Social Networks

Week-1 Assignment

1.
If there exist a graph where nodes represents students and edges represents friendship, then for a rumour to be spread across entire class -

A. Every student must know every other student.
B. The graph needs to be connected.
C. The graph need not be connected.
D. Will spread in any case.

Answer - (B)

Reference - Lecture-1
Timestamp - 2:25

Solution -
If the graph is not connected, then there exists at least one student who has no friend and hence will not know about the rumour.

2.
If x = random.randrange(5,10), which values can x take?

I) 5
II) 8
III) 4
IV) 10

A. Only I, II, IV
B. Only I, II, III
C. Only II, III
D. Only I, II

Answer - (D)

Reference - Lecture-3
Timestamp - 7:00

Solution -

random.randrange(start,stop) gives out a random integer including the start value while excluding stop.

3.
If x = random.randint(3,6), which values can x take?

I) 5
II) 4.3
III) 3
IV) 6

A. Only I, II
B. Only I, III
C. Only I, III, IV
D. Only I

Answer - (C)

Reference - Lecture-3
Timestamp - 8:55

Solution -
random.randint(start,stop) gives a random integer including both start and stop values.

4.
What will be the output of the following code snippet?

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

A. It is an even number
B. It is an odd number
C. Element does not exist
D. The code won't run

Answer - (C)

Reference - Lecture-6
Timestamp - 37:30

Solution -
Since there are only 5 elements in the list, x[5] doesn't exist and so will throw an error(IndexError: list index out of range) and so the code will move to the except block.

5.
What will be the output of the following code snippet?

```
import random
x = []
for i in range(7):
    x.append(random.randint(1,5))
x.sort()
x.append({"one":1, "two":2})
print(len(x))
```

A. 9
B. 8
C. 7
D. 10

Answer - (B)

Reference - Lecture-3
Timestamp - 16:41

Solution -
7 random numbers(between 1 & 5) are being added to the list.
Dictionaries inside lists are considered as single elements.
Hence, The length of the list is 8.

6.
Maximum number of edges that can be present in a graph with 10 nodes are -

A. 100
B. 45
C. 50
D. 55

Answer - (B)

Reference - Lecture-5

Timestamp - 6:55

Solution -
Maximum number of edges in a graph with n nodes = $\frac{n(n-1)}{2}$

7.
For a complete graph Z with 5 nodes if $A = \frac{z.order()}{z.size()}$, what will be the value of A?

A. $\frac{1}{4}$
B. $\frac{1}{8}$
C. $\frac{1}{2}$
D. $\frac{1}{16}$

Answer - (C)

Reference - Lecture-5
Timestamp - 6:37

Solution -
z.order() gives the total number of nodes i.e equal to 5.
z.size() gives the total number of edges i.e equal to $\binom{n}{2} = \frac{n(n-1)}{2} = 10$
So, A = $\frac{5}{10} = \frac{1}{2}$

8.
What will nx.dijktra_path(G,u,v) return?

A. Returns shortest path from u to v in a weighted graph
B. Returns shortest path length
C. Returns all possible paths from u to v
D. Returns no. of possible paths from u to v.

Answer - (A)

Reference - Lecture-6
Timestamp - 22:45

Solution -
The function returns the shortest path from source to target in a weighted graph.

9.
What will nx.gnp_random_graph(20,0.5) return?

A. Returns graph with 20 nodes with half of the nodes connected.
B. Returns graph with 20 nodes with each edge to be put with probability 0.5
C. Returns a connected graph with 10 nodes.
D. Returns a graph with 10 nodes with each edge to be put with probability 0.5

Answer - (B)

Reference - Lecture-5
Timestamp - 9:22

Solution -
nx.gnp_random_graph(x,y)
The function generates a graph with x nodes with each edge to be put with probability y.

10.
Maximum number of graphs possible from 50 nodes are -

A. $50 * 50$
B. $2^{\binom{50}{2}}$
C. $\binom{50}{2}$
D. 50^{50}

Answer - (B)

Reference - Lecture-7
Timestamp - 1:55

Solution -
Total number of edges with n nodes be X = $\frac{n*(n-1)}{2}$
Total number of graph containing 0 edges = $\binom{x}{0}$
Total number of graph containing 1 edges = $\binom{x}{1}$
Total number of graph containing 2 edges = $\binom{x}{2}$
And so on,
Hence total number of possible graphs with X edges = $\binom{x}{0} + \binom{x}{1} + \binom{x}{2} + ... + \binom{x}{x} = 2^x$