Lecture 4: For Loops

CS 51P

September 14, 2022

Last Time: Loops

Write a program that prompts user for a password, repeating until the correct password is entered, then prints "got it!"

```
pw = input("?")
while pw != "123456":
    print("incorrect")
    pw = input("?")
print("got it!")
```

Write a program that asks the user for a positive integer and then counts down from that value to 1 (all on one line!) and then prints "GO!"

```
num = int(input("?"))
s = ""
while num > 0:
    s = s + str(num)
    if num > 1:
        s = s + ", "
    num = num - 1
print(s + "\nGO!")
```

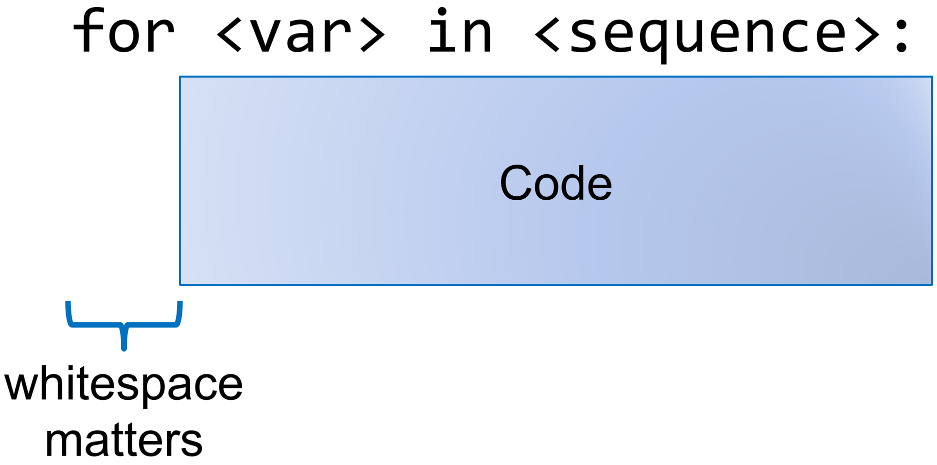
Last Time: Loops

Write a program that asks the user for a positive integer and then prints the value $1^2 + 2^2 + \cdots + n^2$

For example, if the user enters 5, it would print 55 (since 1+4+9+16+25 == 55)

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

range

- `range([start,] stop [, step])`
- generates a sequence of numbers
- to see the elements, call the function `list`

```
range(5)

range(1,10)

range(1,15,2)

range(1,15,-1)

range(10,-5,-3)
```

Exercise 1

- `range(3)`
- `range(5, 10)`
- `range(5, 0, -1)`
- `range(0,10, 2)`
- `range(10, 0, 2)`

Example: For Loops

Write a program using a for-loop that asks the user for a positive integer and then counts down from that value to 1 (all on one line!) and then prints "GO!" on the next line. For example, if the user enters 5, it should print:

```
5, 4, 3, 2, 1
GO!
```

Exercise 2

Using a `for` loop, write a program that asks the user for a positive integer and then prints the sum of the odd values between 1 and n.

For example, if the user enters 5, it would print 9 (since 1 + 3 + 5 == 9)

Strings as sequences

- Example: write a program that asks the user for a string and then prints each letter of the string on a new line

```
string?
hello
h
e
l
l
o
```

- a string is a sequence of characters!

Exercise

Write a program that asks the user for a string and then prints that string backwards.

```
string?
hello
olleh
```

Example: Nested loops

Without using multiplication, write a program that asks the user for two inputs (a width and a height) and then prints a rectangle of plus signs that is `width` across and `height` high.

```
width?
3
height?
4
+++
+++
+++
+++
```