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/IvIv6XTnlhDScF3JJxSPv3gStAC-4TU2E/view

Topics for Today: For Loops and Range

For loops

- Basics of a for loop
- Product of a list of numbers

Range

- Owhat 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)
```

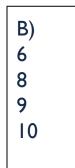
Exercise: For Loop Basics

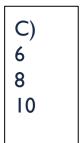
What will be printed?

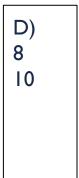
```
>>> for x in [4, 6, 8, 9, 10]:

if x % 2 == 0 and x > 6:

print(x)
```







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</pre>
```

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

Exercise

What is the generated by the following statement? range(I, 5)

- A. I, 2, 3, 4
- B. I, 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. I, 3, 5
- B. I, 2, 3, 4, 5
- C. I, 3
- D. I, 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) I only

B) 3 only

C) I and 2 only

D) 3 and 4 only

14

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]
```