For Looping
Chapter 5

A companion to
An Introduction to STEM
Programming with Python
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Best way to use this video.

- Open up Python
- Pause the video and try the examples yourself.
- Modify the example to do other things
- Restart the video for the next topic.

Iteration

According to the dictionary, Iteration is:

the repetition of a sequence of computer instructions a specified number of times or until a condition is met.

https://www.merriam-webster.com/dictionary/iteration Retrieved 2018-10-05

Python has two ways to repeat blocks of code.

For Loop

- Loop through a collection of items (list, tuple, dictionary…).
- Or loop through a range of numbers.

While Loop

- Loops while a condition is true.
- Covered in future presentation..

Looping through a list

```
fruits = ["apples", "pears", "peaches"]
for z in fruits:
    print("I like to eat", z)
print("Done.")
```

```
I like to eat apples
I like to eat pears
I like to eat peaches
Done.
```

Looping through a second list

```
values = [12,45,88,22]
prod=1
for v in values:
    print(v)
    prod = prod * v
print("the product of the values is", prod)
```

```
12
45
88
22
the product of the values is 1045440
```

Looping through a Dictionary

```
inventory = {"AB56":23, "CZ88":3, "SK9": 12}
for itemid in inventory:
    print(itemid)
```

```
AB56
CZ88
SK9
```

Looping through a Dictionary - 2

```
inventory = {"AB56":23, "CZ88":3, "SK9": 12}
for itemid in inventory:
    print(itemid, "has" , inventory[itemid], 'in stock.')
```

```
AB56 has 23 in stock.
CZ88 has 3 in stock.
SK9 has 12 in stock.
```

Looping through a Dictionary - 3

```
inventory = {"AB56":[23, 5.67], "CZ88":[3, 6.23], "SK9": [12, 23.45]}
totalvalue = 0
for itemid in inventory:
    val = inventory[itemid][0] * inventory[itemid][1]
    print(itemid, "has" , inventory[itemid][0], 'in stock with a value of', val)
    totalvalue = totalvalue + val
print("with a grand total value of", totalvalue)
```

```
AB56 has 23 in stock with a value of 130.41
CZ88 has 3 in stock with a value of 18.69
SK9 has 12 in stock with a value of 281.4
with a grand total value of 430.5
```

Looping through a Simple Range

```
for n in range(4):
    print(n)
    print(n, "squared is", n**2)
```

```
0
0 squared is 0
1
1 squared is 1
2
2 squared is 4
3
3 squared is 9
```

Looping through a Range with Start and End

```
for n in range(10,20):
    print("the square root of", n, "is", n**.5)
```

```
the square root of 10 is 3.1622776601683795
the square root of 11 is 3.3166247903554
the square root of 12 is 3.4641016151377544
the square root of 13 is 3.605551275463989
the square root of 14 is 3.7416573867739413
the square root of 15 is 3.872983346207417
the square root of 16 is 4.0
the square root of 17 is 4.123105625617661
the square root of 18 is 4.242640687119285
the square root of 19 is 4.358898943540674
```

Looping through a Range with Start, End, and Step

```
tot = 0
for n in range(2,12,2):
    print(n)
    tot = tot + n
print("the total is", tot)
```

```
2
4
6
8
10
the total is 30
```

Loops inside loops

```
mos = {"Jan":31, "Feb":28, "Mar":31}
for m in mos:
    for d in range(1,mos[m]+1):
        print(m,d)
    print("----------")
```

```
Jan 1
Jan 2
...
Jan 31
----------
Feb 1
...
Feb 28
----------
Mar 1
...
Mar 31
----------
```