Announcements

MPL Assignment 6 (Lists) - due on Thursday, Nov. 6th by 11:59pm
(I highly encourage you to do it before your midterm for extra practice)

Program 6 has been assigned - due on Sunday, Nov. 9th by 11:55pm

Next Week:
   Monday: Review of Strings and Lists
   Wednesday: Midterm 2
   Friday: More on Lists

Practice from Last Time

Get the file Oct29.py from my Public directory. It has the main function written for you and stubs for 2 other functions that you will need to write.

findAverage(numbers) – will return the average of all the numbers in the list

countNumbers(numbers, average) - will return 2 values; it counts the number of above average and below average numbers in a list

Finding Items in Lists with the in Operator

- You can use the in operator to determine whether an item is contained in a list
  - General format: item in list
  - Returns True if the item is in the list, or False if it is not in the list
- Similarly you can use the not in operator to determine whether an item is not in a list
Example Using `in` Operator

```python
# This program demonstrates the in operator
# used with a list.

def main():
    # Create a list of product numbers.
    prod_num = ['659', '8957', 'q143', 'z688']
    # Get a product number to search for.
    search = input('Enter a product number: ')  
    # Determine whether the product number is in the list.
    if search in prod_num:
        print ('was found in the list.')
    else:
        print ('was not found in the list.')

main()
```

Example Using Append

```python
def main():
    infile = open ('randomNums.txt', 'r')
    numbers = []
    for line in infile:
        numbers.append (int (line))
    print (numbers)

main()
```

Output:

[62, 57, 35, 27, 45, 44, 46, 68, 86, 27, 88, 33, 11, 61, 64, 45, 56, 9, 31, 32, 56, 63, 24, 26, 100, 95, 62, 10, 87, 58, 69, 54, 75, 51, 22, 93, 82, 16, 92, 49, 6, 71, 85, 59, 56, 22, 3, 50, 1, 20, 54, 18, 27, 78, 17, 7, 41, 83, 92, 38, 5, 54, 60, 92, 15, 26, 57, 39, 80, 41, 67, 56, 24, 77, 28, 90, 24, 72, 2, 46, 75, 53, 58, 47, 50, 18, 40, 65, 24, 58, 4, 58, 81, 40, 6, 77, 85, 86, 68, 63]

List Methods and Useful Built-in Functions

- **append(item)**: used to add items to a list — item is appended to the end of the existing list

- **index(item)**: used to determine where an item is located in a list
  - Returns the index of the first element in the list containing item
  - Raises ValueError exception if item not in the list

- **insert(index, item)**: used to insert item at position index in the list

- **sort()**: used to sort the elements of the list in ascending order

- **remove(item)**: removes the first occurrence of item in the list

- **reverse()**: reverses the order of the elements in the list
List Methods and Useful Built-in Functions (cont’d.)

- **del statement**: removes an element from a specific index in a list
  - General format: `del list[i]`

- **min and max functions**: built-in functions that returns the item that has the lowest or highest value in a sequence
  - The sequence is passed as an argument

- **sum function**: built-in functions that returns the total of all the values in a sequence
  - The sequence is passed as an argument
Example Using del, min, max, and sum functions

```python
my_list = [5, 4, 3, 2, 50, 40, 30]
del my_list[2]
print("Before Deletion:", my_list)
print("After Deletion:", my_list)

alpha_list = ['a', 'b', 'c', 'd']
print("The lowest value is", min(alpha_list))
print("The lowest value is", max(alpha_list))

# You cannot take the sum of a list that has strings in it
```

Output:
Before Deletion: [5, 4, 3, 2, 50, 40, 30]
After Deletion: [5, 4, 3, 2, 50, 40, 30]
The lowest value is a
The highest value is d

Copying Lists

- To make a copy of a list you must copy each element of the list
  - Two methods to do this:
    - Creating a new empty list and using a for loop to add a copy of each element from the original list to the new list
    - Creating a new empty list and concatenating the old list to the new empty list

Copying Lists (cont’d.)

```python
list1 = [1, 2, 3, 4]
list2 = list1

Output
List 1: [1, 2, 3, 4]
List 2: [1, 2, 3, 4]
```

Code to Copy List

```python
list1 = [1, 2, 3, 4]
list2 = []
for item in list1:
    list2.append(item)
print("List 1:", list1)
print("List 2:", list2)
list1[0] = 99
print("List 1:", list1)
print("List 2:", list2)
```

Output:
List 1: [1, 2, 3, 4]
List 2: [1, 2, 3, 4]
List 1: [99, 2, 3, 4]
List 2: [99, 2, 3, 4]
Practice

Write a program that randomly generates 20 integers between 1 and 50, and stores them in a list. Print out the lowest and the highest numbers in your list, as well as the sum of all the numbers in the list.

Next Time

Review of Strings & Lists