



Introduction to Computation for the Social Sciences

Assignment 2

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Please solve the exercises below and commit your solutions to our GitHub Classroom until Nov, 12th midnight. Submit all your code in one executable file (*py* / *ipynb*) and your text in one text file (*txt* / *md* / *pdf*). You can score up to 10 points in this assignment. You will get individual feedback in your repository.

Exercise 1: Update GitHub Repository

a) Fetch Feedback from Origin

On your local machine, open your command line and navigate inside your repository. If you are in the right place, then fetch and merge from the remote origin of your repository.

If everything worked correctly, then you should find now a feedback file inside your *assignment01* folder.

b) Add Remote on Assignment Repository

Throughout the semester, we will make the materials available in the teacher-maintained repository. Inside the repository on your local machine, please run the following command:

```
git remote add assignments git@github.com:css-konstanz/icss-assignments.git
```

This will create a remote on our repository and allow you to get the new assignments conveniently. If you cannot access this repository, then please send us your university email and GitHub username so that we grant you access permissions.

c) Get Assignment 2

Fetch and merge from the new remote assignments of your repository.

If everything worked correctly, then you should find the folder *assignment02* including your new assignment now.

Exercise 2: Python Basics

a) Complete Course “Introduction to Python”

Complete the course “Introduction to Python” in the *PyCharm Edu IDE*^[1].

b) Give Feedback

In your existing Git Repo, navigate to *assignment02 > solution*. There, create a file in which you describe challenges and problems you encountered while completing the course. If you could complete the course without problems, you can leave the file empty.

Exercise 3: Theoretical Questions

Answer the following questions about the principles of number coding that you learned in the lecture.

- a) Explain the principle of coding integer valued numbers using individual bits. Illustrate the principle by showing the representation of 17 in 8-bit binary notation.
- b) Explain the general idea of representing numbers with decimal places in binary notation. What problem arises for the coding of fractions like 0.1 in this notation?
- c) In the lecture, we also discussed IEEE 754 encoding for floating point numbers. Show the corresponding representation of 17.1 using simple precision.

Exercise 4: Lambda Functions

Python supports lambda functions as a handy way to define small, anonymous, i.e. unnamed, functions inline. The basic syntax for lambda functions is:

lambda parameter1, parameter2, ... : **expression**

Use a lambda function to only retain the even values in an array of integers. Test your function with an input array of your choosing. Print the input array and the filtered output array to stdout.

Exercise 5: List Comprehension

Python supports list comprehensions. The basic syntax of list comprehensions is:

L = [**<elem>** for **<elem>** **<Condition>**]

Use list comprehensions to write a Python function `remove_long_words()` that:

- accepts a sentence `s` and an integer `n` as input parameters
- uses the `split()` function of String objects to split the sentence into words
- stores the individual words in a list
- removes all words that are longer than `n` characters from the list, thereby creating a new list
- prints the new list to stdout

[1] <https://www.jetbrains.com/education/>