Programming and Classification 2021:

1. Introduction to Python Programming Language

Marek Klonowski

Suggested deadline: 20.03.2021

1. $\star$ Ask the user for a number. Check if the input is an integer. Depending on whether the number is odd or even, print out an appropriate message to the user.
2. $\star$ Generate 20 **integers** in the range $10 - 99$ at random and return their mean value and maximal value.
3. $\star$ Write a function that computes cosine of the angle between two d-dimensional vectors.
4. $\star$ Write a function that for a given set of integers $\{a, \ldots, b\}$ and an integer c lists all integers greater than a and smaller than b that are divisible by c.
5. $\star\star$ Write a program that for two lists x and y (possibly of different sizes) returns a list of elements that are common between the lists.
6. $\star$ Write a function that removes all `a` letters form a given string x. For example, for $x =$`abracadabra` we expect $x =$`brcdbr`.
7. $\star$ Write a program that accepts a sentence and calculates the number of letters and digits. Hint: you can use functions `isalpha()` and `isdigit()`.
8. $\star$ Write a program that lists all subsets of the set $\{a, b, c, d\}$.
9. $\star\star$ Write a program that returns the most frequent letter in a string.
10. $\star\star$ Convert a number represented as a sequence of decimal digits to the binary representation.
11. $\star$ From a given list of integers remove all negative numbers.
12. $\star$ From a list of strings remove all strings longer than 5.
13. $\star\star$ Construct a function that returns a string of maximal length from a set of strings. Note that the the maximal string does not have to be unique.
14. $\star\star\star$ Construct a function that constructs a list that keeps alternately consecutive elements from two argument lists of equal length. For example, for `a=[a1,a2,a3]` and `a=[b1,b2,b3]` the correct output is `[a1,b1,a2,b2,a3,b3]`.
15. $\star\star$ A list contains both integers and strings. Construct a function that sorts given list in such a way that at the beginning of the resulting list one gets strings in alphabetical order followed by integers in an increasing order.