

CS 101

HANDOUT 6: LISTS

1. LISTS (CONTINUED)

Lists are data structures. The List data structure is built-in in Python and can be used to store objects together in a certain order. The data in Lists are usually of the same type like integers or strings but Python allows also for data of different types to be stored in the same list. This is very different from other programming languages like Java where there is a data structure called array but doesn't allow for different data types to be stored in the same array.

2. LIST SYNTAX

We use square brackets `[]` to define a list, with commas to separate the items. An empty list can be defined as `aList=[]`.

Because lists are ordered, we can index the items the same way we can index characters in a string.

3. LIST INDEXING

Indexing starts with index 0, then index 1 and so on and each item in the list has a unique index.
`aList = [elem1, elem2, elem3,...,elemN]`
`aList[0]` is elem1, `aList[1]` is elem2,...,`aList[N-1]` is elemN
`len(aList)` is N
`aList[-1]` is elemN, `aList[-2]` is elem(N-1) and so on

4. LIST OPERATIONS

List Concatenation: `[1,2]+[3,4]` is becoming `[1,2,3,4]`
List Assignment: Lists are mutable (unlike strings) and we can assign elements directly:

```
aList = [1,2,3,4]
aList[1]=5
aList will be [1,5,3,4]
```

Make sure to assign only at indices that are defined for the list.

List Insertion: We can also insert an element at index i with the `insert(index,element)` function. For example:

```
aList=[1,2,3,4]
aList.insert(0,0)
aList will be [0,1,2,3,4]
```

List Removal: We can remove an element from the list at index i with the `pop` function.

```
aList=[1,2,3,4]
poppedElement = aList.pop(0)
aList will be [2,3,4]
```

HOMEWORK

- Create a new Python script file that you will name *CS101_Homework6.py*. Save this file in a folder on your computer where you will keep all your homework assignments.
- When finished, upload your file in Google Classroom using the Homework 8 assignment link. Don't forget to add comments at the beginning of each task and throughout your code for clarity.

1. Create and print out a list with all the positive odd numbers up to 100
2. Given an integer list, remove all elements that are divisible by 7.
3. Given two lists, create a list with the elements that are in both lists
- *4. Given an integer list, return the minimum and maximum values in the list (do not use python's built-in max and min functions)