Social Networks - NPTEL JANUARY 2022

Assignment 1

1. What would be the output for the following code?
   scores=[78,77,45]
   scores.append(90)
   scores.append(98)
   scores.reverse()
   print(scores)

   (a) [98, 90, 78, 77, 45]
   (b) [78, 77, 45, 90, 98]
   (c) [98, 90, 45, 77, 78]
   (d) [78, 77, 45, 98, 90]

   CORRECT ANSWER: (c)

2. Given the following code, Which of the following is not a possible output?

```
import random

def calc():
        x=random.random()
        y=random.random()
        z=random.random()
        return(x+y+z)
print(calc())
```

   (a) 1.6115945523495627
   (b) 0.202709723169674
   (c) 2.3142203461882844
   (d) 3.9133426822720435

   CORRECT ANSWER: (d)

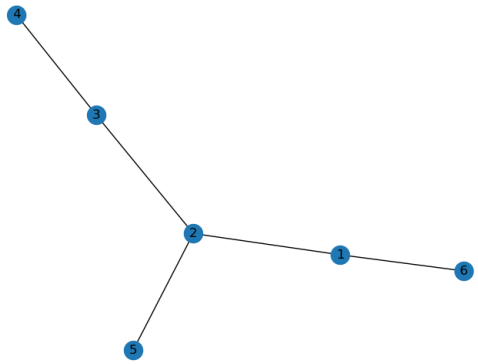
3. Which of the following statement creates the given dictionary, d: 1: 1, 2: 4, 3: 9, 4: 16?

   (a) d=x:x**2 for x in range(1,5)
   (b) d=x:x**2 for x in range(5)
   (c) d=x:x**2 for x in range(0,5)
   (d) d=x:x**2 for x in range(1,6)

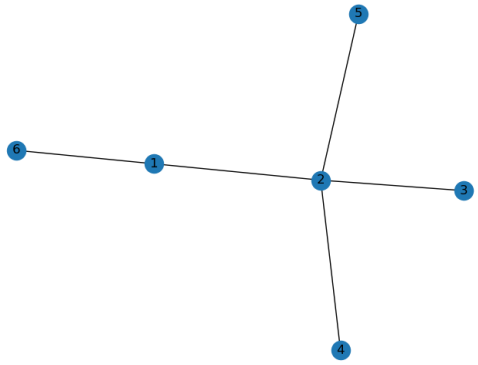
   CORRECT ANSWER: (a)

4. Identify the graph output for the following segment:

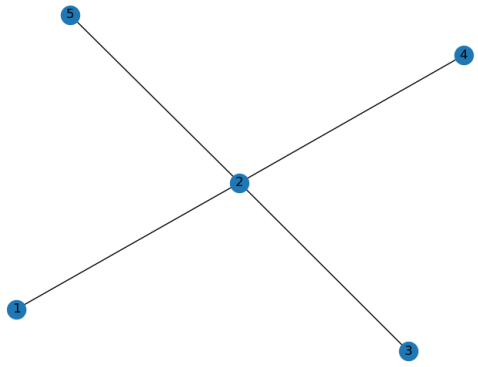
```
import networkx as nx
import matplotlib.pyplot as plt
G=nx.Graph()
G.add_nodes_from([1,2,3,4,5])
G.add_edges_from([(1,2),(2,3),(2,5),(1,6),(3,4)])
nx.draw(G, with_labels=True)
plt.show()
```



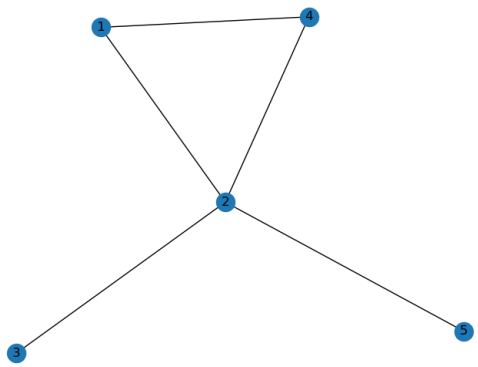
(a)



(b)



(c)



(d)

CORRECT ANSWER: (a) Ref: Lecture:5 - 4:55

Solution: Check out the edges in the code and match it with the graphs in the options. You should observe the following: a) All edges match with the graph b) Instead of edge (3,4) in the graph there is an edge (2,4) c) Edge (1,6) is missing d) Instead of edge(1,6) there is an edge (1,4)

5. Given the following code, what is the number of edges in the graph created?

```
G=nx.Graph()
G.add_nodes_from([i for i in range(10)])

def create_graph(n):
        while(len(G.edges())<n):
                u=random.choice(list(G.nodes()))

                v=random.choice(list(G.nodes()))

                if u!=v and G.has_edge(u, v)==0:
                        G.add_edge(u,v)
```

(a) 9

(b) 10

(c) n

(d) $n-1$

CORRECT ANSWER: (c)

6. Which of the statements is True for the graph created from the statement: $nx.gnp\_random\_graph(10, 0.5)$?

(a) Graph has 10 nodes with half of the nodes connected

(b) Graph has 10 nodes with each edge to be put with probability 0.5

(c) Connected graph with 10 nodes

(d) Graph has 5 nodes with half of the nodes connected

CORRECT ANSWER: (b)

7. What is the maximum number of graphs that can be created from 10 nodes?

(a) $2^{\binom{10}{2}}$

(b) $2^{\binom{2}{10}}$

(c) 2^{10}

(d) 2^{10^2}

CORRECT ANSWER: (a)

Ref: Lecture 7-1:55

Solution: For n nodes, total number of graphs possible is $2^{\binom{n}{2}}$

8. Given that we have n nodes in a network, what is the approximate number of steps to search a node?

(a) $n \log n$

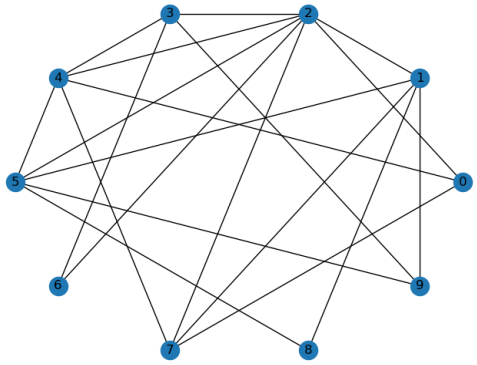
(b) $\log n$

(c) n^n

(d) $2^{\log n}$

CORRECT ANSWER: (b)

9. Identify the layout for the graph given in the following figure.



(a) spectral
(b) spring
(c) circular
(d) random

CORRECT ANSWER: (c)
Ref: Lecture 6-14:10

10. Friend suggestion on Facebook is one of the applications of

(a) Page ranking
(b) Link prediction
(c) Small work phenomenon
(d) Cascading

CORRECT ANSWER: (b)