

Lecture 6 - loops

* Prayer / AMA / Quiz

I. Loop Basics

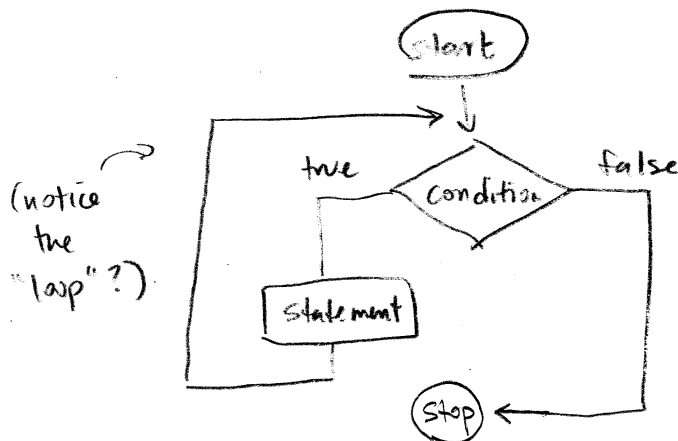
* In programming there are 3 options we have to decide how the logic of the code executes.

(1) order of execution

(2) Decisions (if statements)

(3) loops. (today!)

* Loops are simply repetitive elements of code. We find often that we want to repeat a task.



* while the condition is true, we keep repeating the task.

* Another way to think about a loop is that it is a way to get around copying and pasting over and over.

Activity

Copy and Paste Example in Excel.

II. Loop Syntax in Python

* There are two different kinds of loops in python.

let's first look at the "while" loop.

```
# start
while (condition):
```

```
    statement
```

```
    tab
```

```
# stop
```

← the statement executes
as long as condition == True.

* Example:

```
i = 0
while (i < 5):
    print(i)
    i += 1    # increment i
```

This will print: 0
1
2
3
4
(not 5!)

* Example 2

```
while (True):
    print("Forever")
```

This loop never ends!

"Pete ? Repeat"

* Not all loops have a counter (or iterator), but many do. Because of this it is convenient to have another kind of loop called a "for" loop.

```
for counter in range(N):
```

```
    statement.  
    tab.
```

← don't need
to define
counter before
the loop.

• Here, $\text{range}(N) \rightarrow 0, 1, 2, \dots, N-1$

so counter goes $0, 1, \dots, N-1$.

• This is equivalent to:

```
counter = 0
```

```
while (counter < N):  
    statement
```

* Example

```
for i in range(5):  
    print(i)
```

This will
print:

0
1
2
3
4

(not 5!)

* No infinite loops! This is
a nice feature of the for loop.

Activity Loops in Python