

Assignment 1

Objective: Use your basic programming and problem-solving skills to tackle following tasks.

In this assignment, you will solve five problems. I would like to remind you that even if you are allowed to work with your classmates, you must submit YOUR OWN solutions at the end, that is, try to develop your own path for each solution.

There are five problems:

1. Produce a number guessing game, in which the user will make a guess from 1 to 20, and the program is going to report whether the number is correct.

The game is expected to remain until the user guess the correct number. For any wrong answer, the program should also report whether the guessed number is higher or lower than the correct number.

Hint: The program should first create a random correct number, from 1 to 20.

2. Given a sorted array of distinct integers and a target value, return the index if the target is found. If not, return the index where it would be if it were inserted in order.

3. *Given two binary strings a and b , return their sum as a binary string.*

For instance:

- Input: $a = "11"$, $b = "1"$
- Output: $"100"$

4. Given a non-empty array of integers numbers, every element appears twice except for one. Find that single one.

5. *The DNA sequence is composed of a series of nucleotides abbreviated as 'A', 'C', 'G', and 'T'.*

For example, "ACGAATTCCG" is a DNA sequence. When studying DNA, it is useful to identify repeated sequences within the DNA.

Given a string s that represents a DNA sequence, return all the 10-letter-long sequences (substrings) that occur more than once in a DNA molecule. You may return the answer in any order.

For instance:

- Input: $s = "AAAAACCCCCAAAAACCCCCAAAAGGGTTT"$
- Output: $["AAAAACCCCC", "CCCCCAAAA"]$

Submission: A Jupyter notebook containing the code, outputs, and brief comments explaining each step of the analysis, if necessary. For your comments and headers, please use the *markdown* option.