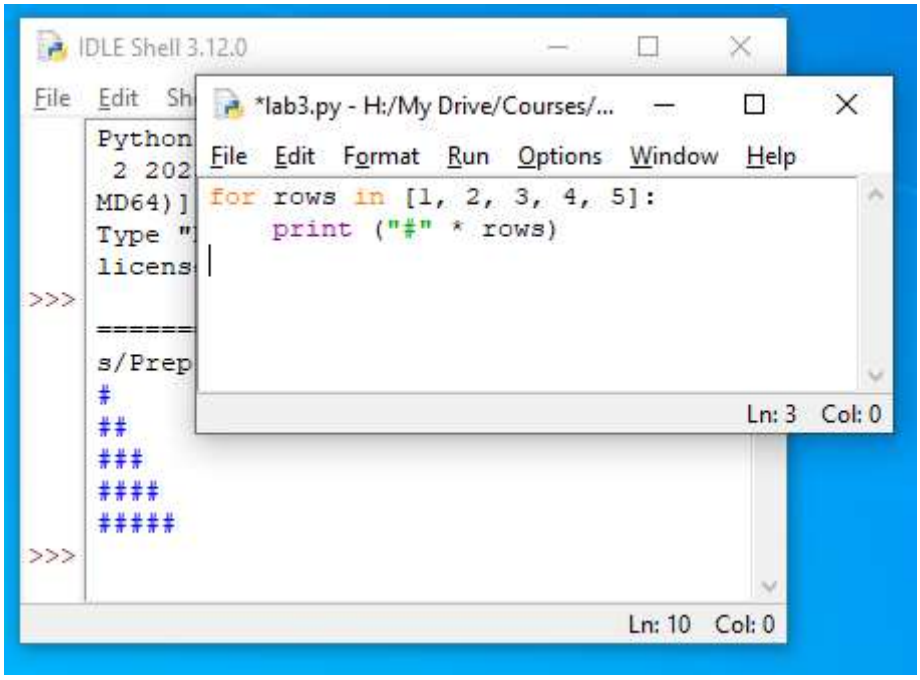
Lab 3

Overview

In this lab we will write how to write a program with repeated logic

Steps

1. From Windows start menu, Open Python IDLE
2. Go to the File menu and select "New File"
3. Copy the following program to the window



4. Go to the File menu and select "Save", and save the program at the Desktop. Please use your student-id as the name of the file, and use "py" as an extension to the program
5. Go to the Run menu and select "Run Module" and see the output shape

Exercise 1:

- **Modify the program to print a reversed triangle ?**

  #####
  ####
  ###
  ##
  #

- **Put the first program and the new one that you just wrote together to print the following shape**

  #
  ##
  ###
  ####
  #####
  #####
  ####
  ###
  ##
  #

Part 2: Range Function

The `range()` function returns a sequence of numbers, starting from 0 by default, and increments by 1 (by default), and stops before a specified number.

`range(start, stop, step)`

- **start** An integer number specifying at which position to start. Default is 0
- **stop** An integer number specifying at which position to stop (not included).
- **step** An integer number specifying the incrementation. Default is 1

Example 1: the following code will print numbers 1, 2, 3, 4, 5, 6, 7, 8, 9

```
x = range(1, 10, 1)
for n in x:
     print(n)
```

Example 2: the following code will print numbers 1, 3, 5, 7, 9

```
x = range(1, 10, 2)
for n in x:
     print(n)
```

Example 3: the following code will print numbers 5, 7, 9

```
x = range(5, 10, 2)
for n in x:
     print(n)
```

Exercise 2:

- **Modify the program you wrote in Exercise 1 to use the range function instead of writing a list of numbers in the loop definition**
- **Change the range to print a bigger triangle. For example print a big triangle of 20 rows**

Part 3: Nested Loops

A nested loop is a loop inside a loop.

The "inner loop" will be executed one time for each iteration of the "outer loop".

For example in the first program, we used a single loop and the string multiplication operator to print the shape.
Now we will modify the program to use Nested Loops. Replace the code with the one below

```
for row in range(1,6):
    line = ""
    for col in range(0,row):
        line = line + "#"
    print (line)
```

Exercise 3:

- **Modify the program you wrote in Exercise 1 to use Nested Loops instead of the string multiplication operator. The output should match this shape.**

```
#
##
###
####
#####
#####
####
###
##
#
```

Hint: you will need to write four for loops