - C. The game always converges with people having different numbers of gold coins
 - D. The game can converge with people having equal/unequal number of gold coins.

Explanation:When people distribute gold coins equally, the game converges. At the convergence state, everybody might/might not have the same number of gold coins.

3. Consider the graph shown in the Figure. The number written in each circle represents the number of gold coins possessed by the corresponding node. Choose the number of gold coins every node has in the next iteration, according to the equal sharing gold coins' game.



- A. A: 30, B: 30, C: 30, D: 40
- B. A: 30, B: 40, C: 30, D: 30
- C. A: 40, B: 40, C: 30, D: 40
- D. A: 30, B: 40, C: 50, D: 10

Explanation: A gets 10 coins from B and 20 coins from C , totalling to 30 coins. B gets 10 coins from A , 20 coins from C , 10 coins from D , totalling to 40 coins. C gets 10 coins from A , 10 coins from B and 10 coins from D , totalling to 30 coins. D gets 10 coins from B and 20 coins from C , totalling to 30 coins.

4. Consider algorithm 1 to be equal sharing coin distribution game and algorithm 2 to be random dropping coin distribution game. Which of the following is true?
- A. Both the algorithms converge.
 - B. None of the algorithms converge.
 - C. Algorithm A converges while Algorithm B does not converge.
 - D. Algorithm B converges while Algorithm A does not converge.

Explanation: It has been shown in the lecture video that both of these algorithms are equivalent and that both of them finally converge.

5. Consider algorithm 1 to be equal sharing coin distribution game and algorithm 2 to be random dropping coin distribution game. Which of the following is true?
- A. Algorithm 1 ranks the nodes in ascending order of their importance while algorithm 2 ranks the nodes in descending order of importance.
 - B. Both the algorithms rank the nodes in descending order of their importance but give different results.
 - C. Algorithm 1 ranks the nodes in descending order of their importance while algorithm 2 ranks the nodes in ascending order of importance.
 - D. Both the algorithms rank the nodes in descending order of their importance and give same result.

Explanation: It has been stated in the lecture video that both of these algorithms are equivalent and that both of them finally converge. Moreover, they converge to a state where nodes are arranged in the descending order of their importance.

6. How does Google Page Rank work??
- A. By hiring experts from different domains who maintain a database of the rankings of all web pages.
 - B. Using machine learning and natural language processing.
 - C. Using web graph and random walk algorithm.
 - D. Using web graph and breadth first traversal.

Explanation: It has been stated and shown in the lecture that Google page ranking can be achieved by taking a random walk on the graph.

7. Which of the following kinds of nodes might create a problem in the random walk (drop) gold coins' distribution game?
- A. Nodes having a very high indegree
 - B. Nodes having a very high outdegree
 - C. Nodes having very high indegree as well as outdegree
 - D. Nodes having zero outdegree

Explanation: Once we reach a node having zero outdegree, we get trapped and can not move further. Hence, the nodes having zero outdegree create a problem.

8. Which of the following correctly depicts teleportation?
- A. Jumping from the current node to its neighbor's neighbor.
 - B. Going back to the previous node which was explored.
 - C. Jumping to any random node in the network.
 - D. Jumping to the node in the network which has maximum outdegree.

Explanation: It has been shown in the lecture videos that once the random walk algorithm gets stuck-/trapped at a node, it jumps to a randomly chosen node in the network. This concept is known as Teleportation.