Assignment Week - 1

Social Networks

July 12, 2024

Question 1. What will be the output of the following snippet of code?

```
print(" a + 'b' + c + ' ' + d ")
```

1.) a + "b" + c + ' ' + d

2.) "a + 'b' + c + ' ' + d"

3.) a + 'b' + c + ' ' + d

4.) a + "b" + c + ' ' + d

Correct Answer: Option 3

Explanation 1. Different types of Quotes: If you want to print single quotes, you will have to put them inside double quotes

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Question 2. Which of the following are valid names for variables in Python?

1.) python_

2.) python

3.) 1python

4.) I python

5.) I python

Correct Answer: Option 1, 2 & 5

Explanation 2. Variable names cannot begin with an integer (Although integers are allowed in variable names, but not in the beginning) and space is not a valid character for a variable name; instead one can use underscore.

Question 3. Farhat wishes to populate a list of 1000 integers, where each integer is drawn at random from the range 10 to 50 (both end points are included). Help Farhat in choosing the right snippet of code.

1.)
```
import random as rand
Integers = [rand.randint(10,51) for i in range(1000)]
```

2.)
```
import random as rand
Integers = [rand.randint(10,50) for i in range(1001)]
```

3.)
```
import random as rand
Integers = [rand.random(10,50) for i in range(1001)]
```

4.)
```
import random as rand
Integers = [rand.random(10,51) for i in range(1000)]
```

5.)
```
import random as rand
Integers = [rand.randint(10,50) for i in range(1000)]
```

6.)
```
import random as rand

Integers = [] for i in
range(1000):
    Integers.append(rand.randint(10,50))
```

Correct Answer: Option 5 & 6

Explanation 3. randint is the function used to generate random integers. The function takes 2 arguments: (start of the range, end of the range) with both end points included. The option 5 uses list comprehension which produces the same result as option 6.

Question 4. Code (a):

```
def black_box(O):       #Argument is a dictionary return([(i,O[i]) for i in O])
```

Code (b):

```
def blackest_box(O):  #Argument is a list of tuples of two values return({i[0]:i[1] for i in O})
```

1.) Code (a) returns a tuple with (value, key) pair of the dictionary provided.
Code (b) returns a dict with (Second value of tuple as key : First value of the tuple as value) for the provided list of tuples.

2.) Code (a) returns a tuple with (value, key) pair of the dictionary provided.
Code (b) returns a dict with (First value of tuple as key : Second value of the tuple as value) for the provided list of tuples.

3.) Code (a) returns a tuple with (key, value) pair of the dictionary provided.
Code (b) returns a dict with (Second value of tuple as key : First value of the tuple as value) for the provided list of tuples.

4.) Code (a) returns a tuple with (key, value) pair of the dictionary provided.
Code (b) returns a dict with (First value of tuple as key : Second value of the tuple as value) for the provided list of tuples.

Correct Answer: Option 4

Explanation 4. function black box accepts a dictionary as an argument and returns a list of tuples with key, value pairs of the dictionary and uses comprehension for returning the value. function blackest box accepts a list of tuples with two values as argument and returns a dictionary with key being the first value of the tuples inside the list and value being the second value of the tuples.

Question 5. Predict the output of the following code:

```
L = [1, 3, -1, 4, -2, 5, 3]

try:
    n=10 for i in range(n):
        if L[i] < 0:
            L[i] = 0 except
IndexError:
    for i in range(n - len(L)):
        L.append(0)

finally:
    print(L)
```

1.) Output = [1, 3, -1, 4, -2, 5, 3]

2.) Output = [1, 3, 0, 4, 0, 5, 3]

3.) Output = [1, 3, -1, 4, -2, 5, 3, 0, 0, 0]

4.) Output = [1, 0, -1, 0, -2, 0, 3]

5.) Output = [0, 3, 0, 4, 0, 5, 0]

6.) This code is wrong

Correct Answer: ~~Option 3~~ **[1, 3, 0, 4, 0, 5, 3, 0, 0, 0]**

Correct Answer is missing in the given options.

Explanation 5. The function replaces all the integer values inside the list L with zeroes if they are less than zero and it appends zero to the list if the code gives an IndexError, since the length of the list is less than range used in the code. In the end, finally always gets executed and hence, the code prints the list.

Question 6. Predict the output of the following code:

```
D = {'mom' : True, 'malayalam' : True, 'dad' : True, 'work' : False} L = ['mom', 'dad', 'non',
'work']
```

```
for word in L: try:
        if D[word]:
            print('This is a Palindrome')
        else: print('This is not a Palindrome')
    except: print('This key is not present in the dict')
```

1.) This is a Palindrome This is a Palindrome This is a Palindrome

2.) This key is not present in the dict This key is not present in the dict
This key is not present in the dict

3.) This is a Palindrome This is a Palindrome
This key is not present in the dict

4.) This is a Palindrome This is a Palindrome
This key is not present in the dict This is not a Palindrome

5.) This is a Palindrome This is a Palindrome
This is not a Palindrome

Correct Answer: Option 4

Explanation 6. Both 'mom' and 'dad' are palindromes and are present in the dictionary as keys. While 'non' is not present in the dictionary as key, despite being a palindrome and 'work' is not a palindrome despite being a key inside the dictionary.

Question 7. Farhat has a list of topper students and he wants to select a student randomly from the list to enlist in a top secret project he is working on. Help Farhat choose the function which can help him do it.

1.) random.sample(students,1)

2.) random.choice(students)

3.) random.choices(students)

4.) random.randint(0, len(students) - 1)

5.) None of the above

Correct Answer: Option 2

Explanation 7. random.choices is the function in the random library which helps one select a random element from a data structure.

Question 8. Gogo has created a list of connections in his classroom. Each connection is represented as a tuple of two individuals who are friends. Gogo needs to create an undirected graph and find the number of nodes and edges in the graph.

```
Connections = [('Jagirat','Jatin'), ('Jagirat', 'Ashutosh'), ('Jatin', 'Gitansh'),
('Ashutosh','Gitansh'), ('Gitansh','Nishit')]

import networkx as nx def
class_network(Connections):
    G = nx.graph()
    G.add_edges_from(Connections) num_nodes =
G.number_of_nodes() num_edges =
G.number_of_edges() return num_nodes,
num_edges print(class_network(Connections))
```

1.) (4,5)

2.) (5,4)

3.) (5,6)

4.) (6,5)

5.) (5,5)

6.) (4,4)

7.) (6,6)

8.) (4,6)

Correct Answer: Option 5

Explanation 8. There are 5 nodes in the graph: Jagirat, Jatin, Ashutosh, Gitansh, Nishit and there are 5 edges between these 5 nodes: ('Jagirat','Jatin'), ('Jagirat', 'Ashutosh'), ('Jatin', 'Gitansh'), ('Ashutosh','Gitansh'), ('Gitansh','Nishit')

Question 9. Aashik wants to create a random graph with 10 nodes with the probability of an edge being present as 0.35. Which function can he choose?

1.) nx.random graph(10,0.35)

2.) nx.gnp _random graph(10,0.35)

3.) nx.erdos renyi graph(10,0.35)

4.) Both (b) and (c)

Correct Answer: Option 4

Explanation 9. Both nx.gnp random graph(n, p) and nx.erdos _renyi graph(n, p) functions of the networkx library can be used to create a graph with some 'n' nodes and probability of an edge being present being 'p'.

Question 10. Aashik now wants to create a directed graph and add edges to it. Help Aashik with choosing the right function.

1. nx.graph() & graph.add edge()

2. nx.Digraph() & graph.add edge()
3. nx.Multigraph() & graph.add edge from()
4. nx.MultiDigraph() & graph.add edges from()

Correct Answer: Option 2

Explanation 10. You will have first import networkx. To create a graph, you will have to use the function nx.graph() and then to add edges to the graph, you will have to use graph.add edge() function.

Question 11. Now, Aashik wants to see the graph he has created, Which of the folllowing options can help him with it?

1.) nx.draw(graph) & plt.show()
2.) nx.plot(graph) & plt.show()
3.) nx.display(graph)
4.) nx.draw(graph) & plt.visualize()

Correct Answer: Option 1

Explanation 11. You will have first import 2 libraries: matplotlib and networkx. To draw a graph, you can use the function nx.draw(graph) and plt.show() to show the said graph.

Question 12. Aashik wants to check if the first random graph he created was connected or not. Which function will he use now?

1.) nx.is connected(graph)
2.) nx.connected(graph)
3.) nx.isconnected(graph)
4.) nx.is fully connected(graph)

5.) nx.is complete(graph)

Correct Answer: Option 1

Explanation 12. nx.is connected(Graph) function of the networkx library is the function that will help you check if your graph is a connected graph or not.

Question 13. Ashutosh created a social network graph of his class and wants to find out who is the person he can be friends with very easily. Which algorithmic concept can he use to do this?

1.) Page Ranking

2.) BFS

3.) DFS

4.) Link Prediction

Correct Answer: Option 4

Explanation 13. Link Prediction is the concept that helps you recommend a potential friend to a person based on the friends network they have. This is the same concept that is used in friend recommendations in social network sites such as facebook, linkedin, instagram etc.

Question 14. Sundari has 55 students in his class and he wants to create a network graph for the class. What is the maximum number of graphs possible for the given class.

1.) 2^{55}

2.) ${}_{55}C_2$

3.) $2_{{}_{55}C_2}$

4.) 55^2

Correct Answer: Option 3

Explanation 14. We have 55 nodes in the graph. To make a edge we require 2 nodes, therefore, we can have ${}^{55}C_2$ possible edges in the graph. But either an edge can be present or it can be absent, hence we have 2 choices for each edge and we have ${}^{55}C_2$ such decisions to make, whether to keep that edge or not. Therefore, the answer is $2^{{}^{55}C_2}$.