CSE 8A: Intro to Programming in Python

Spring 2021

Lecture 8 - Loops (get stuck for a while)

UC San Diego

Announcement

- PA2 due tomorrow
- Discussion this week: PA3
- Useful functions for Strings (available edstem module): https://drive.google.com/file/d/1v1v6XTnlhDScF3JJxSPv3gStAC-4TU2E/view

Topics for Today: For Loops and Range

- For loops
  - Basics of a for loop
  - Product of a list of numbers
- Range
  - What is range?
  - Writing a function using for loop and range

Loops

- Allow us to repeat an action multiple times
- Normally there are two ways
  - repeat something x times (for loop)
  - repeat something until something happens (while loop)

for loop

```
for elem in ____:
  #statements to repeat
```

_____ can be a list, then `elem` is each element in the list

_____ can be a string, then `elem` is each character in the string

Example

```
for e in [8, 11, 12, 30, 100, 101]:
    print(e)
```

Exercise: For Loop Basics

What will be printed?

```
>>> for x in [4, 6, 8, 9, 10]:
           if x % 2 == 0 and x > 6:
                  print(x)
```

A)
4
6
8
9
10

B)
6
8
9
10

C)
6
8
10

D)
8
10

Exercise: For Loops with Variable Updates

What does the following function do?

```
def what_am_i(nums):
    c = 0
    for n in nums:
        c = c + 1
    return c
```

What is a better name for this function?

What is a better name for the variable c?

A) The function computes and returns the sum of all the values in the list nums

B) The function computes and returns the number of values in the list nums

C) The function computes and returns the product of all the values in the list nums

D) The function always returns zero

Exercise

What will be printed out when the code executes?

```
courses = [8, 11, 12, 30, 100, 101]
for e in courses:
    e = e + 1
print(courses)
```

A. [9, 12, 13, 31, 101, 102]
B. [8, 11, 12, 30, 100, 101]
C. courses
D. None of the above
E. I have no idea

```
courses = [8, 11, 12, 30, 100, 101]
for e in courses:
    e = e + 1
print(courses)
```

Topic: Range Basics

A special way in Python to generate a range of things

Normally we use it to generate indexes

`range(a, b[, step])`

--Generates a sequence of numbers where the ith number is

`r[i] = a + step *i   (i>=0)`

and guarantees that `r[i] < b` if `step > 0`

OR `r[i] > b` if `step < 0`

if `a` is omitted, assumes `0`. If `step` is omitted, assume `1`

Exercise

What is the generated by the following statement?

range(1, 5)

A. 1, 2, 3, 4

B. 1, 2, 3, 4, 5

C. 2, 3, 4, 5

D. None of the above

Exercise

What is the generated by the following statement?

range(1, 5, 2)

A. 1, 3, 5

B. 1, 2, 3, 4, 5

C. 1, 3

D. 1, 2, 3, 4

E. None of the above

Range Basics

Which of the following ranges produce the list `[1, 2, 3, 4, 5]`?

```
1) list(range(0, 5, 1))
2) list(range(5))
3) list(range(1, 6))
4) list(range(6))
```

A) 1 only

B) 3 only

C) 1 and 2 only

D) 3 and 4 only

You give it a try!

Write a function that takes in a list of numbers and square all the positive numbers in the list, and leave non-positive values unchanged. Return the number of elements that you have squared

```
def selective_sq(numList):
    #write your code
```

```
nums = [1, 2, 3, 4, 5, -1, -2, -3]
print(selective_sq(nums)) #prints 5
print(nums) # prints [1, 4, 9, 16, 25, -1, -2, -3]
```