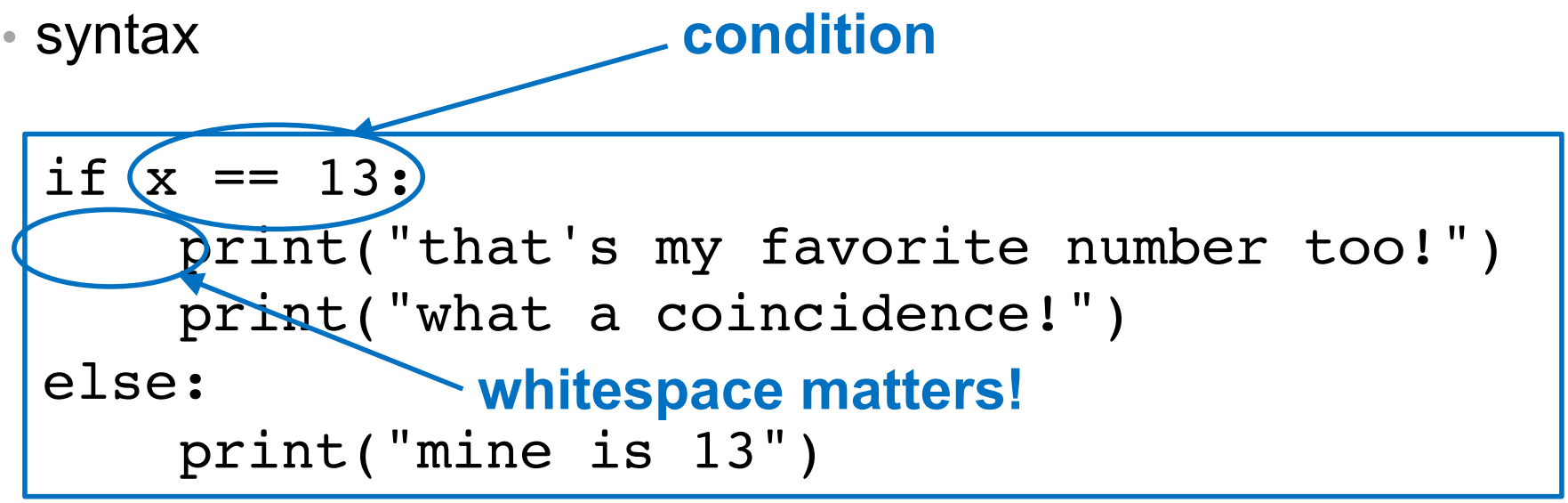
Lecture 3: For Loops

CS 51P

September 11, 2023

Review: if-statements

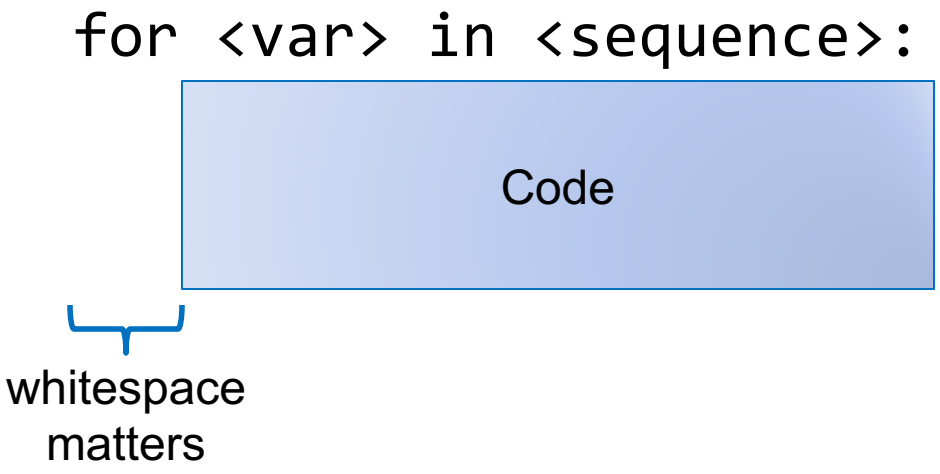
- syntax



- condition must be an expression that evaluates to True or False (type bool)

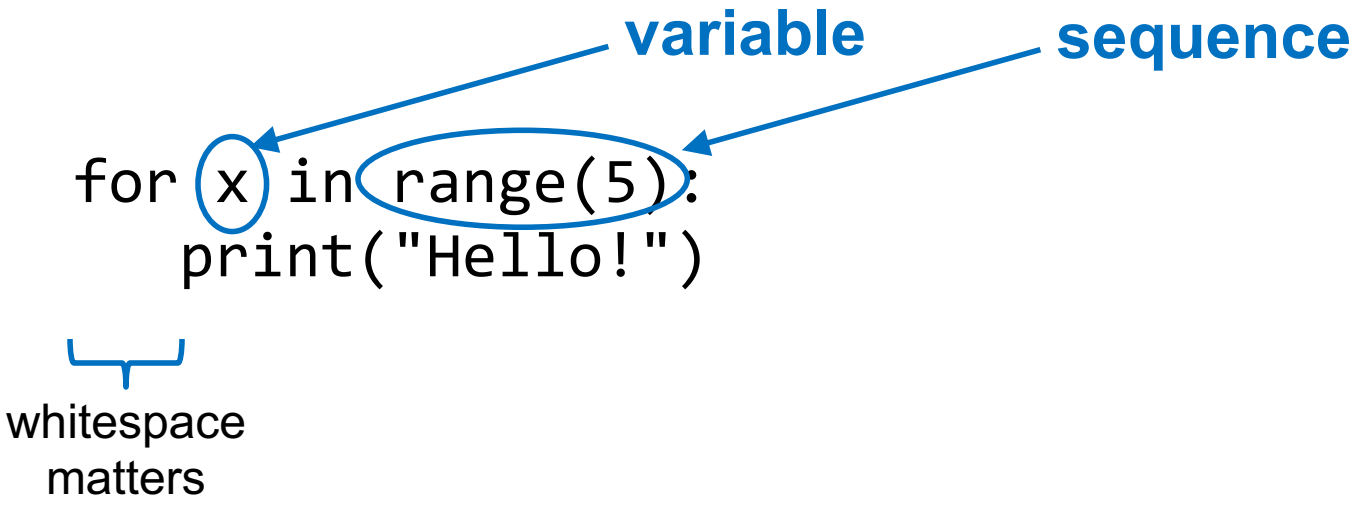
for loops

- When you want some set of statements to execute repeatedly



Example: for loops

- When you want some set of statements to execute repeatedly



Exercise 1: for loops

Using a for loop, write a program that asks the user for word and a number, then prints the word followed by ! that many times, each on its own line. For example:

```
Enter a word:
    happy
Enter a pos int:
    3
happy!
happy!
happy!
```

Updates in loops

- You can update variables inside a loop even if they are initially defined outside the loop

```
counter = 13
for x in range(5):
    counter = counter + 1
    print(counter)

print("Final: " + counter)
```

Exercise 2: loops and accumulators

Using a `for` loop and **no string duplication**, write a program that asks the user for a positive integer n and then prints a string containing n *'s.

```
Enter a pos int:
    7
*******
```

range

- `range(stop)` generates a sequence of numbers 0,…, stop-1
- the number of elements in the sequence determines the number of times the program goes through the loop

- each time through the loop, the index variable gets assigned one of the values in the sequence
- to see the elements, call the function `list`

Index variables

- Each time a program iterates through the loop, the index variable gets one of the values in the sequence

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

Exercise 3: index variables

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)

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 4: ranges

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

Exercise 3: index variables

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)

How could you modify this code to make the program work without an if statement?