

Week 1 : Assignment 1

The due date for submitting this assignment has passed.

Due on 2024-02-07, 23:59 IST.

Assignment submitted on 2024-02-06, 15:29 IST

1) Which of the following is the output of the given code segment?

1 point

```
l=[]
l.append(5)
l.append("AAA")
l.append([2,3])
print(l)
```

- ☐ [5,AAA,[2,3]]
- ☒ [5,'AAA',[2,3]]
- ☐ [5:AAA:2,3]
- ☐ error

Yes, the answer is correct.

Score: 1

Accepted Answers:

[5,'AAA',[2,3]]

2) Assume you have to roll a dice with six faces. Choose the statement to simulate the same.

1 point

- ☒ random.randint(1,6)
- ☐ random.randrange(1,8)
- ☐ random.randint(1,7)
- ☐ random.randrange(1,6)

Yes, the answer is correct.

Score: 1

Accepted Answers:

random.randint(1,6)

3) Select the code to create the given dictionary:

1 point

{1:2,2:4,3:6,4:8,5:10,6:12,7:14,8:16,9:18}

- ☐ d={x:x**2 for x in range(1,10)}
- print(d)
- ☐ d={x:x*2 for x in range(1,9)}
- print(d)
- ☒ d={x:x*2 for x in range(1,10)}
- print(d)
- ☐ d={x:x**2 for x in range(1,9)}
- print(d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

d={x:x*2 for x in range(1,10)}

print(d)

4) What does the G(n,p) random graph model in Networkx library represent?

1 point

- ☐ A graph with n nodes and p edges
- ☒ A graph with n nodes and p is the probability of an edge between any two nodes
- ☐ A graph with n nodes and p-1 edges
- ☐ A graph with n nodes and p is the probability of a path of any length between every two nodes

Yes, the answer is correct.

Score: 1

Accepted Answers:

A graph with n nodes and p is the probability of an edge between any two nodes

5) What is the output of the following code snippet?

1 point

```
import networkx
G = networkx.Graph()
G.add_edges_from([(2,1),(2,3),(4,2),(2,5)])
G.remove_node(2)
print(len(G.edges()))
```

- ☒ 0
- ☐ 1
- ☐ 2
- ☐ 3

Yes, the answer is correct.

Score: 1

Accepted Answers:

0

6) Which of the following functions is used to find the shortest path length?

1 point

- ☐ networkx.dijkstra_path_length(G,'node a')
- ☐ networkx.dijkstra_path_length('node a','node b')
- ☐ networkx.dijkstra_path_length('node a','node b',G)
- ☒ networkx.dijkstra_path_length(G,'node a','node b')

Yes, the answer is correct.

Score: 1

Accepted Answers:

networkx.dijkstra_path_length(G,'node a','node b')

7) What does the Page Rank algorithm measure?

- ☐ The number of friends a person has in the social network



7) What does the Page Rank algorithm measure?

1 point

- ☐ The number of friends a person has in the social network
- ☒ The person who is more important in the network
- ☐ The person who is very frequently posting content on the social network
- ☐ The total number of connections in the network

Yes, the answer is correct.

Score: 1

Accepted Answers:

The person who is more important in the network

8) The code inside the 'try' block is monitored for any exceptions. The 'except' block contains the code to handle the exception, providing an alternative path for the program to continue execution. Find the output for the given code snippet:

1 point

```
x=[5,2,7,3,8]
try :
    a=x[3]
    if(a%2==0):
        print("It is an even number")
    else:
        print("It is an odd number")
except:
    print("Element does not exist")
```

- ☐ Element does not exist
- ☐ It is an even number
- ☒ It is an odd number
- ☐ error

Yes, the answer is correct.

Score: 1

Accepted Answers:

It is an odd number

9) What is the maximum number of graphs possible from 70 nodes?

1 point

- ☐ 2^{70}
- ☒ $2^{\binom{70}{2}}$
- ☐ $\binom{70}{2}$
- ☐ 70^2

Yes, the answer is correct.

Score: 1

Accepted Answers:

$2^{\binom{70}{2}}$

10) Which algorithm or concept should be used to suggest connections on LinkedIn?

1 point

- ☒ Link Prediction
- ☐ Page Ranking
- ☐ Hits algorithm
- ☐ BFS

Yes, the answer is correct.

Score: 1

Accepted Answers:

Link Prediction

Week 2 : Assignment 2

The due date for submitting this assignment has passed.

Due on 2024-02-07, 23:59 IST.

Assignment submitted on 2024-02-06, 15:31 IST

1) Which of the following statements is/are True?

1 point

Statement I - Email network is a directed network.

Statement II - Co-authorship network is an undirected network.

- ☐ I only
☐ II only
☒ Both
☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both

2) What is the clustering coefficient of a node that has 4 neighbors and 3 connections between those neighbors?

1 point

- ☐ 0.25
☒ 0.5
☐ 0.75
☐ 1

Yes, the answer is correct.

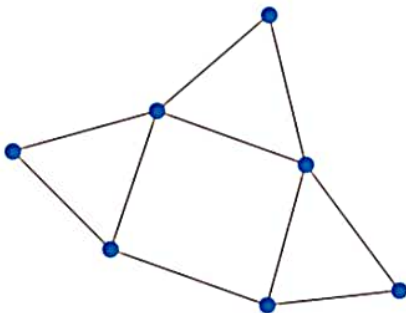
Score: 1

Accepted Answers:

0.5

3) Calculate the density of the given graph.

1 point



- ☒ 10/21
☐ 9/42
☐ 9/21
☐ 10/42

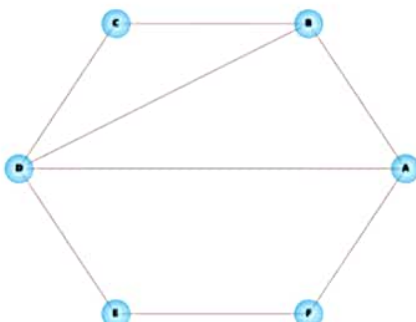
Yes, the answer is correct.

Score: 1

Accepted Answers:

10/21

4) Find the clustering coefficient of node B in the given graph.



0.667

Yes, the answer is correct.

Score: 1

Accepted Answers:

(Type: Range) 0.66,0.68

1 point

5) Which statement accurately reflects the characteristics of node degrees according to Power law?

1 point

- ☐ every individual in a social network has an equal number of connections
- ☐ exhibit a uniform distribution of connections among all users
- ☒ a small number of individuals have a substantially higher number of connections compared to the majority
- ☐ each node has an identical degree, promoting equality in connectivity

Yes, the answer is correct.

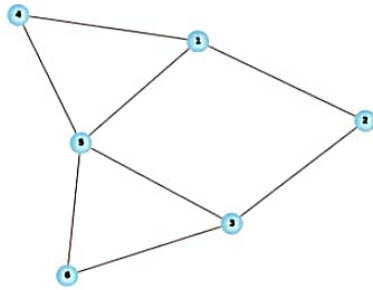
Score: 1

Accepted Answers:

a small number of individuals have a substantially higher number of connections compared to the majority

6) What is the diameter of the following graph?

1 point



- ☐ 1
- ☒ 2
- ☐ 3
- ☐ 4

Yes, the answer is correct.

Score: 1

Accepted Answers:

2

7) Which of the following formats was created as a part of Gephi project?

1 point

- ☐ GML
- ☒ GEXF
- ☐ GraphML
- ☐ Pajek

Yes, the answer is correct.

Score: 1

Accepted Answers:

GEXF

8) Given is a graph G with $|V| = n$ number of nodes and $|E|$ number of edges. In which of the following cases, we can guarantee that G is connected?

- ☐ $|E| = n$
- ☒ $|E| = n - 1$
- ☐ $|E| = n(n - 1)/2$
- ☐ $|E| = n \log_2 n$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$|E| = n(n - 1)/2$

9) Which of the following statements is True for GML format of networks?

1 point

Statement I: Labels and attributes can be added

Statement II: Weights can be added

- ☐ I only
- ☐ II only
- ☒ Both
- ☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both

10) In the mentioned synonymy network, why might there be a path between words like "love" and "hatred"?

1 point

- ☐ Due to faulty edges
- ☐ To enable users with contradictory paths to find antonyms
- ☒ Words can undergo semantic shifts, acquiring new meanings or evolving to represent opposite concepts
- ☐ The network algorithm identifies unrelated words as synonyms

Yes, the answer is correct.

Score: 1

Accepted Answers:

Words can undergo semantic shifts, acquiring new meanings or evolving to represent opposite concepts

Week 3 : Assignment 3

The due date for submitting this assignment has passed.

Due on 2024-02-14, 23:59 IST.

Assignment submitted on 2024-02-14, 17:36 IST

1) Consider the following definitions of local bridge.

1 point

- i An edge with zero neighborhood overlap
- ii An edge whose endpoints have no friends in common.
- iii An edge whose deletion results in increasing the distance between the endpoints to a value strictly more than two.
- iv An edge that does not form the side of any triangle in the graph.

Which of the above definitions are correct?

- ☐ i, ii and iv
- ☐ ii, iii and iv
- ☐ i, ii, and iii
- ☒ All of the above

Yes, the answer is correct.

Score: 1

Accepted Answers:

All of the above

2) Assume A is a friend of B and B is a friend of C, eventually A becomes a friend of C. This phenomena is called the

1 point

- ☒ triadic closure
- ☐ weak tie
- ☐ strong tie
- ☐ structural hole

Yes, the answer is correct.

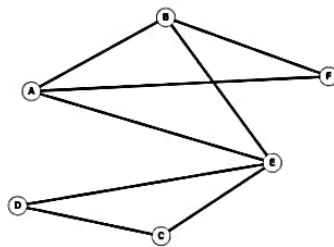
Score: 1

Accepted Answers:

triadic closure

3) Given E_{ij} is the Embeddedness of an edge between nodes i and j, choose the correct option for the given network.

0 points



- ☐ $E_{AB} < W_{CD}$
- ☒ $E_{AB} > W_{CD}$
- ☐ $E_{AB} = W_{CD}$
- ☐ $E_{AB} \leq W_{CD}$

Yes, the answer is correct.

Score: 0

Accepted Answers:

$E_{AB} > W_{CD}$

4) While implementing the Girvan Newman algorithm on a certain graph G, you observe that edge E_2 gets removed after E_1 . What can you comment about them? 1 point

- ☐ E_1 has higher betweenness than E_2
- ☐ E_2 has higher betweenness than E_1
- ☐ E_1 has more shortest paths passing through it
- ☒ E_1 has higher betweenness than E_2 , also E_1 has more shortest paths passing through it

Yes, the answer is correct.

Score: 1

Accepted Answers:

E_1 has higher betweenness than E_2 , also E_1 has more shortest paths passing through it

5) Which of the two statements are True?

1 point

Statement I - The nodes at the ends of a local bridge in a graph have no common nodes.

Statement II - Removing bridges from a graph leads to a disconnected graph

- ☐ I only
- ☐ II only
- ☒ Both
- ☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

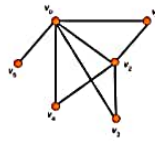
Both

6) Find the Neighborhood overlap of the edge connecting V0 and V3 in the given graph.

1 point

6) Find the Neighborhood overlap of the edge connecting V_0 and V_3 in the given graph.

1 point



- ☐ $\frac{3}{4}$
☐ $\frac{3}{5}$
☐ $\frac{1}{5}$
☒ $\frac{1}{4}$

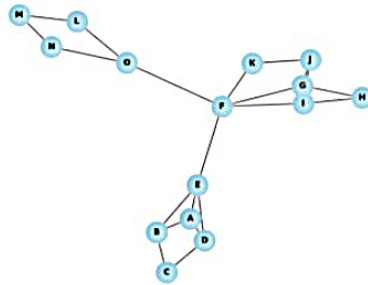
Yes, the answer is correct.

Score: 1

Accepted Answers:
1/4

7) For the given network, identify the node that has multiple local bridges and spans the structural hole in the organisation.

1 point



- ☐ E
- ☒ F
- ☐ O
- ☐ K

Yes, the answer is correct.

Score: 1

Accepted Answers:
F

8) In a small social network resembling Facebook, individuals are linked by edges representing friendship connections. The edges in this network are weighted to signify the strength of these connections. Which statement accurately reflects the nature of this network? 1 point

- ☐ Strong ties generally exhibit low edge weights.
- ☐ Strong ties typically possess high edge betweenness.
- ☐ Strong ties are primarily observed as inter-community edges, connecting two distinct communities.
- ☒ None of the above statements are accurate.

Yes, the answer is correct.

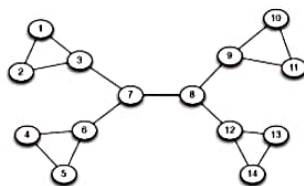
Score: 1

Accepted Answers:

None of the above statements are accurate.

9) Find the betweenness of the edge 3-7 for the given network:

0 points



- ☐ 20
- ☐ 22
- ☐ 30
- ☒ 33

Yes, the answer is correct.

Score: 0

Accepted Answers:
33

10) For the same network in Question 9, find the edge with maximum betweenness.

1 point

- ☐ 1-2
- ☐ 6-7
- ☒ 7-8
- ☐ 13-14

Yes, the answer is correct.

Score: 1

Accepted Answers:
7-8

Week 4 : Assignment 4

The due date for submitting this assignment has passed.

Due on 2024-02-21, 23:59 IST.

Assignment submitted on 2024-02-21, 18:26 IST

1) "People tend to have links to others who are similar to them". Identify this process that impacts the structure of Social Network. 1 point

- ☐ Social Influence
- ☐ Triadic Closure
- ☒ Selection
- ☐ Betweenness

Yes, the answer is correct.

Score: 1

Accepted Answers:

Selection

2) Given two authors are editing Wikipedia articles. Number of articles edited by both author A and author B is 10. The total number of articles edited by either of them is 18. Compute the similarity measure. 1 point

- ☐ 18/10
- ☒ 10/18
- ☐ 10/28
- ☐ 18/28

Yes, the answer is correct.

Score: 1

Accepted Answers:

10/18

3) Dynamics of friendships formation and behaviour of people in a network is affected by 1 point

- ☐ Selection
- ☐ Social Influence
- ☒ Both Selection and Social Influence
- ☐ Neither Selection nor Social Influence

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both Selection and Social Influence

4) Suppose Hari and Joy have k common friends. Given that each common friend gives Hari and Joy an independent probability p of forming a link, what is the probability that there will exist a link between Hari and Joy? 1 point

- ☐ p^k
- ☐ $1 - p^k$
- ☒ $1 - (1 - p)^k$
- ☐ pk

Yes, the answer is correct.

Score: 1

Accepted Answers:

$1 - (1 - p)^k$

5) Ram and Raghu met joined a Yoga class. Their similarity measure was 0.005 at the time of joining. They became good friends on Day 3. What is the similarity measure right before they became friends? 0 points

- ☐ 0.04
- ☒ 0.004
- ☐ 1.005
- ☐ 0.005

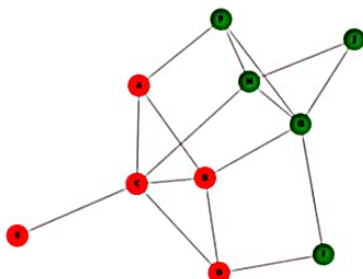
Yes, the answer is correct.

Score: 0

Accepted Answers:

0.004

6) Given the friendship network in a dance school, 5 girls represented by red nodes and 5 boys represented by green nodes. Find the Homophily of the network. 1 point



- ☐ 0
- ☐ 1/4
- ☒ 1/2
- ☐ 1

Yes, the answer is correct.

Score: 1

Accepted Answers:

1/2

7) Which of the following conditions is ideal for a good community?

1 point

- ☒ ratio of intra-community edges to inter-community edge should be high
- ☐ ratio of intra-community edges to inter-community edge should be low
- ☐ ratio of intra-community edges to inter-community edge should be 1
- ☐ ratio of intra-community edges to inter-community edge should be 0

Yes, the answer is correct.

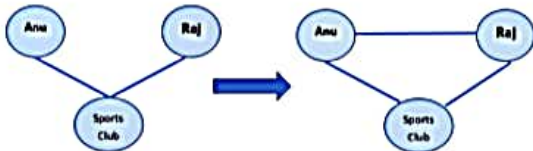
Score: 1

Accepted Answers:

ratio of intra-community edges to inter-community edge should be high

8) Identify the network mechanism in play for the following transformation.

1 point



- ☐ Triadic Closure
- ☐ Structural hole
- ☒ Focal closure
- ☐ Membership closure

Yes, the answer is correct.

Score: 1

Accepted Answers:

Focal closure

9) When calculating the homophily value, what range of values is expected when the network exhibits heterogeneity?

0 points

- ☐ 0
- ☐ 1
- ☒ less than 1
- ☐ greater than 1

Yes, the answer is correct.

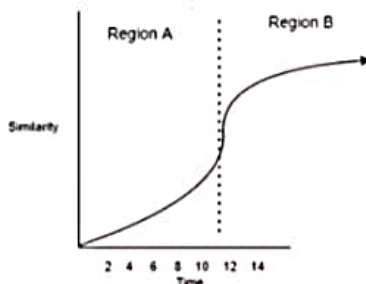
Score: 0

Accepted Answers:

less than 1

10) Which phenomenon is represented in region B of the given graph?

1 point



- ☐ Selection
- ☒ Social Influence
- ☐ Focal Closure
- ☐ Membership

Yes, the answer is correct.

Score: 1

Accepted Answers:

Social Influence

Week 5 : Assignment 5

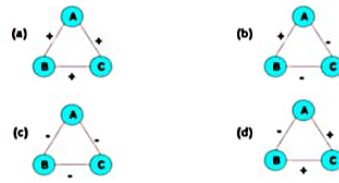
The due date for submitting this assignment has passed.

Due on 2024-02-28, 23:59 IST.

Assignment submitted on 2024-02-28, 22:39 IST

1) Select all the triangles that are stable.

1 point



- ☒ (a)
☒ (b)
☐ (c)
☐ (d)

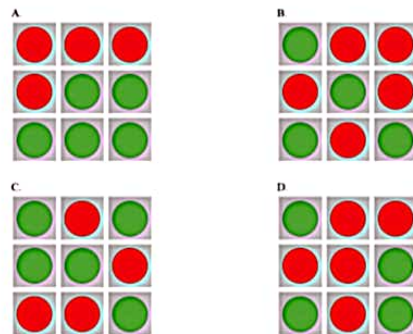
Yes, the answer is correct.

Score: 1

Accepted Answers:

(a)
(b)

2) Which of the following figure represents a unsatisfied central node according to the Schelling's model of spatial segregation, given the threshold $t=4$? 1 point



- ☐ (a)
☒ (b)
☐ (c)
☐ (d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(b)

3) In a 2-D grid with dimensions 120 by 90, what is the maximum number of nodes that can have exactly 8 neighbors?

1 point

- ☐ 120 x 90
☐ 119 x 89
☒ 118 x 88
☐ 121 x 91

Yes, the answer is correct.

Score: 1

Accepted Answers:

118 x 88

4) Identify the statement that is INCORRECT.

1 point

- ☒ Structural balance involves studying the interplay of positive and negative relationships among the nodes over time
☐ Structural balance is a theory that offers ways of equating the number of positive and negative edges in a network so that it becomes 'balanced'
☐ Structural balance illustrates a nice connection between local and global network properties
☐ Structural balance is to understand the tension between the two forces, i.e. friendship and antagonism

No, the answer is incorrect.

Score: 0

Accepted Answers:

Structural balance is a theory that offers ways of equating the number of positive and negative edges in a network so that it becomes 'balanced'

5) Given a triangular network with two negative relationships, When is the network stable?

0 points

- ☐ Never
☒ Sometimes
☐ Always
☐ Cannot be inferred

Yes, the answer is correct.

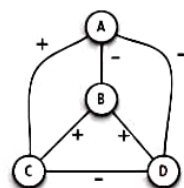
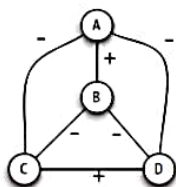
Score: 0

Accepted Answers:

Sometimes

6) Which of the following complete graphs are structurally balanced?

1 point



- ☒ A only
☐ B only
☐ Both A and B
☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

A only

7) Given a relationship between 3 people (+,-) where + represents friendship and - represents enmity, which of the following options is/are valid options to become stable? 1 point

- ☒ one friendship transforms to enmity
☒ one enmity becomes friendship
☐ both friendships turn to enmity
☐ cannot become stable

Yes, the answer is correct.

Score: 1

Accepted Answers:

one friendship transforms to enmity

one enmity becomes friendship

8) Consider Frank McCown's simulation of the Schelling model illustrated in the course. The simulation has parameters: Similar (threshold), empty (fraction of empty cells) and red/blue ratio. Choose the **INCORRECT** statements from the options. 1 point

- ☐ As similar increases, it takes more time for the system to stabilise
☒ The system will always stabilise no matter what the parameters are
☐ The system can stabilise even if similar = 100%
☐ Spatial segregation doesn't always induce communities/clustering in the grid

Yes, the answer is correct.

Score: 1

Accepted Answers:

The system will always stabilise no matter what the parameters are

9) Which of the following statements are True for structural balance? 1 point

Statement I - For every set of three nodes exactly one of them is labeled +
 Statement II - For every set of three nodes if all three of these edges are labeled +

- ☐ I only
☐ II only
☒ Both
☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both

10) Assume there are 100 people in a community who know each other. Pick out all the scenarios when the community network is stable. 1 point

- ☒ 75 people are friends with each other, 25 are friends with each other and there is a negative relationship between these two groups
☒ All 100 people are friends with each other
☐ 30 people are friends among each other, 40 are friends with each other, 30 are friends with each other and there is antagonism between each group
☐ There is antagonism amidst set A of 75 people and antagonism amidst set B of 25 people and friendship between set A and set B

Yes, the answer is correct.

Score: 1

Accepted Answers:

75 people are friends with each other, 25 are friends with each other and there is a negative relationship between these two groups

All 100 people are friends with each other

Week 6 : Assignment 6

The due date for submitting this assignment has passed.

Due on 2024-03-06, 23:59 IST.

Assignment submitted on 2024-03-06, 23:28 IST

1) What happens when the gold coins distribution game converge?

1 point

- ☐ all the nodes get equal number of coins
- ☐ all the nodes are visited at least once
- ☒ each node might have different number of coins
- ☐ one node gets all the coins

Yes, the answer is correct.

Score: 1

Accepted Answers:

each node might have different number of coins

2) In a game distributing gold coins across a network, each node begins with an equal number of coins. Following one round of redistribution, the total number of coins across the network remains the same. Which network structure guarantees this outcome?

1 point

- ☐ Random network
- ☐ Scale-free network
- ☒ Ring network
- ☐ None of the above

Yes, the answer is correct.

Score: 1

Accepted Answers:

Ring network

3) Which of the following statements is True for Teleportation?

1 point

Statement I - prevents random walk from getting stuck in certain regions of the graph

Statement II - Jumping to any random node in the network

- ☐ I only
- ☐ II only
- ☒ Both
- ☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both

4) If nx represents networkx library then, for a graph G, what does nx.pagerank(G) returns?

1 point

- ☐ list of nodes in the ascending order of their page rank
- ☐ list of Page ranks of all nodes
- ☒ dictionary of node, Page rank pairs
- ☐ dictionary of edge, page rank pairs

Yes, the answer is correct.

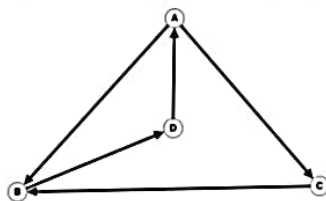
Score: 1

Accepted Answers:

dictionary of node, Page rank pairs

5) If the initial PageRank of each node is $\frac{1}{4}$ for the given graph below, what will be the PageRank of the nodes after 2 iterations?

1 point



- ☐ A=1/4, B=1/4, C=1/4, D=1/4
- ☐ A=1/4, B=3/8, C=1/8, D=1/4
- ☐ A=1/4, B=1/2, C=1/8, D=1/4
- ☒ A=1/4, B=1/4, C=1/8, D=3/8

Yes, the answer is correct.

Score: 1

Accepted Answers:

A=1/4, B=1/4, C=1/8, D=3/8

6) Pick out the invalid statement for web graphs.

1 point

- ☐ Nodes represent web pages
- ☐ edges represents a hyperlink from one page to another
- ☐ It is a directed graph
- ☒ It is a complete graph

Yes, the answer is correct.

Score: 1

Accepted Answers:

It is a complete graph

6) Pick out the invalid statement for web graphs.

1 point

- ☐ Nodes represent web pages
- ☐ edges represents a hyperlink from one page to another
- ☐ It is a directed graph
- ☒ It is a complete graph

Yes, the answer is correct.

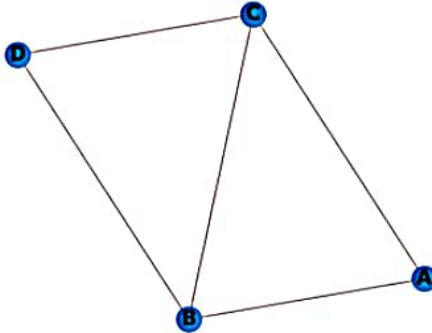
Score: 1

Accepted Answers:

It is a complete graph

7) Consider the following graph for the gold coins distribution game. Each node in the graph $G = A, B, C, D$ has 20, 30, 45, 30 corresponding number of gold coins initially. What is the number of gold coins after one iteration?

0 points



- ☒ 25, 40, 35, 20
- ☐ 40, 25, 35, 20
- ☐ 25, 40, 30, 20
- ☐ 40, 35, 30, 25

Yes, the answer is correct.

Score: 0

Accepted Answers:

25, 40, 35, 20

8) How is the PageRank vector typically computed in the PageRank algorithm?

1 point

- ☐ Solving a system of linear equations
- ☐ Using a recursive algorithm
- ☒ Iteratively updating the vector until convergence
- ☐ All the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All the above

9) In a graph of individuals with edges representing friendship, choose the correct option based on the two statements given below.

1 point

Statement I - Take a random walk and drop 1 coin at each node while visiting. Individuals accumulating the most coins will be the most popular.
Statement II - Give an equal number of coins to all individuals at the beginning and then each individual has to distribute them equally to all of their friends at every snap. After many snaps, the individual with the most coins will be the most popular.

- ☒ Both statements are correct.
- ☐ Statement I is correct and statement II is incorrect.
- ☐ Statement I is incorrect and statement II is correct.
- ☐ Both statements are incorrect.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both statements are correct.

10) Which of the following are True for Page rank and Degree of nodes?

1 point

Statement I - Their correlation depends on the specific characteristics of the network
Statement II - They capture different aspects of node importance

- ☐ I only
- ☒ II only
- ☐ Both
- ☐ None

No, the answer is incorrect.

Score: 0

Accepted Answers:

Both

Picture saved

Week 7 : Assignment 7

The due date for submitting this assignment has passed.

Due on 2024-03-13, 23:59 IST.

Assignment submitted on 2024-03-13, 23:11 IST

1) Consider the modeling of information cascade in a graph G , where everyone starts with B and there is a small set S of early adopters of A . Given following two statements.
S1: Nodes in S keep using A no matter what payoffs tell them to do
S2: Nodes outside S keep using B no matter what payoffs tell them to do.
Choose the correct option.

0 points

- ☐ Both S1 and S2 are true
- ☐ S1 is true but S2 is false
- ☐ S2 is true but S1 is false.
- ☒ Both S1 and S2 are false.

No, the answer is incorrect.

Score: 0

Accepted Answers:

S1 is true but S2 is false

2) Consider a group of 10 bachelors, 5 live on the first floor of the apartment and 5 live on the second floor. Suppose that each person in this group has two friends on their own floor, and one friend on the other floor. Now, a new restaurant opens, and five persons all living on the first floor each begin eating there on the first day. This action will eventually be adopted by

1 point

- ☐ Nobody in the apartment
- ☒ Only the bachelors in the first floor
- ☐ Only the bachelors in the second floor
- ☐ Cannot say

No, the answer is incorrect.

Score: 0

Accepted Answers:

Cannot say

3) If the payoff for working on your Assignment is 0.3 and participating in a Hackathon is 0.5. Five of your friends are participating in the Hackathon and six of your friends are working on the Assignment, what will you opt for?

1 point

- ☒ Participate in Hackathon
- ☐ Work on Assignment
- ☐ Cannot say

Yes, the answer is correct.

Score: 1

Accepted Answers:

Participate in Hackathon

4) In the context of a cascade of adoptions of a behavior/product 'X' within a network, which statement is NOT POSSIBLE? Consider a chain reaction of switches from 'Y' to 'X'.

0 points

- ☐ Eventually all nodes adopt 'X' over time.
- ☐ The cascade initiates but halt before all nodes transition to 'X'.
- ☐ At a point, every node reverts to 'Y'.
- ☒ Only the initial seed node transitions to 'X'.

No, the answer is incorrect.

Score: 0

Accepted Answers:

At a point, every node reverts to 'Y'.

5) What is the density of a cluster?

1 point

- ☒ fraction of nodes' friends present inside the cluster
- ☐ fraction of the node's friends present outside the cluster
- ☐ average number of friends inside the cluster
- ☐ maximum number of friends inside the cluster

Yes, the answer is correct.

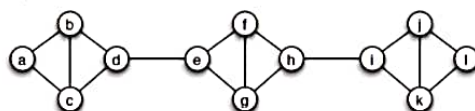
Score: 1

Accepted Answers:

fraction of nodes' friends present inside the cluster

6) What is the cluster density of the each of the four node cluster?

1 point



- ☐ 1/3
- ☒ 2/3
- ☐ 1
- ☐ 4/3

Yes, the answer is correct.

Score: 1

Accepted Answers:

2/3

7) Consider a network where all of its nodes have adopted an idea A with a threshold 'q' for nodes in the remaining network to adopt A . Which of the following efforts can be a valid attempt to create a complete cascade of a new idea B in such a network? Select all that is applicable.

1 point

- ☐ Increase the product price



Week 7 : Assignment 7

The due date for submitting this assignment has passed.

Due on 2024-03-13, 23:59 IST.

Assignment submitted on 2024-03-13, 23:11 IST

1) Consider the modeling of information cascade in a graph G , where everyone starts with B and there is a small set S of early adopters of A . Given following two statements.

0 points

S1: Nodes in S keep using A no matter what payoffs tell them to do

S2: Nodes outside S keep using B no matter what payoffs tell them to do.

Choose the correct option.

- ☐ Both S1 and S2 are true
- ☐ S1 is true but S2 is false
- ☐ S2 is true but S1 is false.
- ☒ Both S1 and S2 are false.

No, the answer is incorrect.

Score: 0

Accepted Answers:

S1 is true but S2 is false

2) Consider a group of 10 bachelors, 5 live on the first floor of the apartment and 5 live on the second floor. Suppose that each person in this group has two friends on their own floor, and one friend on the other floor. Now, a new restaurant opens, and five persons all living on the first floor each begin eating there on the first day. This action will eventually be adopted by

1 point

- ☐ Nobody in the apartment
- ☒ Only the bachelors in the first floor
- ☐ Only the bachelors in the second floor
- ☐ Cannot say

No, the answer is incorrect.

Score: 0

Accepted Answers:

Cannot say

3) If the payoff for working on your Assignment is 0.3 and participating in a Hackathon is 0.5. Five of your friends are participating in the Hackathon and six of your friends are working on the Assignment, what will you opt for?

1 point

- ☒ Participate in Hackathon
- ☐ Work on Assignment
- ☐ Cannot say

Yes, the answer is correct.

Score: 1

Accepted Answers:

Participate in Hackathon

4) In the context of a cascade of adoptions of a behavior/product 'X' within a network, which statement is NOT POSSIBLE? Consider a chain reaction of switches from 'Y' to 'X'.

0 points

- ☐ Eventually all nodes adopt 'X' over time.
- ☐ The cascade initiates but halt before all nodes transition to 'X'.
- ☐ At a point, every node reverts to 'Y'.
- ☒ Only the initial seed node transitions to 'X'.

No, the answer is incorrect.

Score: 0

Accepted Answers:

At a point, every node reverts to 'Y'.

5) What is the density of a cluster?

1 point

- ☒ fraction of nodes' friends present inside the cluster
- ☐ fraction of the node's friends present outside the cluster
- ☐ average number of friends inside the cluster
- ☐ maximum number of friends inside the cluster

Yes, the answer is correct.

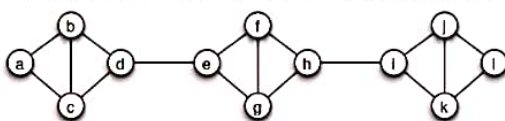
Score: 1

Accepted Answers:

fraction of nodes' friends present inside the cluster

6) What is the cluster density of the each of the four node cluster?

1 point



- ☐ 1/3
- ☒ 2/3
- ☐ 1
- ☐ 4/3

Yes, the answer is correct.

Score: 1

Accepted Answers:

2/3

7) Consider a network where all of its nodes have adopted an idea A with a threshold 'q' for nodes in the remaining network to adopt A. **1 point**
Which of the following efforts can be a valid attempt to create a complete cascade of a new idea B in such a network? Select all that is applicable.

- ☐ Increase the product price
- ☒ Increase the product payoff
- ☐ No cluster with density less than $(1 - q)$
- ☒ Find out the key people in the network to inject idea

Yes, the answer is correct.

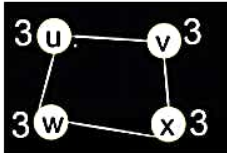
Score: 1

Accepted Answers:

Increase the product payoff

Find out the key people in the network to inject idea

8) Assume a model for collective behavior where the threshold for each node is represented near the node. Which of the following statements are correct? Select all that apply. **1 point**



- ☒ node U knows the threshold of V and W
- ☒ node V does not know the threshold of W
- ☐ Each of them easily decide to protest
- ☒ Each node has an incomplete knowledge of the entire network

Yes, the answer is correct.

Score: 1

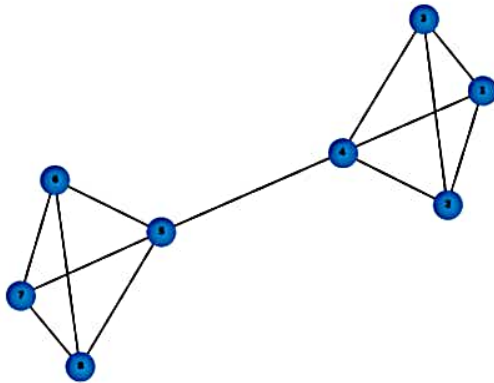
Accepted Answers:

node U knows the threshold of V and W

node V does not know the threshold of W

Each node has an incomplete knowledge of the entire network

9) Given a network as shown in the following Figure, assume that initially every node in this network has adopted behavior B. Next, a new behavior A is introduced in the network and the nodes 7 and 8 are the initial adopters of this behavior A, i.e., nodes 7 and 8 now have adopted behavior A and the rest of the nodes have adopted behavior B. The payoff associated with A is $a = 3$ and the payoff associated with B is $b = 2$. After the introduction of this new behavior A in the network, all the nodes will start weighing their options and might change their behavior. This leads to a cascade in the network. When the cascade ends, which all are the nodes who have adopted the behavior A. **1 point**



- ☐ 7,8,6
- ☒ 7,8,6,5
- ☐ 7,8,6,5,4
- ☐ 7,8,6,5,4,2,3,1

Yes, the answer is correct.

Score: 1

Accepted Answers:

7,8,6,5

10) Let 'v' be a node in a graph. Suppose that a 'p' fraction of the neighbors of 'v' have behavior A, and a $(1 - p)$ fraction have behavior B; **0 points**
that is, if 'v' has 'd' neighbors, then pd adopt A and $(1 - p)d$ adopt B. Behavior A has a payoff of 'a' and behavior B has a payoff of 'b'. Then B is a better choice for 'v' if

- ☐ $p \geq a/b$
- ☐ $p \geq b/a$
- ☒ $p \geq a/(a + b)$
- ☐ $p \geq b/(a + b)$

Yes, the answer is correct.

Score: 0

Accepted Answers:

$p \geq a/(a + b)$

Week 8 : Assignment 8

The due date for submitting this assignment has passed.

Due on 2024-03-20, 23:59 IST.

Assignment submitted on 2024-03-20, 22:40 IST

1) Consider a vector u with a very high magnitude as compared to a vector v , comment on the direction of the resultant vector when u is added to v . Select all that apply.

- ☒ closer to u
- ☐ closer to v
- ☐ independent of u and v
- ☐ cannot say

Yes, the answer is correct.

Score: 1

Accepted Answers:

closer to u

2) Which of the following statements best describes the concepts of "hubs" and "authorities"? Select all that apply.

1 point

- ☒ The Authority update rule states that for each page p , update $auth(p)$ is the sum of the hub scores of all pages that point to it.
- ☐ The Authority update rule states that for each page p , update $auth(p)$ is the average of the hub scores of all pages that point to it.
- ☒ The Hub update rule states that for each page p , update $hub(p)$ is the sum of the authority scores of all pages that it points to.
- ☐ The Hub update rule states that for each page p , update $hub(p)$ is the max of the authority scores of all pages that it points to

Yes, the answer is correct.

Score: 1

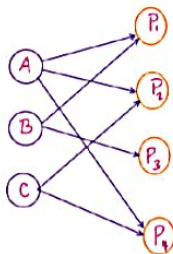
Accepted Answers:

The Authority update rule states that for each page p , update $auth(p)$ is the sum of the hub scores of all pages that point to it.

The Hub update rule states that for each page p , update $hub(p)$ is the sum of the authority scores of all pages that it points to.

3) Consider the following bipartite graph, which of the following is/are correct for repeated improvement?

1 point



- ☒ $A = P1 + P2 + P4$
- ☒ $P3 = B$
- ☐ $C = P1 + P2 + P3 + P4$
- ☒ $P1 = A + B$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$A = P1 + P2 + P4$

$P3 = B$

$P1 = A + B$

4) Let C be the unit circle with $(0,0)$ as its origin in the XY - plane. Then A , the point at which the vector $(3,7)$ intersects C , is

1 point

- ☒ $3/\sqrt{58}, 7/\sqrt{58}$
- ☐ $3/\sqrt{10}, 7/\sqrt{10}$
- ☐ $3/\sqrt{9}, 7/\sqrt{49}$
- ☐ $3/\sqrt{49}, 7/\sqrt{9}$

Yes, the answer is correct.

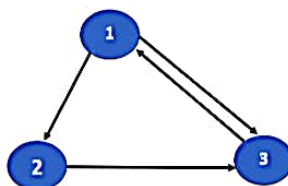
Score: 1

Accepted Answers:

$3/\sqrt{58}, 7/\sqrt{58}$

5) 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 convergence?

1 point



- ☐ 0.33, 0.33, 0.33
- ☒ 0.40, 0.20, 0.40
- ☐ 0.20, 0.40, 0.40
- ☐ 0.40, 0.40, 0.20

Yes, the answer is correct.

Score: 1

Accepted Answers:

0.40, 0.20, 0.40

6) Which of the following statements is true about a Markov matrix?

1 point

- ☒ All elements in a Markov matrix must be non-negative, and each column must sum to 1.
- ☐ A Markov matrix is always a square matrix.
- ☐ The determinant of a Markov matrix is always equal to 1.
- ☐ A Markov matrix can have negative elements as long as the row sums are equal.

Yes, the answer is correct.

Score: 1

Accepted Answers:

All elements in a Markov matrix must be non-negative, and each column must sum to 1.

7) Which of the following statements are correct?

0 points

Statement I - Applying a matrix on its eigenvectors only changes the direction of the eigenvector.

Statement II - Eigenvectors of a matrix are linearly dependent on each other.

- ☐ I only
- ☐ II only
- ☐ Both
- ☒ None

No, the answer is incorrect.

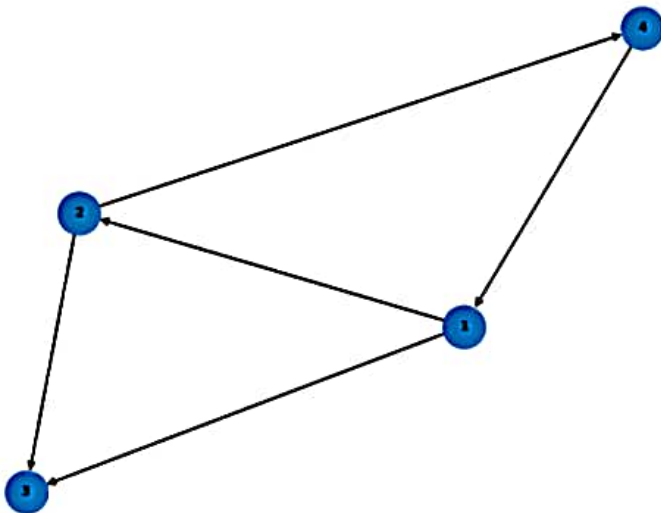
Score: 0

Accepted Answers:

Both

8) What values of PageRank will the nodes (1,2,3,4) of the given graph have after the second iteration if the initial values are 1/4 for each node?

0 points



- ☐ 0.25, 0.13, 0.25, 0.25
- ☒ 0.25, 0.13, 0.19, 0.13
- ☐ 0.13, 0.13, 0.19, 0.13
- ☐ 0.13, 0.06, 0.13, 0.13

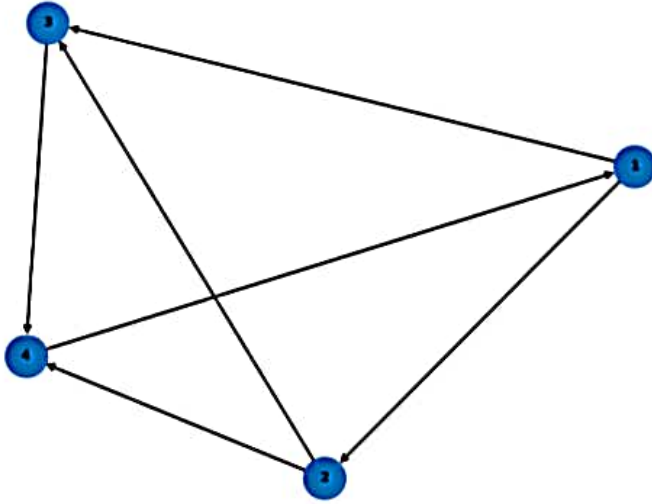
Yes, the answer is correct.

Score: 0

Accepted Answers:

0.25, 0.13, 0.19, 0.13

9) Given the graph as shown in the following Figure, while calculating the pagerank using matrix multiplication method on this graph, how does the first matrix operation look like? **1 point**



☒
$$\begin{bmatrix} 0 & 0 & 0 & 1 \\ 1/2 & 0 & 0 & 0 \\ 1/2 & 1/2 & 0 & 0 \\ 0 & 1/2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{bmatrix}$$

☐
$$\begin{bmatrix} 1/2 & 0 & 0 & 1 \\ 0 & 1/2 & 0 & 0 \\ 1/2 & 0 & 0 & 0 \\ 0 & 1/2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{bmatrix}$$

☐
$$\begin{bmatrix} 0 & 1/2 & 1/2 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 1/2 & 0 & 0 \\ 0 & 1/2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{bmatrix}$$

☐
$$\begin{bmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 0 & 0 & 1/2 \\ 1/2 & 1/2 & 0 & 0 \\ 0 & 1/2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{bmatrix}$$

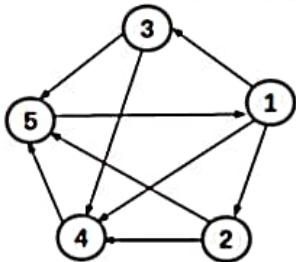
Yes, the answer is correct.

Score: 1

Accepted Answers:

$$\begin{bmatrix} 0 & 0 & 0 & 1 \\ 1/2 & 0 & 0 & 0 \\ 1/2 & 1/2 & 0 & 0 \\ 0 & 1/2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{bmatrix}$$

10) What is the score value of authority(a) and hub (h) respectively for the node 4 in the following figure after applying 1-step hub-authority computation (i.e. when k is 1)? Assume initial hub and authority of each node as 1. **1 point**



☐ $a(1) = 1, h(1) = 3$

☒ $a(1) = 3, h(1) = 1$

☐ $a(1) = 4, h(1) = 2$

☐ $a(1) = 2, h(1) = 4$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$a(1) = 3, h(1) = 1$

Picture saved

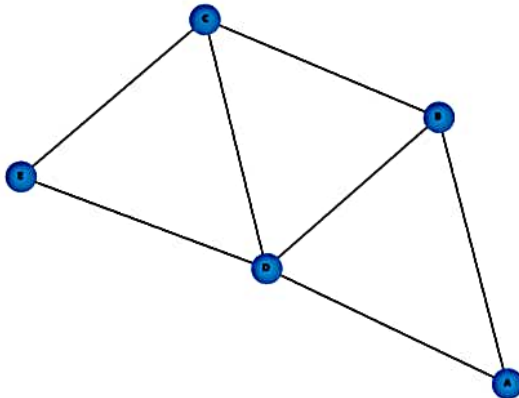
Week 9 : Assignment 9

The due date for submitting this assignment has passed.

Due on 2024-03-27, 23:59 IST.

Assignment submitted on 2024-03-27, 22:16 IST

1) Given a network being generated by 'rich get richer' phenomenon. Following figure shows the snapshot of a network at time t . A new **1 point** node u enters the network at time $t + 1$ and makes an edge with one of the existing nodes. If $P(X)$ is the probability of the new node to form an edge with node X , which of the following is correct?



- ☐ $p(A) < p(D) < p(C)$
- ☒ $p(A) < p(B) < p(D)$
- ☐ $p(E) < p(D) < p(C)$
- ☐ $p(A) < p(C) < p(E)$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$p(A) < p(B) < p(D)$

2) Pick out the reason for Power Law Distribution in real world networks.

1 point

- ☐ Triadic closure
- ☐ Membership closure
- ☒ Preferential attachment
- ☐ Focal closure

Yes, the answer is correct.

Score: 1

Accepted Answers:

Preferential attachment

3) Assume a set of 10 graphs are generated using Erdos-Renyi model with (n, p) parameters. Which of the following statements are True? **1 point**

Statement I - Number of edges in all the graphs is the same

Statement II - Number of edges in all the graphs may vary

- ☐ I only
- ☒ II only
- ☐ Both
- ☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

II only

4) Given set $E = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$. We pick a value a_1 uniformly at random from this set E . Next, we pick another value a_2 , again uniformly at random from this set E . Similarly we pick 8 more values, a_3, a_4, \dots, a_{10} . Look at the sum $S = a_1 + a_2 + \dots + a_{10}$. Which of the following is true for the range of values of S ? **1 point**

- ☐ $\{11, 12, \dots, 200\}$
- ☒ $\{110, 12, \dots, 200\}$
- ☐ $\{11, 12, \dots, 2000\}$
- ☐ $\{110, 12, \dots, 2000\}$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$\{110, 12, \dots, 200\}$

5) Pick out the correct representation of the Power Law.

0 points

- ☒ $\frac{1}{x^3}$
- ☒ $\frac{1}{x^2}$
- ☐ $\frac{1}{3^x}$
- ☒ $\frac{1}{3x}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\frac{1}{x^3}$
 $\frac{1}{x^2}$

6) Consider a random graph with 600 nodes and edges between any two nodes with a probability of 0.2, where can one expect the peak of the degree-distribution graph? 1 point

- ☐ 300
- ☒ 120
- ☐ 320
- ☐ 500

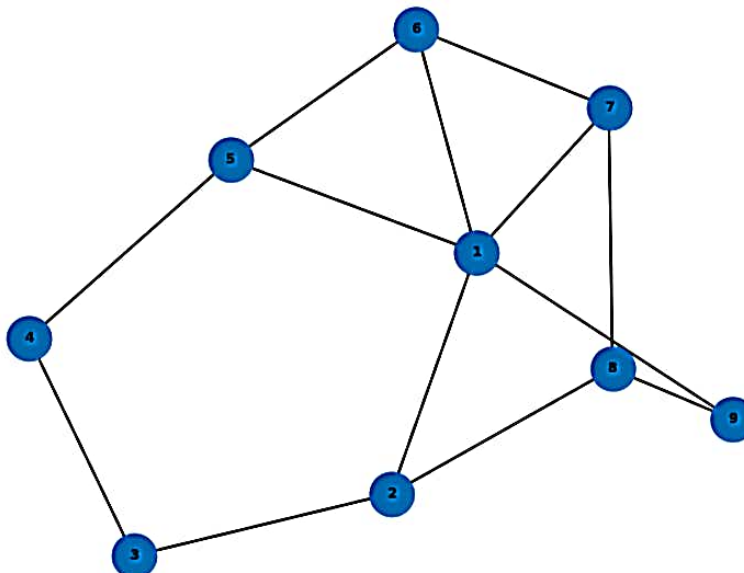
Yes, the answer is correct.

Score: 1

Accepted Answers:

120

7) Consider the given graph, there is an incoming node P, To which node will this new node be added according to 'Rich get Richer' phenomenon? 1 point



- ☒ 1
- ☐ 6
- ☐ 7
- ☐ 8

Yes, the answer is correct.

Score: 1

Accepted Answers:

1

8) Which of the following correctly depicts the meaning of 'Marks distribution of students in a class'? 1 point

- ☒ Plot different mark values on the X-axis and the fraction/percentage of students having those marks on the Y-axis
- ☐ Plot different mark values on the X-axis and the fraction/percentage of students having marks greater than those marks on the Y-axis
- ☐ Plot different mark values on the X-axis and the fraction/percentage of students having marks less than those marks on the Y-axis
- ☐ None of the above

Yes, the answer is correct.

Score: 1

Accepted Answers:

Plot different mark values on the X-axis and the fraction/percentage of students having those marks on the Y-axis

9) Assume a random network A, where the nodes were removed randomly and assume a network B where the nodes are removed selectively. Which of the following is true for the results obtained in the demonstration? 1 point

Statement I - As the network is random, there is no preferential attachment of nodes in this network
Statement II - There are no hubs in random network

- ☐ I only
- ☐ II only
- ☒ Both
- ☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both

Both

10) Select the correct statements about the Barabási-Albert (BA) model for scale-free networks. (Choose all that apply)

1 point

- ☐ Nodes are added randomly to the network
- ☒ The BA model follows a preferential attachment mechanism
- ☐ All nodes in the BA model have equal probabilities of forming connections
- ☒ In the BA model, new nodes are more likely to connect to existing nodes with higher degrees

Yes, the answer is correct.

Score: 1

Accepted Answers:

The BA model follows a preferential attachment mechanism

In the BA model, new nodes are more likely to connect to existing nodes with higher degrees



Week 10 : Assignment 10

The due date for submitting this assignment has passed.

Due on 2024-04-03, 23:59 IST.

Assignment submitted on 2024-03-29, 12:40 IST

1) Assume for a disease 'C', People who are diagnosed in the earlier stage have a high chance of recovery. The recovered people do not have a chance to get infected again. What kind of model does this disease 'C' exhibit?

- ☐ SIS
☒ SIR
☐ Both SIS and SIR
☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

SIR

2) Which of the following statements is/are correct?

1 point

Statement I - SIR model should come to an end after running for a finite number of steps on a network

Statement II - SIS model can keep running indefinitely on a network

- ☐ I only
☐ II only
☒ Both
☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both

3) Consider a Tree network to demonstrate infection transmission. If one node has 'k' children each and the probability of transmitting an infection is 'p', then the number of secondary infections is

1 point

- ☒ $p \times k$
☐
☐ p^k
☐ $\log p$
☐ $k \log p$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$p \times k$

4) Suppose the basic reproductive number is estimated to be $R_0 = 2.5$. A vaccine providing a certain level of immunity is introduced and the new reproductive number is found to be $R_1 = 1.8$. What is the percentage of immunity provided by the vaccine?

1 point

- ☐ 25%
☒ 28%
☐ 72%
☐ 75%

Yes, the answer is correct.

Score: 1

Accepted Answers:

28%

5) Which of the following is correct if the Basic reproductive number is less than 1?

1 point

- ☐ the disease dies away with a probability 0
☐ the disease dies away with a probability < 1
☒ the disease dies away with a probability 1
☐ the disease persists with a probability 1

Yes, the answer is correct.

Score: 1

Accepted Answers:

the disease dies away with a probability 1

6) Select the factors that affect the spread of a contagion.

1 point

- ☐ density of the contact network
☐ degree of contagiousness
☒ both density of network and degree of contagiousness
☐ none

Yes, the answer is correct.

Score: 1

Accepted Answers:

both density of network and degree of contagiousness

7) In a city, an infection 'TOV' is found to persist with a probability $P > 0$. Which of the following is/are the possible reproductive numbers?

1 point

- ☐ 0.5
☒ 1.1
☒ 1.2
☒ 1.5

Yes, the answer is correct.

Score: 1

Accepted Answers:

1.1

1.2

1.5

8) In which of the following model does a node v become infected during the epidemic if and only if there is a path to v from one of the initially infected nodes that consists entirely of open edges? 1 point

- ☐ SIR
☐ SIS
☒ Percolation
☐ SEIR

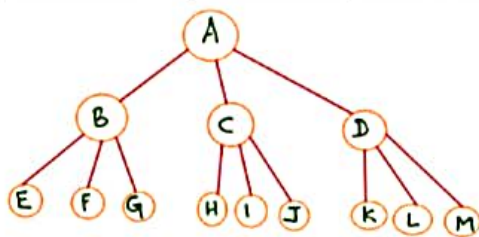
Yes, the answer is correct.

Score: 1

Accepted Answers:

Percolation

9) Consider the branching model for a 2 level tree shown in the following figure. Here, k (number of children for each node) = 3 and p (probability of infection) = $1/2$. What is the probability that at least one of the nodes E, H and K are infected? 1 point



- ☐ $1/8$
☐ $7/8$
☒ $37/64$
☐ $1/64$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$37/64$

10) Given that the Reproductive number of an epidemic in action is 0.5. What are valid attempts to curb the disease? 0 points

- ☐ Isolate the infected person so that we reduce the number of people getting infected
☐ Create awareness among the population to follow proper hygiene thereby reducing the probability of the disease spread
☐ You can never curb the spread of the disease
☒ The disease dies away even without intervention

Yes, the answer is correct.

Score: 0

Accepted Answers:

The disease dies away even without intervention

Week 11 : Assignment 11

The due date for submitting this assignment has passed.

Due on 2024-04-10, 23:59 IST.

Assignment submitted on 2024-04-10, 23:53 IST

1) In the context of small world generative model, what does random rewiring refer to?

1 point

- ☐ reducing the network to two communities
- ☐ creating new communities in the network
- ☐ adding more links randomly
- ☒ remove an edge at random and add a new edge

Yes, the answer is correct.

Score: 1

Accepted Answers:

remove an edge at random and add a new edge

2) Ignore for the time being that many of your friends' friends are your friends as well. If everyone has 500 friends, how many friends of friends does a person have on average?

- ☐ 500
- ☐ 1,000
- ☐ 5,000
- ☒ 250,000

Yes, the answer is correct.

Score: 1

Accepted Answers:

250,000

3) Which of the following is True for the Watts-Strogatz model?

1 point

- ☐ network model with a fixed degree distribution
- ☐ nodes are added sequentially to the network
- ☒ homophily and weak ties are the two phenomena which give rise to small world networks
- ☐ triadic closure and community structure are the two phenomena which give rise to small world networks

Yes, the answer is correct.

Score: 1

Accepted Answers:

homophily and weak ties are the two phenomena which give rise to small world networks

4) Pick out the ideal value of clustering component to perform an efficient decentralized search in a 2D WattsStrogatz model.

1 point

- ☐ -1
- ☐ 0
- ☐ 1
- ☒ 2

Yes, the answer is correct.

Score: 1

Accepted Answers:

2

5) Which of the following best describes a small world network?

1 point

- ☐ Friendship network across the world is completely connected
- ☐ Most people are isolated in the real world friendship network
- ☒ Any two people are connected in the friendship network with a small path length
- ☐ Any two people are connected in the friendship network with a fixed path length

Yes, the answer is correct.

Score: 1

Accepted Answers:

Any two people are connected in the friendship network with a small path length

6) In a real world friendship network, the edges which are not to your neighborhood and connect you to friends from distant regions represent

1 point

- ☐ strong ties
- ☒ weak ties
- ☐ selection
- ☐ social influence

Yes, the answer is correct.

Score: 1

Accepted Answers:

weak ties

7) Consider a 1-D Watts Strogatz model. The network is portrayed as a ring/cycle on n people where each node is connected to k nodes on its left and k nodes to its right. For $k = 2$, the network will contain

1 point

- ☒ $2n$ edges where k can be any positive
- ☐ n^2 edges where k can be any positive
- ☐ $n/2$ edges where k can be any positive integer
- ☐ All of the above

Yes, the answer is correct.

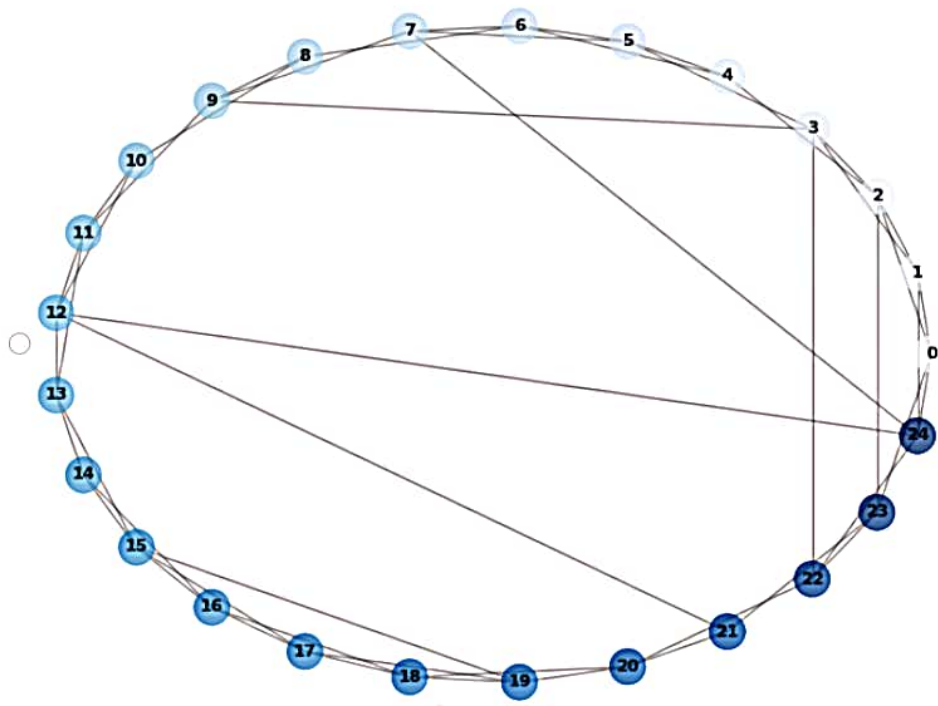
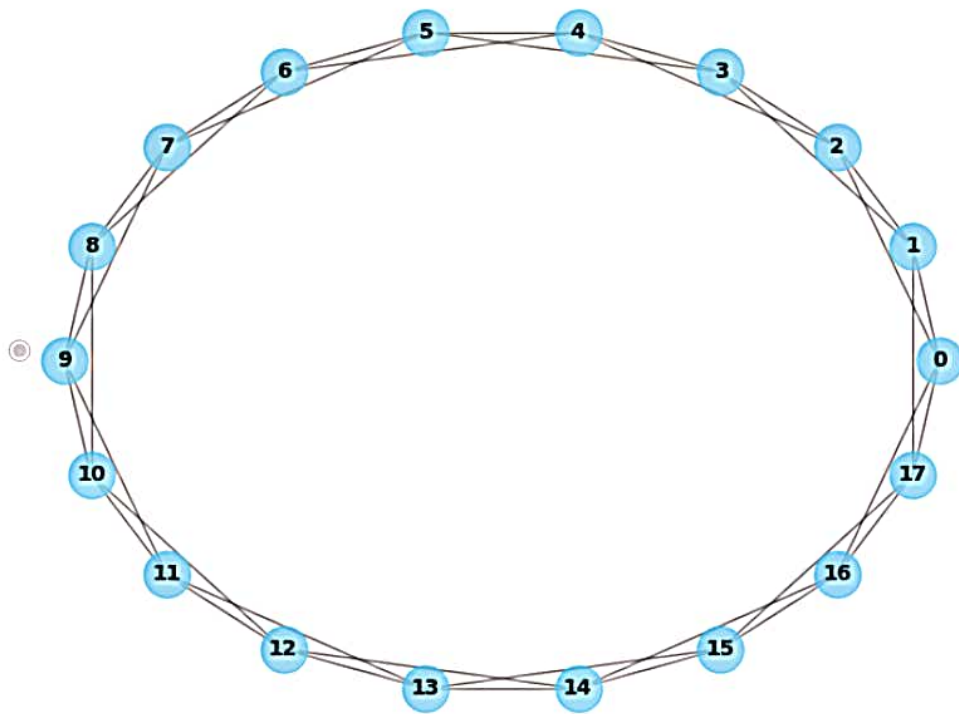
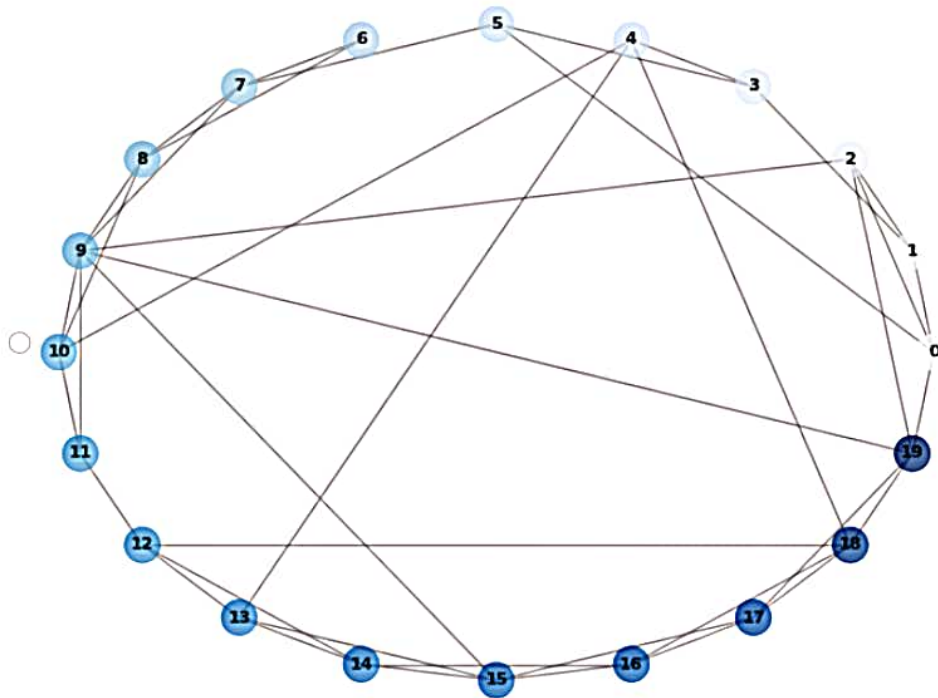
Score: 1

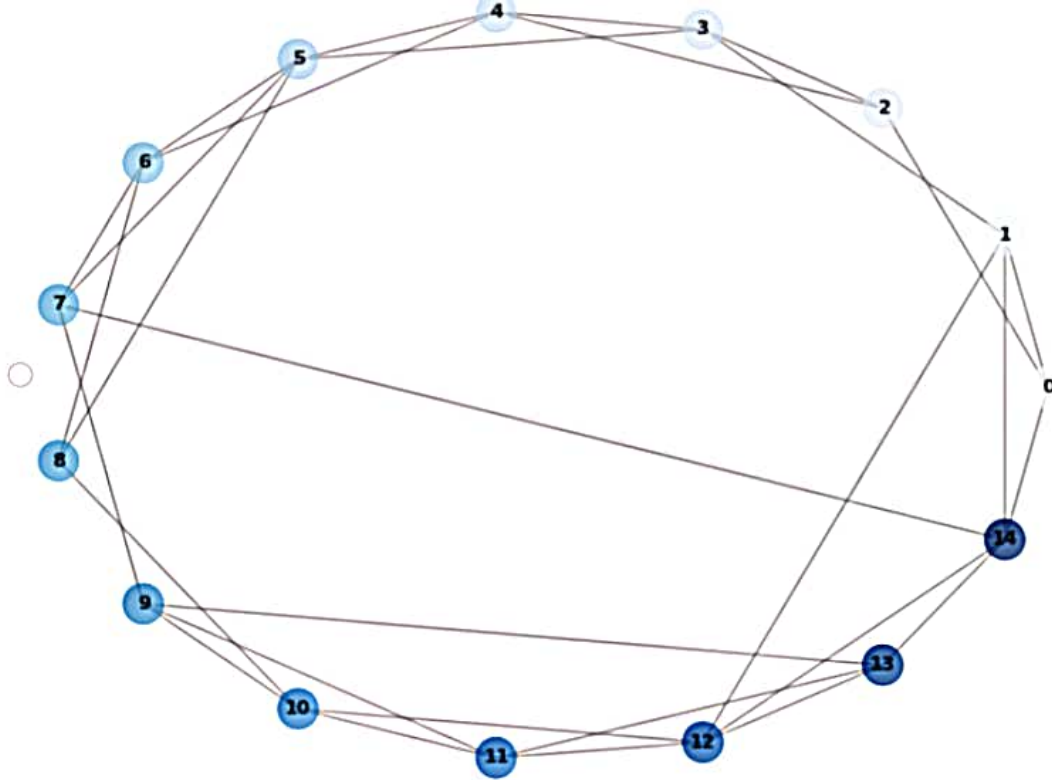
Accepted Answers:

$2n$ edges where k can be any positive

9) Pick out the networks that does not represent the Watts Strogatz model.

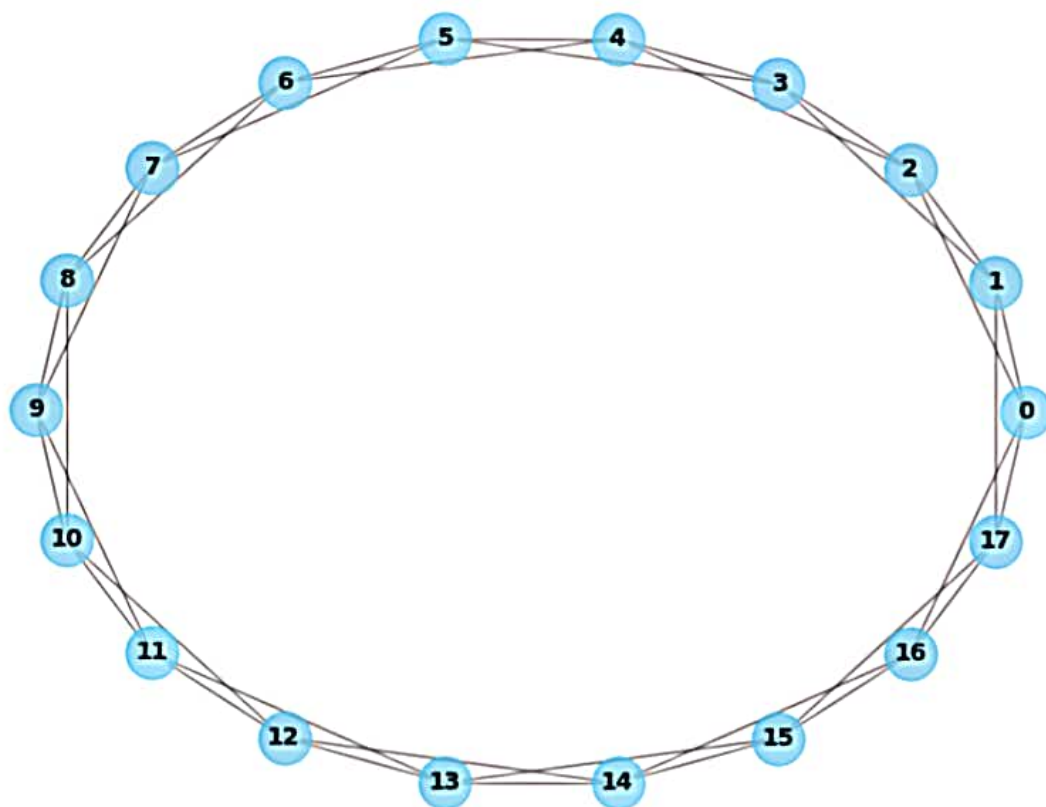
1 point





Yes, the answer is correct.
Score: 1

Accepted Answers:



10) What is the average distance between any two random nodes in a small world network of size n ?

1 point

- ☐ n
- ☒ $\log n$
- ☐ $n \log n$
- ☐ $\log n^2$

Yes, the answer is correct.
Score: 1

Accepted Answers:
 $\log n$

Week 12 : Assignment 12

The due date for submitting this assignment has passed.

Due on 2024-04-17, 23:59 IST.

Assignment submitted on 2024-04-17, 20:05 IST

1) Which of the following statements is true for Internet Memes?

1 point

- ☐ Internet memes are exclusively images and never involve text-based content.
- ☐ The virality of a meme is independent of its relatability and cultural relevance.
- ☒ Memes often spread through social networks, be it an image, audio, video or a file in some other format.
- ☐ Memes have a consistent and universal interpretation across diverse cultural backgrounds.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Memos often spread through social networks, be it an image, audio, video or a file in some other format.

2) What is/are the factor(s) responsible for a meme to go viral?

1 point

- ☐ only quality of the meme
- ☐ only structure of the network
- ☒ Both quality of the meme and structure of the network
- ☐ Neither quality of the meme and structure of the network

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both quality of the meme and structure of the network

3) What happens during the i^{th} iteration of k-shell decomposition algorithm?

1 point

- ☐ removes all nodes of degree i
- ☐ removes all nodes of degree i recursively, so that there is no node with degree i any more
- ☐ removes all nodes of degree less than i recursively, so that there is no node with degree less than i any more
- ☒ removes all nodes of degree less than or equal to i recursively, so that there is no node with degree less than or equal to i any more

Yes, the answer is correct.

Score: 1

Accepted Answers:

removes all nodes of degree less than or equal to i recursively, so that there is no node with degree less than or equal to i any more

4) Which of the following statements is/are True?

1 point

Statement I - Core nodes of a network are removed in the last iteration of the k-shell decomposition algorithm

Statement II - Periphery nodes of a network are removed in the first iteration of the k-shell decomposition algorithm.

- ☐ I only
- ☐ II only
- ☒ Both
- ☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

Both

5) Identify the node that has spreading capacity similar to the innermost core node but does not belong to the innermost core.

1 point

- ☒ pseudo-core
- ☐ periphery node
- ☐ core node
- ☐ hyper-core

Yes, the answer is correct.

Score: 1

Accepted Answers:

pseudo-core

6) A sub-graph of a graph is known as 4-core if

1 point

- ☐ Each node has a maximum degree of 4
- ☐ Each node has a degree strictly less than 4.
- ☐ Each node has a degree equal to 4.
- ☒ Each node has a degree greater than or equal to 4.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Each node has a degree greater than or equal to 4.

7) Which of the following are True?

1 point

Statement I - Myopic search always performs as good as an Optimal search algorithm.

Statement II - Time taken for myopic search increases logarithmically with n .

- ☐ I only
- ☒ II only
- ☐ Both
- ☐ None

Yes, the answer is correct.

Score: 1

Accepted Answers:

II only

8) Identify the core which has the most influential people in the network.

1 point

- ☐ 2
- ☐ 3
- ☐ 4
- ☒ 5

Yes, the answer is correct.

Score: 1

Accepted Answers:

5

9) Which of the following is true for Decentralised search?

1 point

- ☐ Only one primary node performs the search
- ☒ The effort is shared across multiple nodes
- ☐ All nodes are involved in the search of every element
- ☐ The effort is on only two nodes - the primary and secondary node

Yes, the answer is correct.

Score: 1

Accepted Answers:

The effort is shared across multiple nodes

10) On a connected simple graph G we can measure the distance between two distinct vertices v_i and v_j as the number of edges on the shortest path between them. The diameter of a graph G is the maximum distance between any two distinct vertices in G . What is the diameter of a complete graph having n vertices?

1 point

- ☐ 0
- ☒ 1
- ☐ n
- ☐ $n-1$

Yes, the answer is correct.

Score: 1

Accepted Answers:

1