Lists in Python – Info and Practice

- **Lists in Python are used to store collections of items. Those items might be strings, integers, other lists or many different things.**
- **Each item in the list has an assigned index value (identifying its location in the list).**
- **Lists are enclosed in [ ]. In other words, ALL the items in the list are found inside the [ ].**
- **Each item in a list is separated by a comma.**
- **Lists are created using a list of values which are separated by commas with square brackets around the list of values.**

Examples of creating a list:

```
myList = []      # creates an empty list
myFruits = ['apple','banana','orange']    # creates list with 3 items
myPrimes = [2,3,5,7,11]  # creates a list with 5 items
```

Strings are immutable (can't be changed directly by storing a new value in the middle of the string) but lists ARE mutable meaning they can be changed. Stop and think about that for a moment. Remember how the .replace() method for STRINGS did not change the string itself? In Lists we CAN directly change an item in the list.

Functions and methods that work with lists:

- len returns the number of items in the list
- .append(x) adds item x to the end of the list
- .insert(a,b) inserts item b at position a
- .remove(a) removes item a from the list (NOT THE ITEM AT POSITION a)
- .extend(c) appends list c to the end of the current list
- .reverse() reverses the order of the items in the list
- sorted(a) returns a new list which contains the elements of list a in sorted order. List a is unchanged. NOTE: This is used differently than the methods above. See examples below.

One final handy method that applies to **strings**:

.split(c) This will take a **string** and return a **list** where the string was "split" at each occurrence of c.

Example: Use the following code and then print the contents of the list myWords.

```
mySentence = "This really fun"
myWords = mySentence.split(" ")    # there's a space between the quotes
```

['This', 'really', 'fun']

Examples: Read each example and then enter it into IDLE. After each line, print the contents of the list or the value in the variable to see what the method did. **Write the contents of myFriends on the paper after each line of code is executed.**

```
myFriends = ['Andy','Betty','Carol','Don','Emily']
myFriends.append('Charlie')
myFriends.insert(2,'Creepy')
myFriends.remove('Don')
myFriends.reverse()
print(sorted(myFriends))    # print myFriends after this --was  it changed?
```

['Andy', 'Betty', 'Carol', 'Don', 'Emily', 'Charlie']

['Andy', 'Betty', 'Creepy', 'Carol', 'Don', 'Emily', 'Charlie']

['Andy', 'Betty', 'Creepy', 'Carol', 'Emily', 'Charlie']

['Charlie', 'Emily', 'Carol', 'Creepy', 'Betty', 'Andy']

['Andy', 'Betty', 'Carol', 'Charlie', 'Creepy', 'Emily']

It was not changed.

Accessing individual list elements and partial lists:

- Done in the same way as strings. Initialize a list called mylist and try printing different parts of the list using the following formats. (Remember, start and end will be numbers)
  - mylist[start:end]
  - mylist[start:]
  - mylist[:end]
  - mylist[:]
  - mylist[start:end:step]
- Start or end may be a negative number – counts from the end instead of the beginning. Try printing these:
  - mylist[-1] last item in the list
  - mylist[-5:] last 5 items in the list

Using loops to process lists: (type in some examples and practice using these structures)

- Going through the list and printing each item:

```
for x in mylist:
   print x
```

- Add the user's input to the end of the list

```
for k in range(0,10):
    userInput = input('Please enter your stuff')
    mylist.append(userInput)
```

- Find the sum of all items in a list (assuming the list is a list of numbers)

```
sum = 0
for x in mylist:
      sum = sum + x
```

You can use the keyword "in" to see if an item is in the list

Example:

```
if "Fred" in myFriends:
      print('I have a friend named Fred')
```

Other list methods:

- mylist.pop #removes the last item in the list
- mylist.count(a) #returns the number of instances that a is found in mylist

Practice Questions: (Not graded – but do these before attempting the assignments this week. Really. It will help you complete the assignments quickly.)

1. Does remove() take out **all** the instances of the item you're removing or just the first one? Test this with the following code:

```
myWords = ['Hi','Goat','Hi','Bye']
print(myWords)
myWords.remove('Hi')
print(myWords)
```

Just the first instance.

2. Does sorted change the original list? Enter the following code to find out.

```
mystuff = ['Fun','Boat','Elephant','Goat']
mynewstuff = sorted(mystuff)
print(mynewstuff)
print(mystuff)
```

It does not change the original.

3. Suppose myGoats is a List defined below. Write the line(s) of coded needed to print the string found at the 5th location of the list called myGoats. Be careful….the index of the 5th location is not 5!!

```
myGoats = ['Harry','Barry','Billy','Susie','Fred','Joe']
```

print(myGoats[4])

4. Write the lines of code that will print all the items in the list myGoats, one per line.

```
for goat in myGoats:
    print(goat)
```

5. Write the line(s) of code that will take a sentence entered by the user and store the words in a list. For example, if the user enters "I love python" the resulting list should be ["I","love","python"]

```
text = input('Enter a sentence')
uList = text.split()
```