

PRACTICE 3: Flow Control Selection (Classroom Exercises)

DURATION: 2 Hours

THERIC 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

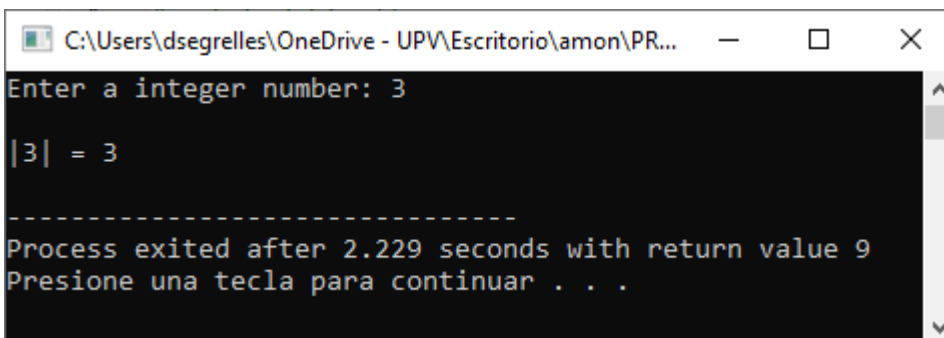
<https://classroom.github.com/a/KZ0BWni7>

PROPOSED EXERCISES

Exercise 1. Design and implement in C an algorithm that displays the absolute value of a number that must be given by the user. See below the definition of absolute value of a number x .

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

Examples:



```
C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PR...
Enter a integer number: 3
|3| = 3
-----
Process exited after 2.229 seconds with return value 9
Presione una tecla para continuar . . .
```

```

C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PRO...
Enter a integer number: -3
|-3| = 3
-----
Process exited after 2.871 seconds with return value 10
Presione una tecla para continuar . . .

```

Exercise 2. Design and implement in C an algorithm that Solve a simple equation

$$aX + b = 0.$$

If a is equal to 0 and b is not equal to 0 then the solution is not feasible.

If a is equal to 0 and b is equal to 0 then the solution is indeterminate

Examples:

```

C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PROJECTES...
Enter a and b numbers: 4 2
The result is -0.50
-----
Process exited after 5.222 seconds with return value 20
Presione una tecla para continuar . . .

```

```

C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PR...
Enter a and b numbers: 0 0
The solution is indeterminate
-----
Process exited after 2.322 seconds with return value 0
Presione una tecla para continuar . . .

```

```

C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PR...
Enter a and b numbers: 0 0
The solution is indeterminate
-----
Process exited after 2.322 seconds with return value 0
Presione una tecla para continuar . . .

```

Exercise 3. Design and implement a C program that simulates a basic calculator through the following steps:

- Select one of these options: sum, subtraction, multiplication or division.
- Ask two integer numbers.
- Perform the corresponding operation.
- Show the result.

Note: Division by zero is not feasible

```
C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PR...  -  □  X
Menu
    1-Sum
    2-Substraction
    3-Multiplication
    4-Division
Enter option Menu (1-4): 1
Enter First Operand: 2
Enter Second Operand: 3
5
-----
Process exited after 6.745 seconds with return value 1
Presione una tecla para continuar . . .
```

```
C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PROJEC...  -  □  X
Menu
    1-Sum
    2-Substraction
    3-Multiplication
    4-Division
Enter option Menu (1-4): 2
Enter First Operand: 5
Enter Second Operand: 3
2
-----
Process exited after 4.912 seconds with return value 1
Presione una tecla para continuar . . .
```

```
C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PRO...  -  □  X
Menu
    1-Sum
    2-Substraction
    3-Multiplication
    4-Division
Enter option Menu (1-4): 3
Enter First Operand: 3
Enter Second Operand: 4
12
-----
Process exited after 7.081 seconds with return value 2
Presione una tecla para continuar . . .
```

```

C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PROJE...
Menu
  1-Sum
  2-Substraction
  3-Multiplication
  4-Division
Enter option Menu (1-4): 4
Enter First Operand: 8
Enter Second Operand: 0
Error. Division by 0.
-----
Process exited after 8.713 seconds with return value 21
Presione una tecla para continuar . . .

```

```

C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PROJ...
Menu
  1-Sum
  2-Substraction
  3-Multiplication
  4-Division
Enter option Menu (1-4): 4
Enter First Operand: 2
Enter Second Operand: 2
1
-----
Process exited after 10.21 seconds with return value 1
Presione una tecla para continuar . . .

```

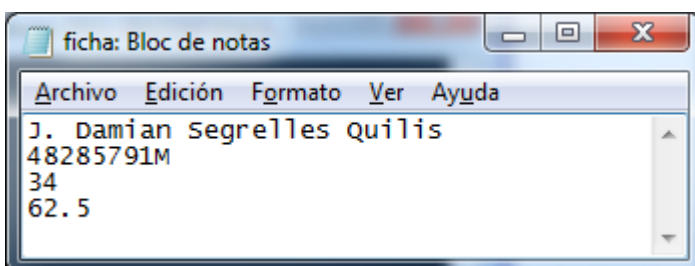
```

C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PR...
Menu
  1-Sum
  2-Substraction
  3-Multiplication
  4-Division
Enter option Menu (1-4): 7
Incorrect option.
-----
Process exited after 2.12 seconds with return value 18
Presione una tecla para continuar . . .

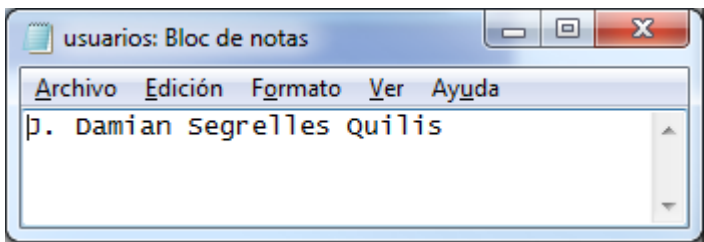
```

Exercise 4. Design and implement in C an algorithm that reads data of a student (name, NIF, age and credits) from a text file given by the user. After that, the program reads the information from this file and writes the student's name in other text file named "user.txt" only if the student is greater than 18 years old or has less 30 credits.

- Example Input File:



- Example output File:



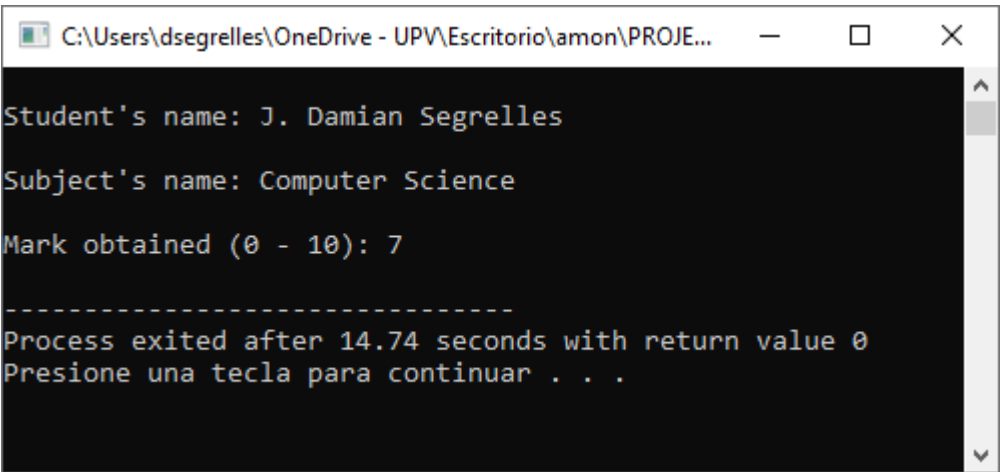
Exercise 5. Design and Implement in C an algorithm in which the user inputs a student's name, name of a subject and the mark of the student in the subject.

The algorithm has to save in an output text file(ex5_alu.txt) the name of the student, the name of the subject and its qualification in function of this table:

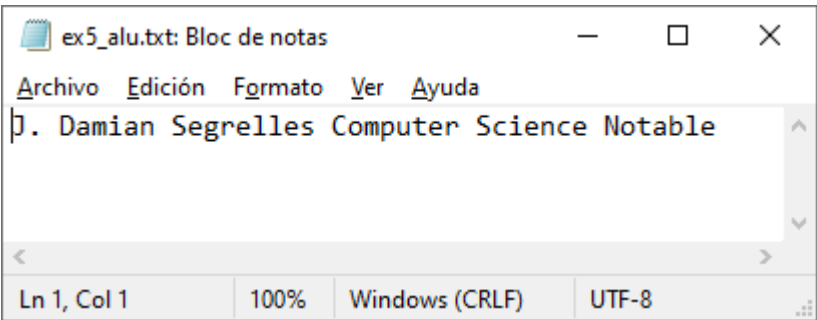
<u>Mark</u>	<u>Qualification</u>
[0,5[Falied
[5,7[Passed
[7,9[Notable
[9,10[Excelent
10	MH

If the mark is less than 0 or greater than 10, the qualification will not to be wrote in the output file.

Example:



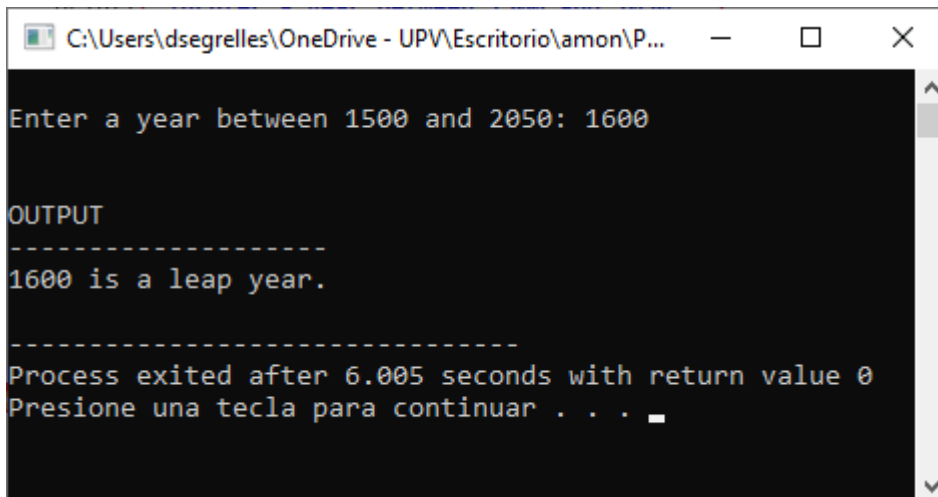
Output (ex5_alu.txt)



Exercise 6. One year is a *leap year* if it is multiple of 4 and it is not multiple of 100, unless it also is multiple of 400.

Design and implement a program in C that asks to the user one value, which must be between 1500 and 2050. If the user enters a value out of this range, the program must display the following message: “Value out of range”. Otherwise, the program must display whether the value is a leap year or not.

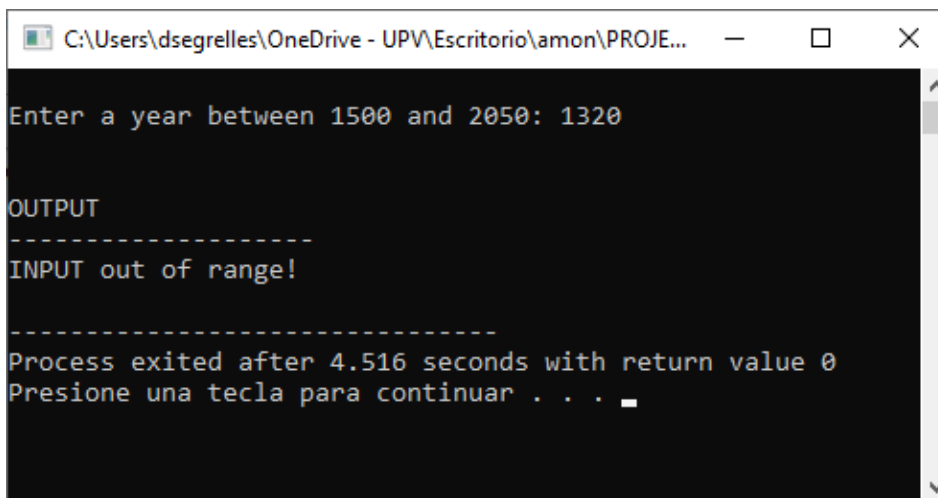
Examples:



```
C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\P...
Enter a year between 1500 and 2050: 1600

OUTPUT
-----
1600 is a leap year.

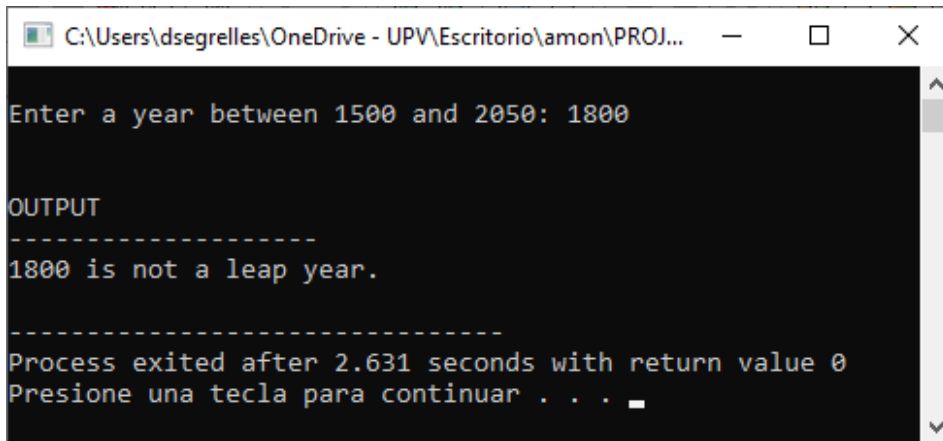
-----
Process exited after 6.005 seconds with return value 0
Presione una tecla para continuar . . .
```



```
C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PROJE...
Enter a year between 1500 and 2050: 1320

OUTPUT
-----
INPUT out of range!

-----
Process exited after 4.516 seconds with return value 0
Presione una tecla para continuar . . .
```



```
C:\Users\dsegrelles\OneDrive - UPV\Escritorio\amon\PROJ...  
Enter a year between 1500 and 2050: 1800  
  
OUTPUT  
-----  
1800 is not a leap year.  
-----  
Process exited after 2.631 seconds with return value 0  
Presione una tecla para continuar . . . _
```