**Lab Evaluation 1 (Python & Numpy basics)**

* Basic Python data structures, String operations, Math operators, Random number generators, Arrays, Array Operations etc
* All Qs carry 2 marks each

1. Generate a tuple from the set ["aman", "222", 777, 400.4]

sett = {"aman","222",777,400.4}

tuple1 = tuple(sett)

print(tuple1)

1. Create a dictionary of your basic data : (a) Roll No (b) Last Name (c) First Name (d) Date of birth. Print out the values and keys.

import pandas as pd

data = {'Rollno':21445,'Last\_name':'Tejaswi','First\_name':'Potu','DOB':'2004/08/04'}

print("KEYS: ")

for key in data.keys():

print(key)

print("Values: ")

for value in data.values():

print(value)

1. Use rand function to generate a 2-dimensional random array with seed.

np.random.seed(42)

s=np.random.rand(2,2)

print(s)

1. Generate a single random number in [0.0, 1.0]. Find the absolute value of (-1234)

x=np.random.random()

print(x)

abs\_val = abs(-1234)

print(abs\_val)

1. Return a random integer N such that 20 <= N <= 90.

xy=np.random.randint(20,91)

print(xy)

1. Given a population or set[11, 12, 13,14, 15]
   * Return a 3 length list of unique elements without replacement.

pop = [11,12,13,14,15]

sam\_size = 3

rand\_sam = np.random.choice(pop, sam\_size, replace=False)

print(rand\_sam)

* + Shuffle the above set

my\_set = {11,12,13,14,15}

sfld = np.array(list(my\_set))

np.random.shuffle(sfld)

print(sfld)

* + Print a random number from the set

sett = {11,12,13,14,15}

arr = np.array(list(sett))

x=np.random.choice(arr)

print(x)

1. Write the text "The King is Dead, Long Live The King" on to a file in your hard drive; read and print the text.

import numpy as np

file\_read="sample2.txt"

read\_txt=np.loadtxt(file\_read,dtype=str,delimiter="'")

print(read\_txt)

1. Create an illustrative function to demonstrate use of: if, elif and else (b) for, while, break and continue.

age=int(input())

if age<14:

print("You are a child")

elif 25>age>=14:

print("You are adult")

elif 50>=age>=25:

print("You are grown up..!")

else:

print("Old..!")

print("How many numbers you want to print? ")

a=int(input())

for i in range(a):

print(i)

a=int(input())

while a>0:

print(a)

a=a-1

if a<3:

break

else:

print("\n")

continue

1. Given a string "The King is Dead, Long Live The King"
   * Print the complete string

file\_path="sample3.txt"

read\_txt = np.loadtxt(file\_path,dtype=str,delimiter="'")

print(read\_txt)

* + Print first character of the string

first\_char = np.array(list(read\_txt))[0]

print(first\_char)

* + Print characters starting from 3rd to 5th

[3:6]

* + Print string starting from 3rd character

[3:]

* + Split the words

Delimiter=None

1. An array can be created from a list: Create an array from a list comprising of numbers 1,4,5,8 (treat them as floats).Slice the above array to display first and second elements

listt = [1.0,4.0,5.0,8.0]

arr = np.array(listt)

x=arr[0]

y=arr[1]

print(x)

print(y)

1. Arrays can be multidimensional. Create a two-dimensional array of (1,2,3) and (4,5,6).

arr = np.array([[1,2,3],[4,5,6],[7,8,9]])

print(arr)

1. Array slicing works with multiple dimensions in the same way as usual, applying each slice specification as a filter to a specified dimension. Consider two-dimensional array of (1,2,3) and (4,5,6).
   * Slice and display the 2nd row.

z=arr[1]

print(z)

* + Write code to display as array([2., 5.])

arr[:,1]

* + Find the length of the array.

len(arr)

1. Arrays can be reshaped using tuples that specify new dimensions. Turn a ten-element one-dimensional array into a two-dimensional one whose first axis has five elements and whose second axis has two elements. Obtain the transpose of the array

arr1=arr.reshape(2,5)

arr2=arr1.transpose()

1. Create an array from a list of 1,2 and 3.

listt = [1,2,3]

arr3 = np.array(listt)

print(arr3)

1. Fill an array [1,2,3] with a single value [9,9,9].

ori = np.array([1,2,3])

fild = np.full\_like(ori,[9, 9, 9])

print("Original array: ",ori)

print("Filled array: ",fild)

1. Sum the elements of array [2,4,5].

x=np.sum(ori)

1. Give the products of array [77,74,75]

y=np.product(ori)

1. Given an array [2,1,9,1,2,22,1,1,4,55,6,2,56]. Find mean, variance, max, min, argmin, median, argmax and standard deviation.

arr = np.array([2,1,9,1,2,22,1,1,4,55,6,2,56])

x=arr.mean()

print(x)

y=arr.var()

print(y)

z=arr.max()

print(z)

w=arr.min()

print(w)

dd = arr.argmin()

print(dd)

xx=np.median(arr)

print(xx)

yy = arr.argmax()

print(yy)

df = arr.std()

print(df)

1. Extract unique elements from an array: [1, 1, 4, 5, 5, 5, 7] and sort it.

rra = np.array([1,1,4,5,5,5,7])

ss = np.unique(rra)

print(ss)

xx = np.sort(rra)

print(xx)

1. Find the dot product of two arrays [1, 2, 3]and [0, 1, 1].

arr1 = [1,2,3]

arr2 = [0,1,1]

pro = np.dot(arr1,arr2)

print(pro)

1. Find the eigenvalues and eigenvectors of matrix A.

arr = np.array([[2,-12],[1,5]])

eig\_val, eig\_vec = np.linalg.eig(arr)

print(eig\_val)

print(eig\_vec)

1. Given an array with [11, 22, 11, 31], [25, 33, 31, 28]]. Treat as floats. Find the correlation coefficients.

var1 = [11,22,11,31]

var2 = [25,33,31,28]

val = np.corrcoef(var1,var2)[0,1]

print(val)

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