CPSC 111BV

Topics Lists

Learning outcomes

At the end of this course, a student is expected to:

* Create (design), analyze, and explain the behavior of simple algorithms:
* Solve problems by designing simple algorithms, e.g., basic calculations, searching in strings and **lists**, etc…
* Create (design) small to medium size programs using Python:
* Create programs that search or construct **lists** and strings
* Create programs that modify **lists** in-place
* Use Python's data types appropriately:
* Compare and contrast mutable and immutable data types (**lists** vs. strings, numeric values)

# Another data type in Python: List

• Let’s have a look at some examples and then see if we can come up with a definition of what a List is:

**prices = [1.20, 0.75, 4.50]**  **names = ["Marlin", "Jason", "Kuan"] somePrimes = [1, 3, 5, 7, 11, 13]**  **underTheBed = [3, "old socks"]**

# List

* Definition: Sequence of values

* Versatile data type
* Can contains elements of different data types

* Each element is accessed by [index] – like a string
* Index from [0]..[len-1] – like a string
* Dynamic length (can shrink or expand)

Create a list

uniRec = ['phys','chem','math',2012,2014,2015]

Access a list

uniRec = ['phys','chem','math',2012,2014,2015]

•To access the whole list ->

# Indexing a list

•To access each element of list ->

**positive indexing -> index: 0 1 2 3 4 5**

uniRec = ['phys','chem','math',2012,2014,2015]

**negative indexing -> index: -6 -5 -4 -3 -2 -1**

* When index out of bound -> error 9
* IndexError: list index out of range

# Slicing a list

uniRec = ['phys','chem','math',2012,2014,2015]

* When slice out of bound -> empty list

Lists are mutable!

* What does this mean?
* It means that we can modify a part of a list

* Please, see the lecture notes called

Mutable [versus](http://www.cs.sfu.ca/CourseCentral/120/alavergn/CourseMaterial/Week6/17-Mutable_vs_Immutable.pdf) Immutable

In these notes, we illustrate what “mutable” and “immutable” mean

# Summary: List (sequence) manipulation

|  |  |  |
| --- | --- | --- |
| **Operation**  **Name** | **Operator/ function** | **Comment** |
|  |  |  |
| concatenation | + | Combine lists together |
| repetition | \* | Concatenate a list that is being repeated a number of times |
| indexing | [n] | Access an element of a list |
| slicing | [ : ] | Extract a part of a list |
| length | len( ) | Determine the number of elements in a list |

http://www.tutorialspoint.com/python/python\_lists.htm

# Built-in functions and methods for list

• Can be found at this [web site](http://www.tutorialspoint.com/python/python_lists.htm)