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Tutorial 1: Introduction to Python

Assignment 1-1   *Installing Python*

Visit the website https://www.anaconda.com/download/ and download the Anaconda distribution for the Python 3.7 version. Make yourself familiar with the jupyter Python notebook which is included in the anaconda installation. If preferred, install also an IDE/editor of your choice. Please make sure to have a python setup up and running for the future tutorials.

Assignment 1-2   *Lists*

Create a list which contains all numbers from 0 to 10.

Assignment 1-3   *Loops and conditionals*

Using the created list from assignment 1-2, print each element of the created list if it is an odd number, by using a loop and conditionals. Try using different type of loops.

Assignment 1-4   *List Comprehensions*

Now generate a list which contains all numbers from 0 to n which have been squared using list comprehensions.

Assignment 1-5   *Functions*

Write a **function** which takes an integer n. The function first creates a list of numbers from 0 to n. Then square each number of the list. Further each of the squared numbers is tested if it is odd. All odd numbers are then appended to a new list. The function returns the list of odd (squared) numbers.

Assignment 1-6   *Assignments*

Given a list $a = ['I','like','cookies']$ and another list $b = a$. Replace in the list b the word $'cookies'$ with $'apples'$. Finally print both lists (a and b). What do you observe? What leads to the observed behavior?

Assignment 1-7   *Shallow Copy I*

Given a list $a = ['I','like','cookies']$ and another list which takes a shallow copy of a, $b = a[:]$. Like in the previous assignment 1-6, replace in the list b the word $'cookies'$ with $'apples'$. Finally print both lists (a and b). What do you observe now?

Assignment 1-8 *Shallow Copy II*

Now we are given a list $a = ['I','like',['chocolate','cookies']]$ and another list which takes a shallow copy of a, $b = a[:]$. Change now the word $'cookies'$ with $'apples'$ in b. Now print again both lists (a and b). What do you observe? What leads to the observed behavior?

Assignment 1-9 *Deep Copy*

Like in the previous assignment, we are given a list $a = ['I','like',['chocolate','cookies']]$. Another list $b = deepcopy(a)$ takes this time a deep copy from a. Change now the word $'cookies'$ with $'apples'$ in b. Print both lists (a and b). What do you observe now?
*Hint: For deep copy, first type: **from** copy **import** deepcopy.*

Assignment 1-10 *Dictionaries I*

Create a dictionary with n entries, where the keys are enumerated from 0 to $n - 1$ and the values are their corresponding keys squared. Use list comprehensions.
Example for expected result: $n = 7$; $\{0 : 0, 1 : 1, 2 : 4, 3 : 9, 4 : 16, 5 : 25, 6 : 36\}$

Assignment 1-11 *Dictionaries II*

Use the dictionary from the previous assignment. Write a **list comprehension** to get a list of all the keys of the dictionary.

Assignment 1-12 *Lambda functions*

Write a list comprehension which takes a number n and returns a list with even numbers, using a lambda function.

Assignment 1-13 *map*

First write a function which takes a length in inch and returns a length in cm. Given a list l with lengths in inches:
$l = [4, 4.5, 5, 5.5, 6, 7]$
Write a list comprehension which takes l and returns a list with all values converted to cm using *map*.

Assignment 1-14 *filter*

Write a list comprehension which filters the list l from the assignment above by returning only sizes between 4 and 6 inches.

Assignment 1-15 *reduce*

Write a list comprehension which reduces the list l by summing up all lengths.
*Hint: for using the reduce function, you need to import it first by: **from** functools **import** reduce*

Literature:
Mark Pilgrim - Dive into python: http://www.diveintopython3.net/
Python 3.7 Documentation: https://docs.python.org/3/