

# 2020 - ESS 112 Programming in Python

## Assignment 3

December 2020

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### Instructions to submit the assignment:

- Answer all the theory questions in a text file and name it “theory.txt”
  - For every coding question, write your program in a separate file and name it as *question\_num.py*. For question 4, name it “4.py”
  - Make a submission folder and put the theory.txt and all the python files inside it.
  - Name your submission folder as RollNumber\_a(*assignment number*). For example, IMT2020001\_a3.
  - Compress your submission folder as a zip file and submit it on the LMS submission link.
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1. Answer the following questions:

- (a) Differentiate between the syntax of `for` and `while` loops.
- (b) Give an example of where you would use an infinite loop.
- (c) Can you use `for` loops to create an infinite loop? Justify.

2. (omit) Answer the following questions:

- (a) What will be the output of the following code snippet?

```
nums_a = (23, 45)
nums_b = 2, 4
res = nums_a + nums_b
print(res)
```

Explain the data types of the variables and the operation that is being performed.

- (b) Given the following code snippet:

```
a = (10, 11, 12)
a[1] = 21
```

What will be the output? Why does this happen, and what is the name of this property?

3. Suppose you want to view the details of your connections list on LinkedIn (similar to the friends list on Facebook). Everyone has a variable number of connections on LinkedIn, so you might need to iterate over each of your connections to display their photo, name and profile link. How could this task be achieved using a loop? Provide a *pseudo code* for the task or just explain it in plain English.

4. Given a list of numbers, print all the numbers in the list that are divisible by both  $x$  and  $y$ .  
 $x$  and  $y$  are inputs taken from the user.

*Sample Input/Output:*

Length of the list ( $n$ ) = 4

Elements of the list are [6, 7, 8, 12]

$x = 2$  and  $y = 3$

The input given below is the format for each of the inputs mentioned above.

**Input:**

4

6

7

8

12

2

3

**Output:**

6 12

5. Given a positive integer  $n$ , print a pattern of  $n$  rows, where row  $r$  contains numbers from 1 to  $r$ . Input  $n$  will be a positive integer.

*Sample Input/Output:*

**Input:**

5

**Output:**

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

6. Given a positive integer  $n$ ,
- If  $n$  is odd, print the double of all even non-negative integers less than  $n$ .
  - If  $n$  is even, print the triple of all odd positive integers less than  $n$ .

*Sample Input/Output:*

**Input 1:**

7

**Output 1:**

0 4 8 12

**Input 2:**

8

**Output 2:**

3 9 15 21

7. Given a positive integer  $n$ , print the first  $n$  odd positive integers.

*Sample Input/Output:*

**Input:**

5

**Output:**

1 3 5 7 9

8. Given two dates  $d_1$  and  $d_2$ , write a program that prints the date that occurs later.  $d_1$  and  $d_2$  are given as lists.

*Sample Input/Output:*

The date is in *dd/mm/yyyy* format

**Input 1:**

21, 03, 1999

15, 05, 2001

**Output 1:**

The date that occurs later is ['15', '05', '2001']

**Input 2:**

21, 03, 1999

21, 03, 1999

**Output 2:**

They are the same date

9. Write a program to print the squares of the first  $n$  positive numbers divisible by 3.

*Sample Input/Output:*

**Input:**

5

**Output:**

9 36 81 144 225

10. Write a program to add the elements of two lists in python. Perform appropriate checks for the length of the lists.

*Sample Input/Output:*

**Input:**

1, 2, 3

7, 8, 9

**Output:**

[8, 10, 12]

11. Write a program to check eligibility for voting for a given list of ages. A user with age *greater than or equal to* 18 is eligible for voting.

*Sample Input/Output:*

Length of the list ( $n$ ) = 3

List = [18, 25, 7]

**Input:**

3

18

25

7

**Output:**

['Eligible', 'Eligible', 'Not Eligible']