Assignment Week 6
(Social Networks)

1. Web graph is
    a. Undirected and acyclic
    b. Directed and acyclic
    c. Undirected and cyclic
    d. Directed and can be cyclic/acyclic

2. 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 the same result.

3. 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.

4. Which of the following is the most efficient way of obtaining the big web graph containing billions of nodes
    a. Searching for every single web page on Internet
    b. Random walk
    c. Breadth First Traversal
    d. depth First Traversal

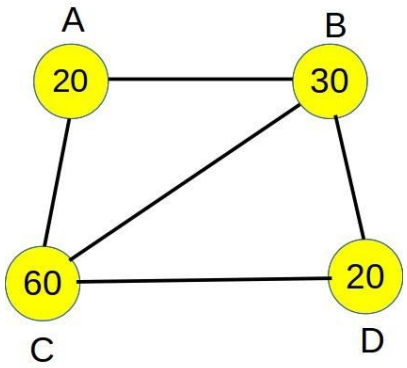
5. Let $\log_2(10) = 3.3$ and the number of atoms in the explored universe be 10^80. Then, pick the largest number of nodes from the below given options such that the number of possible graphs (undirected and without loops) on that many nodes is smaller or equal to the number of atoms in the explored universe.
    a. 25
    b. 24
    c. 23
    d. 22

    Explanation:

The number of atoms in the explored universe is 10^80 = 2^(80*3.3) = 2^264 .
The number of different possible graphs with n nodes is 2^(nC2) .
The number of possible graphs with 23 nodes is 2^253
The number of possible graphs with 24 nodes is 2^276.
The number of possible graphs with 25 nodes is 2^300.

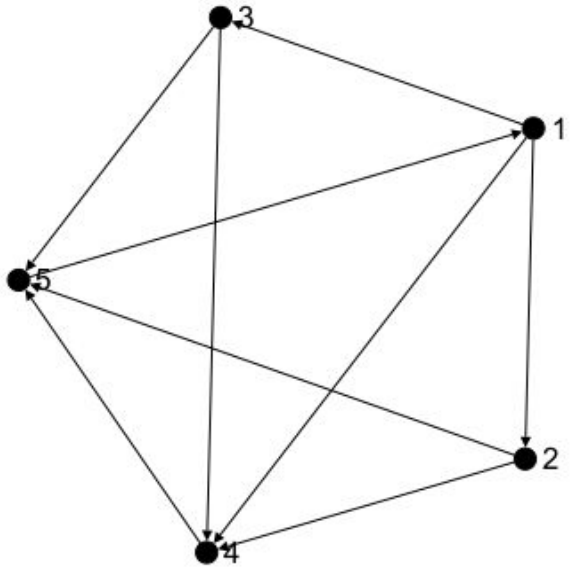
6. In link analysis, teleportation is the process of jumping to a node . . . . . .
   a. **chosen randomly when there are no out-edges**
   b. having highest in-degree when there are no in-edges
   c. having lowest out-degree when there are no out-edges
   d. chosen randomly when there are no in-edges

7. Consider the graph shown in the following 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

8. For what values of pageranks of the nodes in the following Figure does the process converge, i.e. pageranks of the nodes do not change after this configuration?



Node 1: 1/5, Node 2: 1/5, Node 3: 1/5, Node 4: 1/5, Node 5: 1/5
Node 1 : 1/5, Node 2 : 1/5, Node 3 : 2/5, Node 4: 1/10, Node 5: 1/10
Node 1: 3/10, Node 2: 1/10, Node 3: 1/10, Node 4 : 2/10, Node 5: 3/10
Node 1: 1/10, Node 2: 3/10, Node 3: 2/10, Node 4: 1/10, Node 5: 3/10

Explanation:

	Node	1	2	3	4	5
Option A	**Before Update**	1/5	1/5	1/5	1/5	1/5
	After update	1/5	0.07	0.07	0.27	0.40
Option B	**Before Update**	0.200	0.200	0.400	0.100	0.100
	After update	0.100	0.067	0.067	0.367	0.400
Option C	**Before Update**	0.300	0.100	0.100	0.200	0.300
	After update	0.300	0.100	0.100	0.200	0.300
Option D	**Before Update**	0.100	0.300	0.200	0.100	0.300
	After update	0.300	0.033	0.033	0.283	0.350

9. 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.

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.

10. Which of the following factors have an impact on the PageRank?
    a. **The total number of inbound links to a page of a web site.**
    b. The subject matter of the site providing the inbound link to a page of a web site.
    c. The text used to describe the inbound link to a page of a web site.
    d. The number of outbound links on the page that contains the inbound link to a page of a website.