Chapter 5

Dictionaries, Numpy and Files

Learning Objectives

- Lists
- Dictionaries
- Numpy
- Files

5.1 Data structures

As we have discussed before, as a programmer you need a firm grasp on the data you are handling. You have already started working with some meta-data, data about data. A list, for example, is data in a certain order, there is a first element and a last (if it isn't empty).

We are "skipping" the section about tuples (5.2), not because they are not useful, but because we are limited in time. I highly recommend you go back to this chapter when you have time (maybe after your exams?)

In section 5.3 (p110) you'll learn more about lists. In section 5.4 you'll learn about dictionaries, a dictionary is a collection of *key*: *value*-pairs. Make sure you are comfortable with these data-structures you will use them a lot.

5.2 Virtual environments

You have started using some modules from the standard library. Today you'll start to use modules that are not available in the standard library. Installing modules requires some extra rights and carries some risk. A way to organize these modules, mitigate the risks and get around installation permissions is to use a virtual environment.

A virtual environment is somewhat like a computer within the computer[1]. You can install whatever you like, use a bleeding-edge not yet released (unstable) version of a module or even of python, without effecting your "normal" system. When you need to share your code with someone you can share the instructions to setup the virtual environment. That way everyone can work using the same context. Of course "everyone" includes you on a multiple computers.

Virtual environments aren't without overhead cost. You should definitely be working in a virtual environment, but don't create one for every file. Typically you would create a virtual environment for every project you work on. It makes sense to see all of the assignments from the book and the additional assignments from this document as one big project or as a project per week, as we have been doing.

[1] You could take this a step further and create a virtual machine which has a simulated CPU, motherboard, etc. That would be overkill for this purpose though.

5.3 Homework

Reading

- Section 5.3: Lists (page 110)
- Section 5.4: Dictionaries (it might be helpful to look at 5.2: Tuples since some concepts from that section are expanded upon)
- *(Optional)* Chapter 6: Numpy
- Chapter 7: Files

Assignments

1. 5.3.23
2. 5.4.6
3. *(Optional)* 6.8
4. 7.10

Backlog

Go back to this when you have time, it is important but we also have to cover some ground.

1. Chapter 4: Functions (from 4.10 on)
2. Section 5.2: Tuples