PYTHON WORKING QUESTIONS

The document below may help you to solve these questions:

https://numpy.org/devdocs/user/absolute_beginners.html

- 1. Check if "Python" is in "Python is great!". (with the help of "in" operator)
- 2. Check if "123" is in the given list (21, 33, 123, -45, 1, 14, 18)". (with the help of "in" operator)
- 3. Get the last word "great" from "Python is great!"
- **4.** Do the following calculation at the Python command prompt:

```
e^2 \sin(\pi/6) + \log_e(3) \cos(\pi/9) - 5^3
```

- **5**. Verify that $\sin^2(x) + \cos^2(x) = 1$ for $x = \pi, \pi/2, \pi/4, \pi/6$
- **6.** Create an array of angles between (and including) 0 and 2π radians in increments of $\pi/2$ radians.
 - (a) Calculate the sine of each angle in the array
 - (b) Calculate the cosine of each angle in the array
 - (c) Convert each angle in the array to degrees
- **7.** Create a NumPy array called A and store the values 5, 8, -8, 99, and 0 in array A in a single row, five columns. Reshape A to an array with one column and 5 rows.
- 8. Create the two arrays below and perform each calculation.

```
a = [2 \ 4 \ 6], b = [-1 \ 0 \ 1]
```

- (a) 1.5a-2b
- (b) 0.5ab
- **9.** The 1D NumPy array B is defined below.

```
G = np.array([5, -4.7, 99, 50, 6, -1, 0, 50, -78, 27, 10])
```

- (a) Select all of the positive numbers in G and store them in X.
- (b) Select all the numbers in G between O and G and store them in G.
- (c) Select all of the numbers in G that are either less than -50 or greater than 50 and store them in z.
- 10. Define an integer c which is a random integer between 100 and 999 (including 100 and 999)
 - (a) pull the first digit out of ${\tt c}$ and assign it to the variable ${\tt x}$
 - (b) pull the second digit out of \circ and assign it to the variable y
- 11. Convert the given list (data type) to an array data type.

```
1 = [12.23, 13.32, 100, 36.32] #data type is list
```

- 12. Write a NumPy program to create a 3x3 matrix with values ranging from 2 to 10.
- **13**. Write a NumPy program to create a null vector of size 10 and update the sixth value to 11. (with the help Numpy "zero" function)

```
[0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
```

Update sixth value to 11

```
[0.0.0.0.0.0.11.0.0.0.]
```

14. Write a NumPy program to reverse an array (the first element becomes the last).

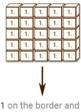
Original array:

[12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37]

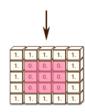
Reverse array:

[37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12]

15. Write a NumPy program to create a 2D array with 1 on the border and 0 inside.



1 on the border and 0 inside in the array using



16 . Write a NumPy program to create an 8x8 matrix and fill it with a checkerboard pattern.

Checkerboard pattern:
[[0 1 0 1 0 1 0 1]
[1 0 1 0 1 0 1 0]
[0 1 0 1 0 1 0 1]
[1 0 1 0 1 0 1 0]
[0 1 0 1 0 1 0 1 0]
[1 0 1 0 1 0 1 0 1]
[1 0 1 0 1 0 1 0 1]
[1 0 1 0 1 0 1 0 1]

17. Use the system of linear equations below to calculate the values of x and y. (with the help of the "inv" and "dot" functions of Numpy)

$$4x-2y=-42$$

-6x+y=31

18. By using Python functions solve the following equations: (with the help of the "solve" function of Numpy)

$$3x_1 - x_2 + 4x_3 = 2,$$

$$17x_1 + 2x_2 + x_3 = 14,$$

$$x_1 + 12x_2 - 7z = 54.$$

19 . Plot the following three functions on the same set of axes. Use a different color line for each function.

```
x=cos(t)
y=cos(t/2)
z=12cos(t)
Set values of t=-4\pi to 4\pi
```

20. Use a for loop to print out all the numbers 1 to 30, but leave out any number that is divisible by 5, such as 5, 10, and 15.

- **21**. Write a program that requests a word from a user and then counts the number of vowels in the word. The English vowels are a, e, i, o, u, y. Hint: the code 'a' in ['a','e','i','o','u','y'] and 'a' in 'aeiouy' both return True.
- 22. Create a for loop to print out all the letters in the word 'love'