

LECTURE 5

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WHAT IS DISCUSSED IN THE LAST CLASS

- Conditionals in python

TODAY, WE WILL LEARN ABOUT

- Loops in python
 - For-loop
 - While-loop
 - Break / Continue

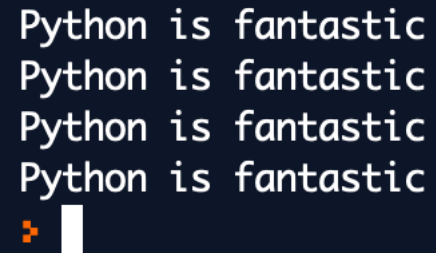
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FOR LOOPS

- To repeat the same instruction 4 times

```
for i in range(4):  
    print("Python is fantastic")
```



```
Python is fantastic  
Python is fantastic  
Python is fantastic  
Python is fantastic  
❯
```

- Sum numbers from m to n

```
def sumToM(m):  
    total = 0  
    for i in range(m+1):  
        total += i  
    return total  
  
def sumFromMToN(m, n):  
    return sumToM(n) - sumToM(m-1)  
  
print(sumFromMToN(1, 10))
```

FOR LOOPS

- Actually, for the sum from m to n, we don't need looping. We can use built-in function instead.

```
def sumFromMToN(m, n):  
    return sum(range(m, n+1))  
  
print(sumFromMToN(1, 10))
```

- Or we can use our mathematical knowledge

```
def sumToN(n):  
    return n*(n+1)//2  
  
def sumFromMToN_byFormula(m, n):  
    return (sumToN(n) - sumToN(m-1))  
  
print(sumFromMToN_byFormula(1, 10))
```


WAIT A SECOND!

- **range()** returns a range object, that is, a sequence of integers
- It is generally used to iterate over with the loop

- **range()** with a single parameter

```
for i in range(4):  
    print("i=", i)
```

```
i= 0  
i= 1  
i= 2  
i= 3  
➤
```

- **range()** with two parameters

```
for i in range(2, 4):  
    print("i=", i)
```

```
i= 2  
i= 3  
➤
```

- **range()** with three parameters

```
for i in range(1, 7, 2):  
    print("i=", i)
```

```
i= 1  
i= 3  
i= 5  
➤
```

- **range()** with the negative third parameters

```
for i in range(7, 1, -2):  
    print("i=", i)
```

```
i= 7  
i= 5  
i= 3  
➤
```

PRACTICE

- Write a function to get sum of evens from M to N

```
def sumOfEvensFromMToN(m,n):  
    if (m%2 == 1):  
        m += 1  
    return sum(range(m, n, 2))  
  
print(sumOfEvensFromMToN(1,5))
```

Change the code using **for-loop** instead of the built-in function sum

NESTED FOR LOOP

```
def nestedLoopTest(x, y):  
    for i in range(x):  
        for j in range(y):  
            print ("x=", i, "y=", j)  
  
nestedLoopTest(2,3)
```

```
x= 0 y= 0  
x= 0 y= 1  
x= 0 y= 2  
x= 1 y= 0  
x= 1 y= 1  
x= 1 y= 2  
❏
```

- The value of **i** changes from 0 to 1
- The value of **j** changes from 0 to 2
- Here, look at the sequence of change on i, j
 - **i=0** → j=0, 1, 2 and then
 - **i=1** → j=0, 1, 2

NESTED FOR LOOP

- Let's print a rectangle of asterisks

```
def printRectangle(n):  
    for i in range(n):  
        for j in range(n):  
            print("*", end="")  
            print()  
  
printRectangle(4)
```

- Practice : write a function to print a right-angled triangle shown below



TODAY, WE WILL LEARN ABOUT

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WHILE LOOPS

- Print out the left-most digit of the input number

```
def leftmostDigit(n):  
    n = abs(n)  
    while (n >= 10):  
        n = n//10  
    return n  
  
print(leftmostDigit(-4938573762))
```



- Generally, if the range is fixed, for-loop is recommended. Otherwise, you'd better use while-loop.

```
for i in range(n):  
    res += i
```

PRACTICE

- Complete the function below to get multiples of 3 or 7

```
def isMultipleOf3or7(x):  
    return ((x % 3) == 0) or ((x % 7) == 0)  
  
def getMultiplesOf3or7(n):  
    ...  
  
getMultiplesOf3or7(10);
```

3 6 7 9 12 14 15 18 21 24 ✎

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BREAK / CONTINUE STATEMENT

- Are used to alter the flow of a normal loop

- **Break**

- Terminates the loop containing it.
- The flow comes out of the loop body immediately.

- **Continue**

- Skips the rest of the code inside the loop for the current iteration only
- Loop does not terminate but continues on with next iteration

```
for n in range(200):  
    if (n % 3 == 0):  
        continue  
    elif (n == 8):  
        break  
    print(n, end=" ")  
print()
```

INFINITE WHILE WITH BREAK STATEMENT

- Loop continues unless you input the string "done"

```
def readUntilDone():
    linesEntered = 0
    while (True):
        response = input("Enter a string (or 'done' to quit): ")
        if (response == "done"):
            break
        print("  You entered: ", response)
        linesEntered += 1
    print("Bye!")
    return linesEntered

linesEntered = readUntilDone()
print("You entered", linesEntered, "lines (not counting 'done').")
```

PRACTICE CODE

- Get Prime Number

```
def isPrime(n):  
    if (n < 2):  
        return False  
    for factor in range(2,n):  
        if (n % factor == 0):  
            return False  
    return True  
  
for n in range(20):  
    if isPrime(n):  
        print(n, end=" ")  
print()
```

- Write a function to get n-th prime number

QUESTION?
