

**COMPUTING SUBJECT:** Machine Learning

**TYPE:** WORK ASSIGNMENT

**IDENTIFICATION:** Python Basic No. 2

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**DEGREE OF DIFFICULTY:** Easy

**TIME CONSUMPTION:** 1 hour

**EXTENT:** < 60 lines

**OBJECTIVE:** Basic understanding  
Simple operations on 1- dim integer lists

**COMMANDS:**

## **IDENTIFICATION:** Python Basics No.2/MICL

### The Mission

This is a crash course in basic Python. The goal is you will be able to utilize 2-dimensional lists, random numbers and understand the code used in the course. Together we are going to do a Python program, with some simple code. In order to keep a good speed no GUI no structure of program. Just coding.

### The problem

To do a Python program with simple 2-dimensional list filled with random numbers.

### Useful links

<https://www.w3schools.com/Python/default.asp>

<https://docs.python.org/3/library/random.html>

[https://www.tutorialspoint.com/python\\_data\\_structure/python\\_2darray.htm](https://www.tutorialspoint.com/python_data_structure/python_2darray.htm)

<https://stackoverflow.com/questions/6142689/initialising-an-array-of-fixed-size-in-python>

### Assignment 1: Application program two different lists

Start Anaconda and Spyder and create a new file.

In the file declare two different lists:

```
color = ["red", "big", "tasty"]  
fruits = ["apple", "banana", "cherry"]
```

Now for each item in *color* print out each item in *fruits* with the respective color, so the output looks similar to:

```
red apple  
red banana  
red cherry  
big apple  
big banana  
big cherry  
tasty apple  
tasty banana  
tasty cherry
```

*Tip: Nested loops!*

### Assignment 2: Application program 2-dim arrays (list) of numbers

Lists with sub-lists are actually the Python version of 2-dim arrays.

Declare a list with four sub-lists:

```
T = [[11, 12, 5, 2], [15, 6, 10], [10, 8, 12, 5], [12,15,8,6]]  
print(T)
```

Try:

```
T[1][2] = 99
```

Which element is changed to the value 99? Print out and see if you were right?

Add a nested for-loop so for each sub-list, *slist*, in *T* print each element, *elem*, in sub-list.

### Assignment 3: Random numbers

You are to do a program, which can initialize an integer list holding 10 elements of random numbers in the interval [0,100] using the module *random*.

Your program must resemble the following template:

```
import random

data = [] # create an empty list
while len(data) < 10:
    randNo= random.randint(0,100)
    data.append(randNo)
print(data)
```

### Assignment 4: Random function

Create your own random method, which returns a list of random numbers.

```
def rand_func():
    . . . . .
```

***Congratulations now you are ready to run Jupyter on data sets.***

Extra assignment A: For the fast ones only

Look at your `rand_func` method from the assignment.

Introduce parameters defining the size of the list and the maximum interger number to be generated?

Extra assignment B: For the fast ones only

What is the following code trying to do? What is wrong in the following code? Fix the problem!

```
#t = 11
#T1 = [[0]*t]*t
#print(T1)
#
#for i in range(1, 11):
#    for j in range(1, 11):
#        print(i*j, end = " ")
#        T1[i][j] = i*j
#        print(T1[i][j], end = " ")
#    print()
#
#print(T1)
```

Assignment X Extra reward only for fast ones!

Here we want to calculate some numbers called Fibonacci numbers and save them in a list. The numbers are defined as:

i	y[i]
0	0
1	1
2	1 = 1+0
3	2 = 1+1
4	3 = 1+2
5	5 = 3+2
6	8 = 5+3
7	13 = 8+5
.....	

As you can see a Fibonacci number from a certain point is the sum of the two previous numbers.

Do a loop so the respective elements in y is assigned the sum of the two previous elements.!!

*Hint:*  $y[i]$  = ask the teacher !

*So far so good!!*