WEEK 02: DATA STRUCTURES IN PYTHON

1. What is the correct writing of the programming language that we used in this course?
( ) Phyton
( ) Pyhton
( ) Pthyon
( ) Python

2. What is the output of the code below?
```python
my_name = "Bora Canbula"
print(my_name[2::-1])
```
( ) alu
( ) ula
( ) roB
( ) Bor

3. Which one is not a valid variable name?
( ) for_
( ) Manisa_Celal_Bayar_University
( ) IF
( ) not

4. What is the output of the code below?
```python
for i in range(1, 5):
  print(f"{i:2d}{(i/2):4.2f}", end='')
```
( ) 010.50021.00031.50042.00
( ) 10.50 21.00 31.50 42.00
( ) 1 0.5 2 1.0 3 1.5 4 2.0
( ) 100.5 201.0 301.5 402.0

5. Which one is the correct way to print Bora's age?
```python
profs = [
  {"name": "Yener", "age": 25},
  {"name": "Bora", "age": 37},
  {"name": "Ali", "age": 42}
]
```
( ) profs["Bora"]["age"]
( ) profs[1][1]
( ) profs[1]["age"]
( ) profs.age[name="Bora"]

6. What is the output of the code below?
```python
x = set([int(i/2) for i in range(8)])
print(x)
```
( ) {0, 1, 2, 3, 4, 5, 6, 7}
( ) {0, 1, 2, 3}
( ) {0, 0, 1, 1, 2, 2, 3, 3}
( ) {0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4}

7. What is the output of the code below?
```python
x = set(i for i in range(0, 4, 2))
y = set(i for i in range(1, 5, 2))
print(x^y)
```
( ) {0, 1, 2, 3}
( ) {}
( ) {0, 8}
( ) SyntaxError: invalid syntax

8. Which of the following sequences is immutable?
( ) List
( ) Set
( ) Dictionary
( ) String

9. What is the output of the code below?
```python
print(int(2_999_999.999))
```
( ) 2
( ) 3000000
( ) ValueError: invalid literal
( ) 2999999

10. What is the output of the code below?
```python
x = (1, 5, 1)
print(x, type(x))
```
( ) [1, 2, 3, 4] <class 'list'>
( ) (1, 5, 1) <class 'range'>
( ) (1, 5, 1) <class 'tuple'>
( ) (1, 2, 3, 4) <class 'set'>

1. What is the correct way to create a NumPy array?
( ) np.list([1, 2, 3])
( ) np([1, 2, 3])
( ) np.array([1, 2, 3])
( ) np(array([1, 2, 3]))

2. Which of the following arrays is a 2-D array?
( ) [3, 5]
( ) [[3], [5]]
( ) [{1, 3}, {5, 7}]
( ) [2]

3. What is the correct way to print 5 from the array given below?
a = np.array([[1, 2], [3, 4], [5, 6]])
( ) print(a[3, 1])
( ) print(a[2, 0])
( ) print(a[1, 2])
( ) print(a[1, 3])

4. What is the correct way to print every other item from the array given below?
a = np.arange(5)
( ) print(a[1:3:5])
( ) print(a[::2])
( ) print(a[1:5])
( ) print(a[0:2:4]

5. What does the shape mean of a NumPy array?
( ) Number of columns
( ) Total number of items
( ) Number of items in each dimension
( ) Number of rows

6. What is the output of the code below?
n_1 = np.array([1, 2, 3])
n_2 = np.array([4, 5, 6])
n_3 = np.array([7, 8, 9])
print(np.array([n_1, n_2, n_3]).ndim)

Your answer:

7. What is the output of the code below?
n_1 = np.array([1, 2, 3])
n_2 = np.array([4, 5, 6])
n_3 = np.array([7, 8, 9])
print(np.array([n_1 + n_2 + n_3]).shape)

Your answer:

8. Which of the following is created with the code given below?
np.array([[1, 2, 3], [4, 5, 6]])
( ) 1-d array of shape 6 x 1
( ) 2-d array of shape 2 x 3
( ) 3-d array of shape 3 x 2
( ) 3-d array of shape 2 x 3

9. What is the output of the code below?
print(np.arange(10).reshape(2, -1))

10. What is the output of the code below?
Print(np.array([0.5, 1.5, 2.5]).dtype)

1. In binary system, which of the following digits are used to represent a number?
( ) 1 and 2
( ) 0 and 1
( ) 0, 1 and 2
( ) A and B

2. Which of the following codes gives a binary representation of 97?
( ) binary(97)
( ) (97).binary()
( ) f"{97:b}"
( ) to_binary(97)

3. What is the name of the NumPy method which converts a number to binary system?
( ) np.binary()
( ) np.bin()
( ) np.binary_representation()
( ) np.binary_repr()

4. The code given below produces this output:

> 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 1 = 97

Complete the code with appropriate statements for the lines given with (1) and (2).

```python
n = 16;r = 97;r_0 = r;b = [0]*n
for i in range(n-1, -1, -1):
    x = 2**i
    if r >= x:
        (1)
        (2)
b = b[::-1]
print(*b, end='')
print(f" = {r_0}")
```

5. Modify the code given in question **4** to avoid fixing the number of digits (**n**).
Hint: use bit_length() method of integer object.

6. Use the codes given in the question **4** as a starting point and write Python codes which converts the decimal of a base-10 number into binary system.

7. Try to write a general function which converts a base-10 floating point number into any base including the decimal part.

```python
def to_any_base(r: float, b: int) -> str:
    '''This function returns the base-b '''
    '''conversion of r, which is a        '''
    '''floating-point number.             '''
    '''Example:                           '''
    '''   to_any_base(3.5, 2) -> '11.1'   '''
```