PRACTICE 4: Flow Control: Repetition (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
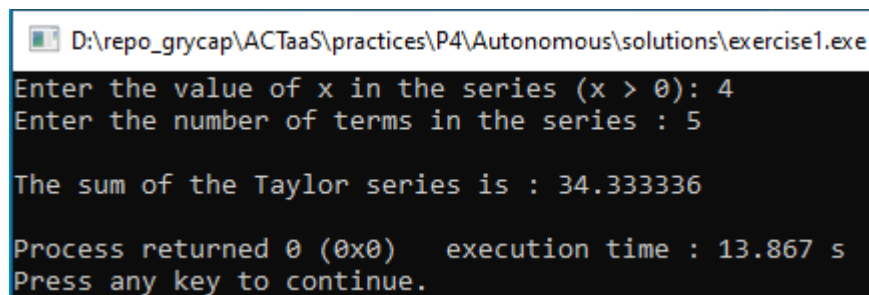- Lesson 7. Flow Control: Repetition

GITHUB CLASSROOM ASSIGNMENT

https://classroom.github.com/a/FWfR7f93

PROPOSED EXERCISES

Exercise 1. Design and implement a program in C that computes the ex-according to the Tailor series:

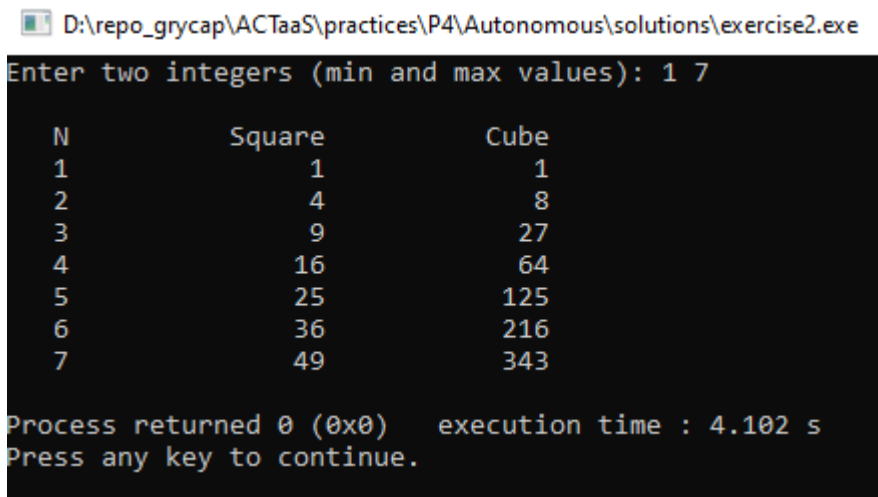$$e^x = \sum_{i=0}^{N} \frac{x^i}{i!}$$

```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise1.exe

Enter the value of x in the series (x > 0): 4
Enter the number of terms in the series : 5

The sum of the Taylor series is : 34.333336

Process returned 0 (0x0)   execution time : 13.867 s
Press any key to continue.
```

Exercise 2. Design and implement a program in C that displays a sequence of integers from an initial value to a final value. The initial and final values must be given by the user. For each integer, in a new line, the program should display the value corresponding to its square and its cube.

```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise2.exe

Enter two integers (min and max values): 1 7

   N           Square              Cube
   1                1                 1
   2                4                 8
   3                9                27
   4               16                64
   5               25               125
   6               36               216
   7               49               343

Process returned 0 (0x0)    execution time : 4.102 s
Press any key to continue.
```
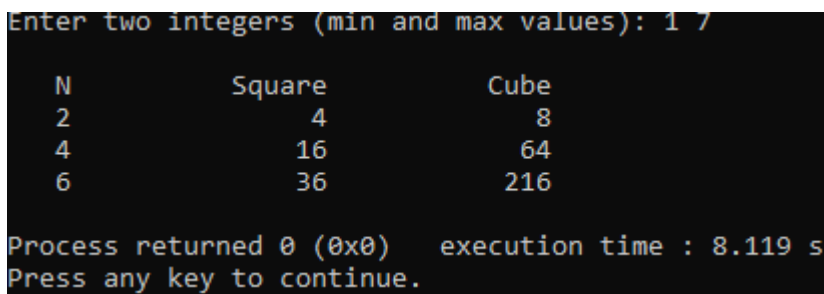
Exercise 3. Design and implement a program in C that displays a sequence of even integers from an initial value to a final value. The initial and final values must be given by the user. For each integer, in a new line, the program should display the value corresponding to its square and its cube.

```
Enter two integers (min and max values): 1 7

   N           Square              Cube
   2                4                 8
   4               16                64
   6               36               216

Process returned 0 (0x0)    execution time : 8.119 s
Press any key to continue.
```
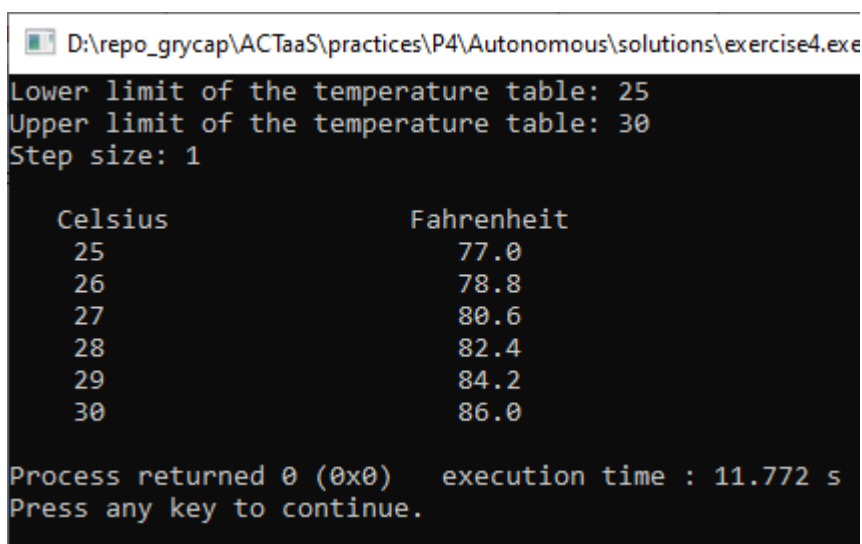
Exercise 4. Design and implement a program in C to convert Celsius degrees to Fahrenheit. The program should request the starting Celsius value, the ending Celsius value, and the increment. The display should have appropriate headings and list the Celsius value and the corresponding Fahrenheit value. Use the relationship: Fahrenheit = (9.0/5.0)*Celsius + 32.0.

```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise4.exe

Lower limit of the temperature table: 25
Upper limit of the temperature table: 30
Step size: 1

   Celsius                 Fahrenheit
    25                         77.0
    26                         78.8
    27                         80.6
    28                         82.4
    29                         84.2
    30                         86.0

Process returned 0 (0x0)    execution time : 11.772 s
Press any key to continue.
```

Exercise 5. Design and implement a program in C to reverse the digits of a positive integer number. For example, if the number 8735 is entered, the number displayed should be 5378.

```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise5.exe

Enter a natural number: 8735
The reversal of 8735 is 5378

Process returned 0 (0x0)   execution time : 24.548 s
Press any key to continue.
```

Exercise 6 .A bookstore summarizes its monthly transactions by keeping the following information for each book in stock:

> Book identification number
> Inventory balance at the beginning of the month
> Number of copies received during the month
> Number of copies sold during the month

Design and implement a program in C that accepts this data for each book and then displays the book identification number and an updated book inventory balance. The program should end when the user enters a negative book identification number.

```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise6.exe

Book identification number: 23
Inventory balance at the beginning of the month: 20
Number of copies received during the month: 2
Number of copies sold during the month: 8
Book identification number: 23
Updated book inventory balance: 14
Book identification number: 38
Inventory balance at the beginning of the month: 12
Number of copies received during the month: 8
Number of copies sold during the month: 6
Book identification number: 38
Updated book inventory balance: 14
Book identification number: -1

Process returned 0 (0x0)   execution time : 139.140 s
Press any key to continue.
```

Exercise 7. Design and implement a program in C that print the decimal values of all characters between the start and stop characters entered by a user. For example, if the user enters an a and z, the program should print all the characters between a and z and their respective numerical values. Make sure that the second character entered by the user occurs later in the alphabet than the first character. If it does not a new value for the second character must be read, until the condition is satisfied.

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```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise7.exe

Enter two characters (alphabetically ordered): d a
Enter two characters (alphabetically ordered): a d

Character          Decimal
   a                  97
   b                  98
   c                  99
   d                  100

Process returned 0 (0x0)    execution time : 13.349 s
Press any key to continue.
```

Exercise 8. Design and implement a program in C in which a machine purchased for $28,000 is depreciated at a rate of $4,000 a year for seven years. Write a C program that computes and displays a depreciation table for seven years. The table should have the form:

```
DEPRECIATION SCHEDULE
-----------------------------------

                       END-OF-YEAR       ACCUMULATED
YEAR    DEPRECIATION      VALUE          DEPRECIATION
------------------------------------------------------------------------
1       4000             24000            4000
2       4000             20000            8000
.
.
7       4000                0            28000
```

```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise8.exe

   YEAR          DEPRECIATION          END OF YEAR VALUE          ACCUMULATED DEPRECIATION
-----------------------------------------------------------------------------------------
    1                4000                   24000                          4000
    2                4000                   20000                          8000
    3                4000                   16000                         12000
    4                4000                   12000                         16000
    5                4000                    8000                         20000
    6                4000                    4000                         24000
    7                4000                       0                         28000

Process returned 0 (0x0)    execution time : 0.250 s
Press any key to continue.
```

The output of this program must be aligned, according to the previous example. The alignment should be obtained using the printf modifiers.

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Exercise 9. A well-regarded manufacturer of widgets has been losing 4 percent of its sales each year. The annual profit for the firm is 10 percent of sales. This year the firm has had $10 million in sales and a profit of $1 million. Determine the expected sales and profit for the next 10 years. Your program should complete and produce display as follows:

SALES AND PROFIT PROJECTION

YEAR	EXPECTED SALES	PROJECTED PROFIT

1	$10000000	$1000000
2	$ 9600000	$ 960000
3		
.		
.		
10		

Totals: $ $

Exercise 10. Design and implement a program in C that Write a C program that calculates and displays the yearly amount available if $1,000 is invested in a bank account for 10 years, considering different interest rates: from 6% to 12%

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```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise10.
Total yearly amount at 6%: 600
Total yearly amount at 7%: 700
Total yearly amount at 8%: 800
Total yearly amount at 9%: 900
Total yearly amount at 10%: 1000
Total yearly amount at 11%: 1100
Total yearly amount at 12%: 1200

Process returned 0 (0x0)    execution time : 0.222 s
Press any key to continue.
```

Exercise 11. Several experiments are performed, each consisting of six test results. The results for each experiment are stored in a file (experiment.txt), which has the following format:

Experiment1:	23.2	31.5	16.9	27.5	25.4	28.6
Experiment2:	22.2	28.7	12.8	27.5	43.4	19.6

....

Experimentn:	18.2	31.5	16.9	33.8	15.4	38.6

The value of n is unknown.


```
experiment.txt: Bloc de notas
Archivo  Edición  Formato  Ver  Ayuda
Experiment1:    23.2    31.5    16.9    27.5    25.4    28.6
Experiment2:    22.2    28.7    12.8    27.5    43.4    19.6
Experiment3:    18.2    31.5    16.9    33.8    15.4    38.6
```
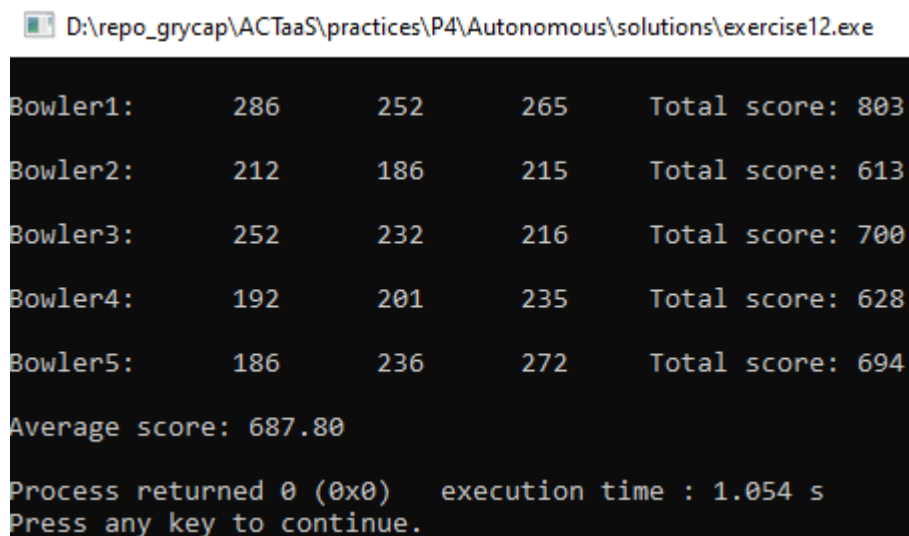
Design and implement a program in C that to compute and display the average of the test results for each experiment.


```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise11.
Experiment1: Average 25.52
Experiment2: Average 25.70
Experiment3: Average 25.73

Process returned 0 (0x0)    execution time : 0.243 s
Press any key to continue.
```

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Exercise 12. A bowling team consists of five players. Each player bowls three games. Write a C program that displays the total score of each player and the average score, considering the five players. Consider the data are stored in a file (bowling_team.txt), which has the following format.

```
Bowler1:   286   252   265
Bowler2:   212   186   215
Bowler3:   252   232   216
Bowler4:   192   201   235
Bowler5:   186   236   272
```
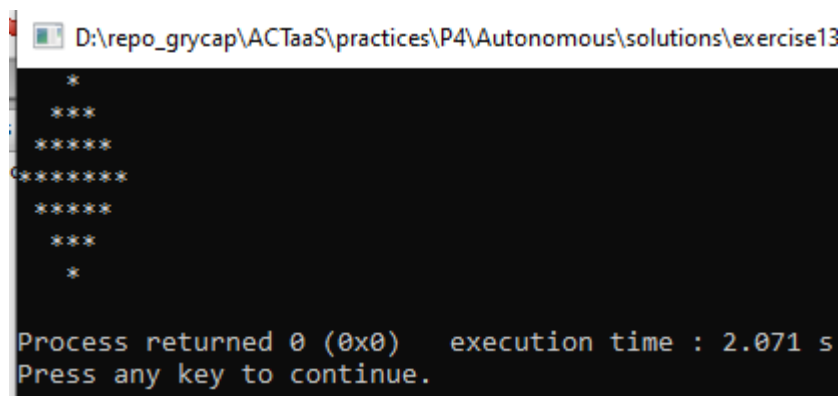
```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise12.exe

Bowler1:        286        252        265        Total score: 803

Bowler2:        212        186        215        Total score: 613

Bowler3:        252        232        216        Total score: 700

Bowler4:        192        201        235        Total score: 628

Bowler5:        186        236        272        Total score: 694

Average score: 687.80

Process returned 0 (0x0)    execution time : 1.054 s
Press any key to continue.
```

Exercise 13. Design and implement a program in C to display the following figure:

```
D:\repo_grycap\ACTaaS\practices\P4\Autonomous\solutions\exercise13

    *
   ***
  *****
 *******
  *****
   ***
    *

Process returned 0 (0x0)    execution time : 2.071 s
Press any key to continue.
```

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