PRACTICE 3: Flow Control: Selection (Autonomous Exercises)

THEORIC CONTENTS

- Lesson 2. Algorithms.
- Lesson 3. Data Types.
- Lesson 4. Operators and Expressions.
- Lesson 5. Input and Output
- Lesson 6. Flow Control: Selection

GITHUB CLASSROOM ASSIGNMENT

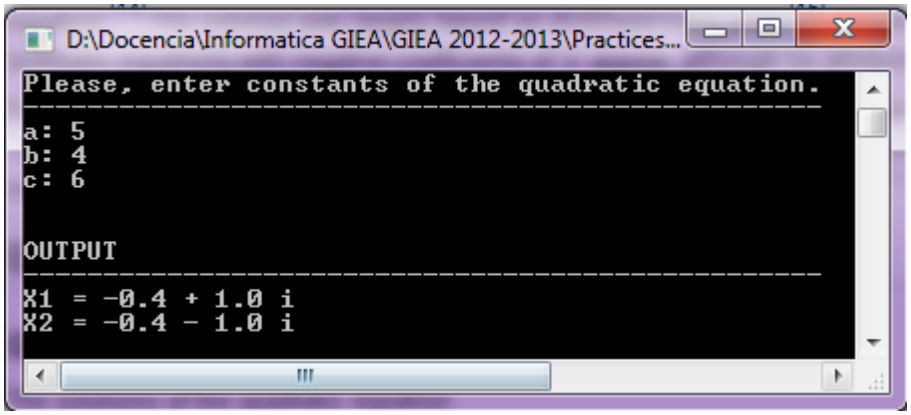
https://classroom.github.com/a/kYjJ_2mF

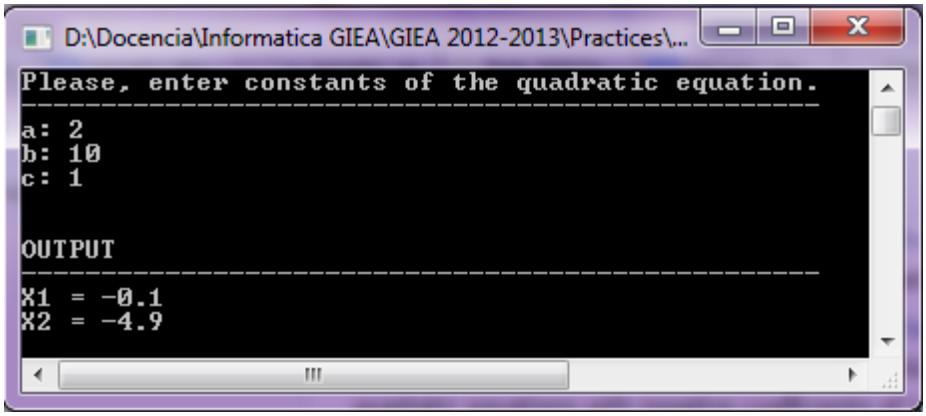
PROPOSED EXERCISES

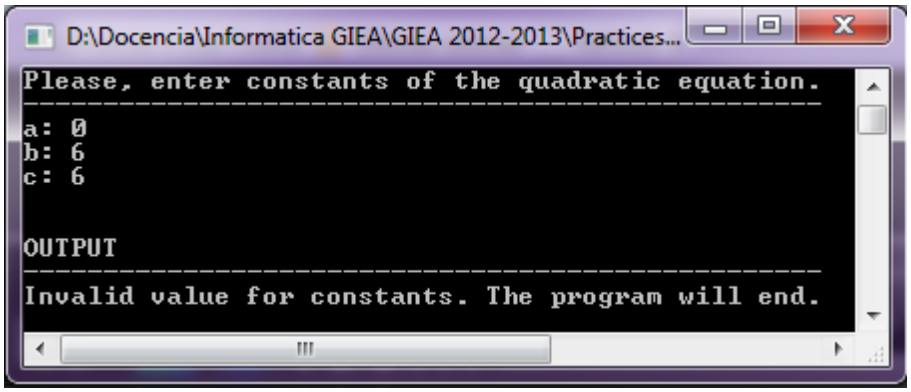
Exercise 1. Design and implement a program in C that solves second-degree equations: $\mathbf{aX^2 + bX + c = 0}$, where **a≠0** and **b≠0**. The program must display all the possible solutions, depending of the constant values (a, b and c).

The function **sqrt**, defined in **math.h** computes the square root of a number.

Examples:

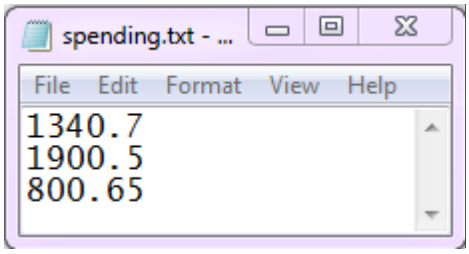




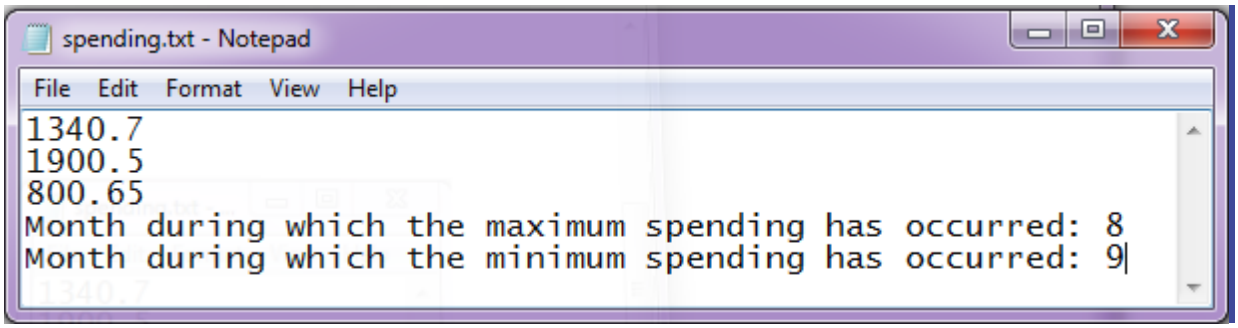


Exercise 2. One file contains three values, which correspond to the monthly cost of one family during the last three months: July, August and September. Each value is separated from another with only one space. Consider that the file already exists.
Design and implement a program in C that adds to the file, the months during which the maximum and minimal spending have occurred, respectively.

Example: Input file



Example: The input file, after the program ends.



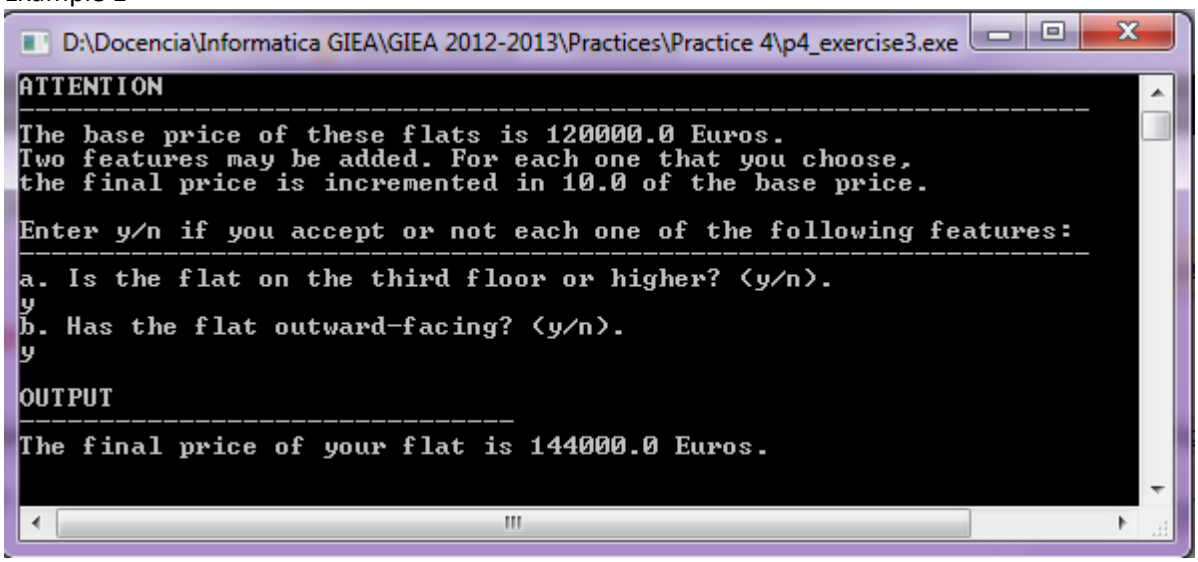
Exercise 3. An estate agent sells flats in a six-story building. The base price is 120,000 Euros, but for each one of the following characteristics that is chosen by the buyer, the price is incremented in 10% of the base price.

a. The flat is on the third floor or higher.
b. The flat has outward-facing.

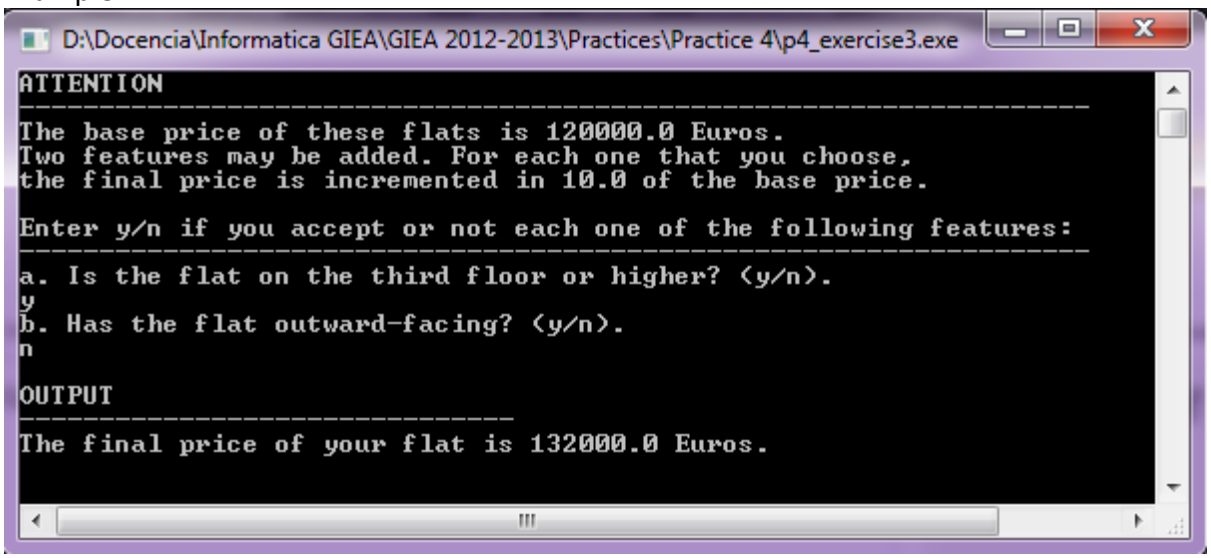
Design and implement a program in C that displays the final price that must be paid, considering the characteristics that the buyer chooses.

Examples:

Example 1



Example 2



Exercise 4. Consider one file(F1.txt) that contains the total points of drivers that occupy the top three positions in the current season of Formula 1: first, second and third, respectively.

Design and implement a program in C that indicates if the driver that occupies the second position, until now, has mathematical chance to become champion in the current season.
The user must enter how many races left to run. Consider that a driver obtains 25 points each time wins a race.

Exercise 5. Design and implement a program in C that asks for an integer value greater than 999 and less than 1,000,000. Once the value has been read, the program should display the word "thousand" between the digits that occupy hundreds, tens and unities and the rest of digits that compose the same number.

Example:
Input: 27322
Output: 27 thousand 322

Exercise 6. The interest rate used on funds deposited in a bank is determined by the amount of time the money is left on deposit. For a particular bank, the following schedule is used.

Design and implement a program in C that accepts the time that funds are left on deposit and displays the interest rate corresponding to the time entered.

Time on deposit	**Interest Rate**
greater than or equal to 5 years	0.095
less than 5 years but greater than or equal to 4 years	0.09
less than 4 years but greater than or equal to 3 years	0.085
less than 3 years but greater than or equal to 2 years	0.075
less than 2 years but greater than or equal to 1 year	0.065
less than 1 year	0.058

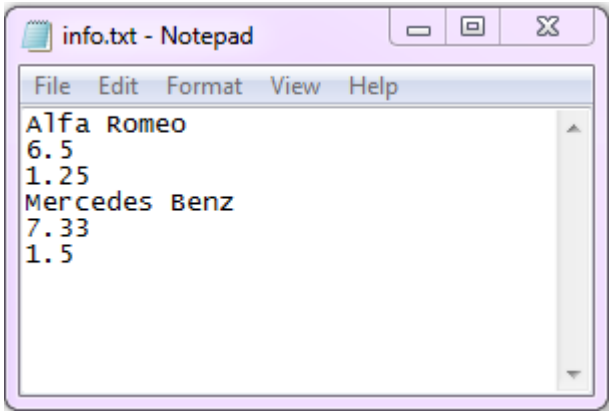
Exercise 7. Design and implement a program in C that reads two integers from file *data.txt*. Once both data have been read, the program has to compute their product. Finally, a message indicating if the product is even or odd, has to be written to *result.txt*

Exercise 8.In this problem, you have to consider that a given file already exists. It contains information about two vehicle makes. For each one of the makes, the file stores the following data:

- Vehicle brand. The brand/make may consist of one or more words.
- Average amount of fuel that is spent each 100 km. The amount will be given in liters. This value may contain decimal part.
- Cost of fuel per liter. The cost will be given in Euros. This value may contain decimal part.

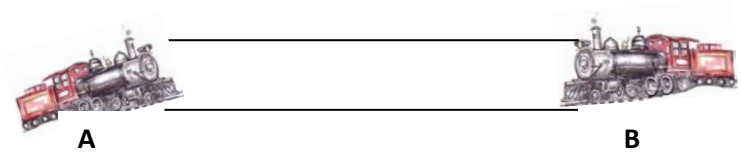
You have to consider the file is named "info.txt"

EXAMPLE: The following figure shows the format that the file should satisfy. The values are not fixed, but the program should consider the format will be the same.



Design and implement a program in C that asks the distance the user requires travel. Considering this value, the program has to rearrange the data in "info.txt", such that: the data of the brand whose spending is greater should appear first, and after, the data of the other one.

Exercise 9. Two trains (*train1* and *train2*) are ready to depart from their respective stations in a given time for each one. Both trains have the same journey between two stations, A and B, but in opposite directions (*train1* travels from A to B, and *train2* travels from B to A). You have to consider that there is only one track section between A and B.



In this problem, you have to consider that there exists a file (train.txt), which contains the following data:

- Distance between stations A and B (meters).
- Constant velocity of *train1* (meter/second).
- Constant velocity of *train2* (meter/second).
- Time, from which, the *train1* is ready to leave the station A (seconds).
- Time, from which, the *train2* is ready to leave the station B (seconds).

The data appear in the same order that are listed above. Each value is separated from the other with one space, or one newline, or one tab.

Design and implement a program in C that determines if both trains would crash or not, considering the data in the input file. The program must display one of the following two messages: “Trains would crash”, or “Trains cannot crash”, according to the result obtained by the code.