

Python for Economics

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Morning Session, 9/17/2021

Table of Contents

This course is divided into numbered Lessons

9. Lists
10. Dictionaries
11. Classes
12. Arrays
 - Some reminders
 - Lunch
 - (more Lessons after Lunch)

Lesson 9

Lists

Your first data structure in Python

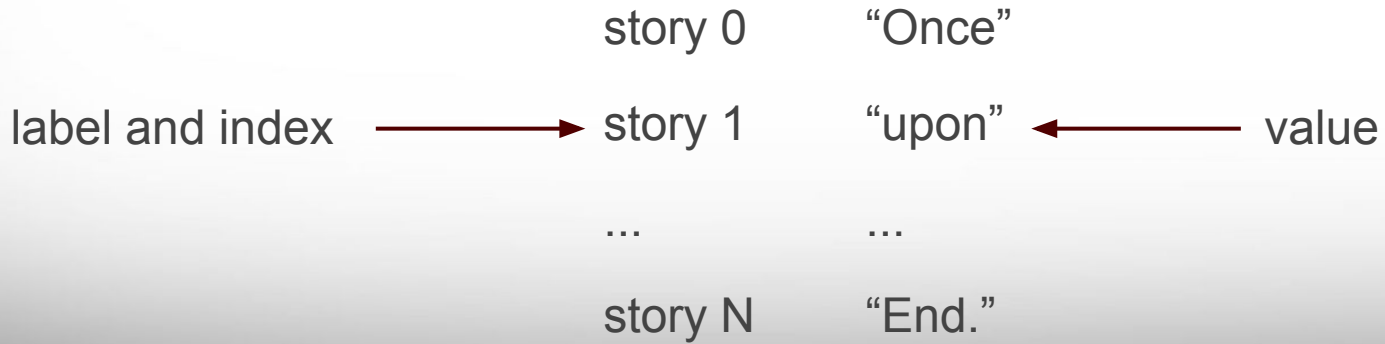
Lesson Learning Objectives

- Understand List properties (Length, Index, Slice)
- Use Membership test “in” as a condition
- Use Strings and Lists with Loops
- Practice some List and String manipulation methods

Lesson Primer

Data structure means applying a label scheme to a group of data elements.

(Imagine naming all these variables by hand!)



Assignment “String Index”

Let us get some practice with this “index” concept using a familiar data type: *strings*.

Go to classroom assignment Lesson 9 “String Index”

Tasks:

- Read and Try the Examples
- Practice with the concepts *index* and *slice*

Assignment “List properties”

The first *data structure* you learn today is the **List**.

Go to classroom assignment Lesson 9 “List Properties”

Tasks:

- Read and Try the Examples
- Lecture: data structure with lists
- Exercise: practice length and index
- Exercise: practice creating and modifying lists

Break Time

10 minutes break. Lesson 9 continues at 10:00am



Lesson 9

Lists

(continued)

Assignment “List logic”

Go to classroom assignment Lesson 9 “List logic”

Tasks:

- Read and Try the Examples
- Exercise: practice using strings and lists with conditionals

Lesson Primer

We have previously seen the `for` loop used with fixed integer counting.

```
for x in range(99):  
    print(x)
```

The `for` loop is powerful: we can replace the fixed integer counting with a *list*.

```
for x in list:  
    print(x)
```

Assignment “List loops”

Go to classroom assignment Lesson 9 “List loops”

Tasks:

- Read and Try the Examples
- Exercise: use `for` loops with lists and strings
- Exercise: use `for` loops with multiple variables
- Exercise: using List comprehension to simplify loops

Homework “Lists and Strings”

Extra practice with Lists and Strings assigned as homework.
Reminder: All homework assignments are **mandatory**.

- Assignment “Lists and Strings”
 - Lecture and Exercise

Lesson 10

Dictionaries

What if Lists had *non-numeric* indices?

Lesson Learning Objectives

- Understand keys and values
- Create dictionaries
- Retrieve data from dictionaries

Lesson Primer

Compare Lists and Dictionaries.

- Lists have an index (integer):

```
story[0]="Once"
```

- Dictionaries have *keys* (any data type).

```
story["first"]="Once"
```


Assignment “Dictionaries demo”

Go to classroom assignment Lesson 10 “Dictionaries demo”

Tasks:

- Read and Try the Examples
- Familiarize

Homework

Extra practice with Dictionaries assigned as homework.

- Assignment “National Economic Data”
 - Preparation for day 3 lessons (**due** by 9/23 11:59 PM)

Lesson 11

Classes

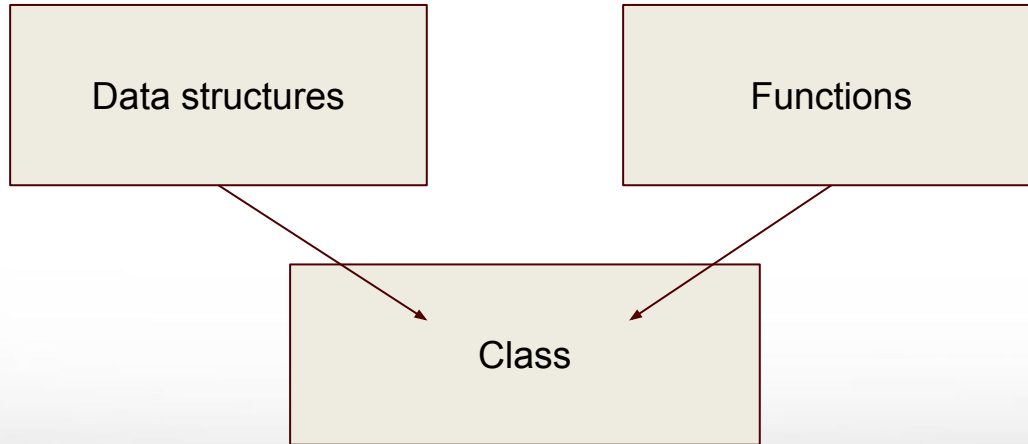
The general solution to complex data structuring

Lesson Learning Objectives

- Recognize classes vs object instances
- Define some simple classes

Lesson Primer

Our powers combined!



Assignment “Classes demo”

Go to classroom assignment Lesson 11 “Classes demo”

Tasks:

- Read and Try the Examples
- Familiarize

Classes Homework

Extra practice with Classes assigned as homework.

Assignment “Talking Cats”

- Fun Activity (**due** by 9/23 11:59 PM)

Break Time

10 minutes break. Lesson 9 continues at 11:00am



Lesson 12

Arrays

A more powerful data structure from the NumPy module

Lesson Learning Objectives

- Compare Numpy arrays to Lists: dimensions, indices, slicing
- Import data from files into arrays
- Perform array operations, such as arithmetic
- Filter arrays with conditionals

Assignment “Array basics”

Go to classroom assignment Lesson 12 “Array basics”

Tasks

- Read and try the examples
- Exercise: create and inspect arrays
- Exercise: read data from file into an array

Lesson Primer

Lists don't have many built-in methods for interacting with data.

Numpy Array supports common operations, such as arithmetic.

Example:

```
array C = array A + array B
```

means: add the elements of A and B pair-wise.

Assignment “Array Operations”

Go to classroom assignment Lesson 12 “Array Operations”

Tasks

- Read and try the examples
- Exercise: use array operations to process data efficiently
- Exercise: use mask to filter data

Homework on Arrays

Learning check with Numpy Arrays assigned as Homework.

- Assignment “Quiz” (**due** by 9/23 11:59 PM)

Some Reminders

Don't forget to Turn in your assignments!

Morning session in-class assignments are **due** now

Summary of Homework Assignments

- Lesson 9: “Lists and Strings”
- Lesson 10: “National Economic Data”
- Lesson 11: “Talking Cats”
- Lesson 12: “Array Quiz”

Please complete your homework before class next Friday 9/24.

Office Hours

Please come to our office hours for assistance

- M 10 - 11 am Blocker 219B
- T 10 - 11 am (on Zoom only)
- W 2 - 4:30 pm Blocker 219B
- R 2 - 3 pm Blocker 219B

Please join our slack channel for discussion

- **Workspace** sweeterworkspace.slack.com
- **Channel** `hprc-econ-fall-21` (private channel)

Lunch Time break reminder slide

Lunch time from 12 pm - 1 pm

We will return to continue with Lesson 13

