# # Read Instructions carefully before attempting this assignment

# 1) don't rename any function name

# 2) don't rename any variable name

# 3) don't remove any #comment

# 4) don't remove """ under triple quate values """

# 5) you have to write code where you found "write your code here"

# 6) after download rename this file with this format "PIAICCompletRollNumber\_AssignmentNo.py"

# Example piaic17896\_Assignment1.py

# 7) After complete this assignment please push on your own GitHub repository.

# 8) you can submit this assignment through the google form

# 9) copy this file absolute URL then paste in the google form

# The example above: https://github.com/EnggQasim/Batch04\_to\_35/blob/main/Sunday/1\_30%20to%203\_30/Assignments/assignment1.txt

# \* Because all assignment we will be checked through software if you missed any above points

# \* then we can't assign your scores in our database.

import numpy as np

# Task no 1

def function1():

# create 2d array from 1,12 range

# dimension should be 6row 2 columns

# and assign this array values in x values in x variable

# Hint: you can use arange and reshape numpy methods

x = # import numpy as np

x=np.arange(1,13)

x.reshape(6,2)

return x

"""

expected output:

[[ 1 2]

[ 3 4]

[ 5 6]

[ 7 8]

[ 9 10]

[11 12]]

"""

# Task2

def function2():

#create 3D array (3,3,3)

#must data type should have float64

#array value should be satart from 10 and end with 36 (both included)

# Hint: dtype, reshape

x = # import numpy as np

arr=np.arange(10,37)

arr.reshape(3,3,3)

arr.dtype

return x

"""

Expected: out put

array([[[10., 11., 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.]]])

"""

#task3

def function3():

#extract those numbers from given array. those are must exist in 5,7 Table

#example [35,70,105,..]

a = np.arange(1, 100\*10+1).reshape((100,10))

x = a[] #wrtie your code here

return x

"""

Expected Output:

[35, 70, 105, 140, 175, 210, 245, 280, 315, 350, 385, 420, 455,

490, 525, 560, 595, 630, 665, 700, 735, 770, 805, 840, 875, 910,

945, 980]

"""

#task4

def function4():

#Swap columns 1 and 2 in the array arr.

arr = np.arange(9).reshape(3,3)

return #wrtie your code here

"""

Expected Output:

array([[1, 0, 2],

[4, 3, 5],

[7, 6, 8]])

"""

#task5

def function5():

#Create a null vector of size 20 with 4 rows and 5 columns with numpy function

z = # import numpy as np

z=np.zeros(20)

z.reshape(4,5)

return z

"""

Expected Output:

array([[0, 0, 0, 0, 0],

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

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

[0, 0, 0, 0, 0]])

"""

#task6

def function6():

# Create a null vector of size 10 but the fifth and eighth value which is 10,20 respectively

arr = #wrtie your code here

return arr

#task7

def function7():

# Create an array of zeros with the same shape and type as X. Dont use reshape method

x = np.arange(4, dtype=np.int64)

return #x=np.zeros(4,dtype=np.int64)

"""

Expected Output:

array([0, 0, 0, 0], dtype=int64)

"""

#task8

def function8():

# Create a new array of 2x5 uints, filled with 6.

x = #write your code here

return x

"""

Expected Output:

array([[6, 6, 6, 6, 6],

[6, 6, 6, 6, 6]], dtype=uint32)

"""

#task9

def function9():

# Create an array of 2, 4, 6, 8, ..., 100.

a = # write your code here

return a

"""

Expected Output:

array([ 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26,

28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52,

54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78,

80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100])

"""

#task10

def function10():

# Subtract the 1d array brr from the 2d array arr, such that each item of brr subtracts from respective row of arr.

arr = np.array([[3,3,3],[4,4,4],[5,5,5]])

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

subt = # write your code here

return subt

"""

Expected Output:

array([[2 2 2]

[2 2 2]

[2 2 2]])

"""

#task11

def function11():

# Replace all odd numbers in arr with -1 without changing arr.

arr = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])

ans = #write your code here

return ans

"""

Expected Output:

array([ 0, -1, 2, -1, 4, -1, 6, -1, 8, -1])

"""

#task12

def function12():

# Create the following pattern without hardcoding. Use only numpy functions and the below input array arr.

# HINT: use stacking concept

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

ans = #write your code here

return ans

"""

Expected Output:

array([1, 1, 1, 2, 2, 2, 3, 3, 3, 1, 2, 3, 1, 2, 3, 1, 2, 3])

"""

#task13

def function13():

# Set a condition which gets all items between 5 and 10 from arr.

arr = np.array([2, 6, 1, 9, 10, 3, 27])

ans = #write your code here

return ans

"""

Expected Output:

array([6, 9])

"""

#task14

def function14():

# Create an 8X3 integer array from a range between 10 to 34 such that the difference between each element is 1 and then Split the array into four equal-sized sub-arrays.

# Hint use split method

arr = numpy.arange(10, 34, 1) #write reshape code

ans = #write your code here

return ans

"""

Expected Output:

[array([[10, 11, 12],[13, 14, 15]]),

array([[16, 17, 18],[19, 20, 21]]),

array([[22, 23, 24],[25, 26, 27]]),

array([[28, 29, 30],[31, 32, 33]])]

"""

#task15

def function15():

#Sort following NumPy array by the second column

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

ans = #write your code here

return ans

"""

Expected Output:

array([[-4, 1, 7],

[ 8, 2, -2],

[ 6, 3, 9]])

"""

#task16

def function16():

#Write a NumPy program to join a sequence of arrays along depth.

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

y = np.array([[2], [3], [4]])

ans = #write your code here

return ans

"""

Expected Output:

[[[1 2]]

[[2 3]]

[[3 4]]]

"""

#Task17

def function17():

# replace numbers with "YES" if it divided by 3 and 5

# otherwise it will be replaced with "NO"

# Hint: np.where

arr = np.arange(1,10\*10+1).reshape((10,10))

return # Write Your Code HERE

#Excpected Out

"""

array([['NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO'],

['NO', 'NO', 'NO', 'NO', 'YES', 'NO', 'NO', 'NO', 'NO', 'NO'],

['NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'YES'],

['NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO'],

['NO', 'NO', 'NO', 'NO', 'YES', 'NO', 'NO', 'NO', 'NO', 'NO'],

['NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'YES'],

['NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO'],

['NO', 'NO', 'NO', 'NO', 'YES', 'NO', 'NO', 'NO', 'NO', 'NO'],

['NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'YES'],

['NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO', 'NO']],

dtype='<U3')

"""

#Task18

def function18():

# count values of "students" are exist in "piaic"

piaic = np.arange(100)

students = np.array([5,20,50,200,301,7001])

x = # Write you code Here

return x

#Expected output: 3

# Task19

def function19():

#Create variable "X" from 1,25 (both are included) range values

#Convert "X" variable dimension into 5 rows and 5 columns

#Create one more variable "W" copy of "X"

#Swap "W" row and column axis (like transpose)

# then create variable "b" with value equal to 5

# Now return output as "(X\*W)+b:

X = # Write your code here

W = # Write your code here

b = # Write your code here

output = # Write your code here

#expected output

"""

array([[ 6, 17, 38, 69, 110],

[ 17, 54, 101, 158, 225],

[ 38, 101, 174, 257, 350],

[ 69, 158, 257, 366, 485],

[110, 225, 350, 485, 630]])

"""

#Task20

def fucntion20():

#apply fuction "abc" on each value of Array "X"

x = np.arange(1,11)

def xyz(x):

return x\*2+3-2

return #Write your Code here

#Expected Output: array([ 3, 5, 7, 9, 11, 13, 15, 17, 19, 21])

#--------------------------X-----------------------------X-----------------------------X----------------------------X---------------------