

Lists and iteration

Monday, May 6, 2019 10:22 AM

Our next goal: do something with a "list" of items.

- Our first problem: compute an average of a list of numbers.

Lists

- A list in Python starts with `[`, contains elements separated by commas, and ends with `]`
- Examples
 - `[1, 2, 3]`
 - `[1, "yo", 5.7]`
 - `[1, [2, 3], 4, "five"]`
- The number of `[`'s and `]`'s must be the same.
- The contents can be any type.

Processing a list

- You may be familiar with "for `i = 1` to `n`" constructions in other languages.
- In Python, iteration is accomplished differently:

```
items = ['bicycle', 'unicycle',  
        'segway']  
for i in items:  
    print(i)
```
- This prints
 - `bicycle`
 - `unicycle`
 - `segway`
- The variable `i` is set to each value of the list, in turn,

and then the print statement is executed with `i` set to that value.

- You can also dispense with the variable `items` and instead write:

```
for i in ['bicycle', 'unicycle',  
         'segway']:  
    print(i)
```

with exactly the same result!

Computing a sum

- Consider

```
items = [1, 6, 5, 2]  
sum = 0  
for i in items:  
    sum = sum + i
```

- After this code, `sum` is the sum of the list items.
- The syntax:

```
sum = sum + i
```

adds the current value of `i` to the current value of `sum`.

- Thus, this code is equivalent to the code:

```
sum = 0  
sum = sum + 1  
sum = sum + 6  
sum = sum + 5  
sum = sum + 2
```

So, how do we compute an average?

- We need another function.
- For a list called `items`:

- `len(items)` is the number of elements in the list.
- Thus, we can write:

```
items = [1, 6, 5, 2]
sum = 0
for i in items:
    sum = sum + i
average = sum / len(items)
print(average)
```

and the result is what we would expect: $(1+6+5+2)/4$
= 3.5