Principles of Programming 2022: Mid-term exam (**THURSDAY NOV-17th, 9:00-12:00**)
Examination time: **180 minutes (P1-P3) || 27h (P4-P5)**

P1	P2	P3	SPOJ	∑ (max. 16)
3	3	4	2 x 3	16

Note: If you think that something is defined not precisely enough, please write down clearly any additional assumptions you have made.

IMPORTANT! Please read and perform the following steps:

1. Please create in your home folder at the server **univ.animima.org** the following folder: **midexam**.
2. Please restrict an access to the folder **midexam** to the owner only (700) using command: **chmod 700 midexam**.
3. Create folders **problem1**, **problem2**, **problem3** in the **midexam** folder.
4. Your are obliged to save all your source codes to Problem 1, Problem 2 and Problem 3 in the appropriate folders.
5. You have to solve Problem 1, Problem 2 and Problem3 using terminal session on the server. To get points you must backup final source codes, a few test cases (input and output) and compiled and runnable executable files (Problem 1, Problem 2, Problem 3).
6. All the activity on the server will be **recorded automatically,** until you will exit or press ctrl-d.

Problem 1. (3 points)

Write a program solving linear equations system:

A*x + B*y = C

D*x + E*y = F

where A,B,C,D,E,F are integers provided from the input in the form: A B C D E F.

Propose the format of the output (solution). Please note that there may be no solutions, one solution or infinite many solutions. Test your solution (compile and run on the server) using the example data.

Please note that to get points you must backup all files (source codes, input, output) in the appropriate folder named `midexam/problem1` on the server `univ.animima.org`

Problem 2. (3 points)

Write the program writing to the output scalable letter „E" consisting of '*', where scale *n* is taken from the input. Print **only** if *n* is between 1 and 20, otherwise print a message with an error. Use nested loops.

For *n*=1 the output is as follows:

```
***
**
***
```

For *n*=2 the output is as follows:

```
*****
*
***
*
*****
```

For *n*=3 the output is as follows:

```
*******
*
*
****
*
*
*******
```

For *n*=4 the output is as follows:

```
*********
*
*
*
*****
*
*
*
*********
```

Test your solution (compile and run on the server) using the example data.

Please note that to get points you must backup all files (source codes, input, output) in the appropriate folder named `midexam/problem2` on the server `univ.animima.org`

Problem 3. (4 points)

You have 100 records of data provided from the input. Each record consists of three fields:
name age identifier
where *name* is a string of characters of length not more than 100, and *age* and *idenfier* are two numbers between 0 and 1000000. Write the program writing to the output the sorted list of records. You must implement one of the sorting algorithms: SelectionSort or BubbleSort. Sorting should be done in the following way: first sort by *age* in the non-decreasing order, and in the case of the same age sort by *identifier* in the non-decreasing order. You may assume that each identifier is unique.

Example Input (4 records in the example, instead of 100):
Giorgi 25 1001
Frank 35 1005
Olaf 25 1000
Pio 35 1002

Example Output:
Olaf 25 1000
Giorgi 25 1001
Pio 35 1002
Frank 35 1005

Please note that to get points you must backup all files (source codes, input, output) in the appropriate folder named **`midexam/problem3`** on the server **`univ.animima.org`**

Problem 4. (3 points) https://www.spoj.com/POP2022/problems/PCPMASUM/

Problem 5. (3 points) https://www.spoj.com/POP2022/problems/OOPCTREE/