

# Lecture 6: While Loops

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CS 50

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# Review: for loops

- When you want some set of statements to execute repeatedly . . . once for each element in a sequence.

```
for <var> in <sequence>:
```



Code

whitespace  
matters

# What about...

- What if we wanted a program that asks the user for a number between 1 and 10 and keeps asking until the user enters a number in the range [1, 10]?
- Example run:

```
Pick a number between 1 and 10:
```

```
-10
```

```
Pick a number between 1 and 10:
```

```
50
```

```
Pick a number between 1 and 10:
```

```
7
```

```
Thanks !
```

# while loops

- When you want some set of statements to execute repeatedly . . . until some stopping criteria is met.

`while <boolean expression>:`

Code

True  
 $x < 5$   
 $(x < 0) \text{ or } (x > 1000000)$   
`not str.isdigit(x)`

whitespace  
matters

# Example 1: Using a while loop

- Define a function `get_num` that asks the user for a number between 1 and 10 and keeps asking until the user enters a number in the range [1, 10], then prints "Thanks!" and returns the requested number

```
x = get_num()  
print(x)
```

Pick a number between 1 and 10:

-10

Pick a number between 1 and 10:

50

Pick a number between 1 and 10:

7

Thanks!

7

# Exercise 1

Define a function `authenticate` that takes one argument `correct`, a string, and prompts user for a password, repeating until the correct password is entered, then prints "Login Successful" and returns the number of attempts.

```
count = authenticate("123456")
print(str(count)+" attempts")
```

Enter your password:

password

Enter your password:

abc123

Enter your password:

123456

Login Successful

3 attempts

# Exercise 2

Using an infinite loop, define a function `authenticate2` that takes one argument `correct`, a string, and prompts user for a password, repeating until the correct password is entered, then prints "Login Successful" and returns the number of attempts.

```
count = authenticate("123456")
print(str(count)+" attempts")
```

Enter your password:

password

Enter your password:

abc123

Enter your password:

123456

Login Successful

3 attempts

# Example 2: Replacing for loops

```
def pyramid(height):  
    string = ""  
    for x in range(height):  
        string = string + "*" * x + "\n"  
  
    return string
```

```
full_string = pyramid(5)  
print(3*full_string)
```