CSC180 Bonus Lab 1

Fall 2013

How to report your solution

Finish this in the lab and **SHOW** your work to the TA **BEFORE** leaving the lab.

Expected files

1. `bonus_1_AB.py`
2. `bonus_1_C.py`

The list type is a container that holds a number of objects, in a given order. The list type implements the sequence protocol. Lists allow you to add and remove objects from the sequence, and can also be iterated over in a very simple manner.

For this lab, you will do some exercise in creating, accessing and modifying lists in part A and part B. Then in part C, you will use the operations you have practiced to write real programs to solve some actual problems.

Part A

For this part of the exercise, you will practice the basic ways of creating and accessing lists.

First of all, create a file named `bonus_1_AB.py`, write code to accomplish the following 5 tasks. Note: You may want to add some comments with task number for each task so that it is easier for the TA to verify your work.

1. Create a list named "*shopping_list*" with 6 items in it. Name the 6 items as you fid fit, for example "TV".
2. Print out the count of the items in the list by using the "*len*" list method. In this case, you should see 6 (of course) in the printout.
3. Print out the 3rd item in the list. Remember, index starts from 0 not 1.
4. Print out the last item in the list. You have two options to do this. Try both.
   - Option 1: use the count that you got in task 2 above, minus it by 1 and use it as index.
   - Option 2: you should know that if you pass in a negative index, Python adds the length of the list to the index, so try passing in -1 as the index and see if you can get the last item.
5. Use a loop to print out all the items in the list.

To verify if you have done the work correctly, run `bonus_1_AB.py` and see if the result is the same as what you expect.

In addition, you should know that accessing an index which does not exist generates an exception (an error). In the example above, try passing in a number which is equal to or greater than 6 as the index and observe Python's behavior. Note: you do not need to keep this extra code in `bonus_1_AB.py` because it generates exception, just try it and then delete it.

Part B

For this part of the exercise, you will practice the basic ways of modifying lists.

This is a continuation of part A, you will continue to add code to `bonus_1_AB.py`. Now do the following tasks:

1. Add an item to the end of the list by using the "*append*" list method. Then use a loop to print out all the items in the list.
2. Add an item after the 3rd item in the list by using the "*insert*" list method. Then use a loop to print out all the items in the list to verify your insertion.
3. Create another list (name it *additional_list*) with 3 items. Add all the items in *additional_list* to *shopping_list by using "extend"* list method. Then use a loop to print out all the items in *shopping_list*.
4. Sort *shopping_list* by using the "*sort*" list method. Then use a loop to print out all the items in the list.
5. Operations that modify the list will modify it in place. This means that if you have multiple variables that point to the same list, all variables will be updated at the same time. Now, create variable *shopping_list_2* and point it to the same list as *shopping_list*. Add a new item to *shopping_list_2*, then print *shopping_list* and see if this newly added item is there or not. It should be there.

Part C

For this part of the exercise, you will use the operations you have practiced previously to write some functions to solve some real problems.

First, create a file named `bonus_1_C.py`, and add the following code to it:

```
marks = [78, 81, 45, 91, 85, 79, 63, 86, 67, 96, 52, 60,
81, 83, 65, 71, 90]

def get_average(marks):
    pass  # Replace "pass" with your logic here.

def get_medium(marks):
    pass  # Replace "pass" with your logic here.

print(get_average(marks))
print(get_medium(marks))
```

As you can see, a list named *marks* has been created for you. Consider it a list of final mark for each student of CSC180. Now what you need to do is to help the professor to do some statistics. Implement the 3 functions that have been defined for you.

1. get_average(…)
   Take in a list of integers. Return the average mark of all students.
2. get_medium(…)
   Take in a list of integers. Return the medium mark.

Note: medium mark means the one that is in the middle. For example: if there are 7 students, the 4^{th} highest is the medium. But if the total number of students is an even number, for example 10, then take the 5^{th} highest instead of 6^{th}.

That's it! Hope you enjoyed it. Show your work to the TA and get your bonus 1% mark.