

Pagerank

Social Networks - July 2020

MCQ Assignment - Week 6

1. Consider the graph shown in Figure 1. 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.

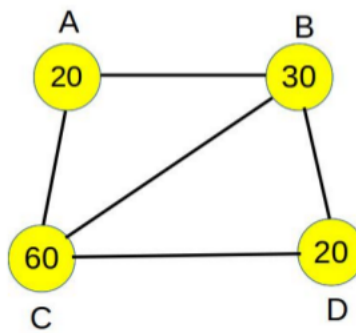


Figure 1: The Graph

- 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

ANSWER: B

A gets 10 coins from *B* and 20 coins from *C*, totaling to 30 coins. *B* gets 10 coins from *A*, 20 coins from *C*, 10 coins from *D*, totaling to 40 coins. *C* gets 10 coins from *A*, 10 coins from *B* and 10 coins from *D*, totaling to 30 coins. *D* gets 10 coins from *B* and 20 coins from *C*, totaling to 30 coins.

2. In the graph shown in Figure 3, assume that the current pagerank values of *A*, *B* and *C* are 0.2, 0.4 and 0.4 respectively. What will be their pagerank values after one iteration?

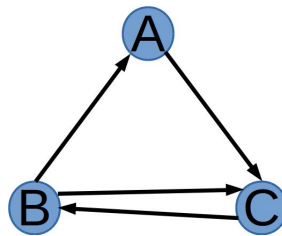


Figure 2: The Graph

- A. $A : 0.4, B : 0.4, C : 0.4$
- B. $A : 0.2, B : 0.4, C : 0.4$
- C. $A : 0.4, B : 0.2, C : 0.4$
- D. $A : 0.4, B : 0.4, C : 0.2$

ANSWER: B

A gets half of the points from B , i.e. 0.2. B gets all the points of C , i.e. 0.4 points. C gets all the points of A and half of the points of B , i.e. $0.2 + 0.2 = 0.4$ points. Hence, the correct answer is **B**.

3. Consider algorithm (a) to be equal gold coin distribution game and algorithm (b) to be random dropping coin distribution game. Which of the following is true?
- A. Algorithm (a) ranks the nodes in ascending order of their importance while algorithm (b) 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 (a) ranks the nodes in descending order of their importance while algorithm (b) ranks the nodes in ascending order of importance.
 - D. Both the algorithms rank the nodes in descending order of their importance and give the same result.

ANSWER: D

Both the algorithms rank the nodes in descending order of their importance and give the same result.

4. 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.

ANSWER: C

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

5. 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 zero indegree.
 - D. Nodes having zero outdegree.

ANSWER: D

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.

6. In the graph shown in Figure 3, assume that the current pagerank values of A , B and C are 0.2, 0.4 and 0.4 respectively. What will be their pagerank values after one iteration?
- A. $A : 0.4, B : 0.4, C : 0.4$
 - B. $A : 0.2, B : 0.4, C : 0.4$

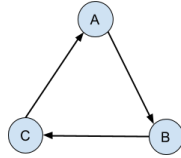


Figure 3: The Graph

- C. $A : 0.4, B : 0.2, C : 0.4$
- D. $A : 0.4, B : 0.4, C : 0.2$

ANSWER: C

A gets the point of C, B gets the point of A and C gets the points of B.

7. 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.

ANSWER: C

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.

8. 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

ANSWER: C

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 .