Lesson 2 Exercises – Part II

13. Write a program in C++ that asks the user for three integer values, and then displays them in order from lesser to greater, separated by commas. For example, if the user inputs 10, 4 y 6, the result will be: 4,6,10.

14. Repeat the previous exercise with three strings (`string`).

15. Extend Exercise 7 program, now taking the grade restrictions into account (the project passed and at least a 5 on the final exam).

16. Write a program in C++ that asks the user for integer numbers until he or she enters `0`. For each number, if it is a positive number, the program will tell us if it is an even or odd number (it will simply ignore negative numbers).

17. Develop a measure converter from the Anglo-Saxon system to the International system. The program will read a real number followed by a space and a letter. The letter will indicate the measurement unit (i → inches; m → miles; f → Fahrenheit degrees; g → gallons; o → ounces; p → pounds) to be converted.

The program will show the quantity in the corresponding international measure followed by a space and the international unit (respectively, cm → centimeters; m → meters; c → Celsius degrees; l → liters; gr → grams; kg → kilograms).

The program will continue asking for measurements to convert until he or she enters a 0 as quantity. Search in Wikipedia for the corresponding conversion factors (if you have any doubts, use the American ones) and declare them as constants.

18. Write a program in C++ that displays on the screen the multiplication table (from 1 to 10) of the number entered by the user (between 1 and 100; if not, the user will be asked again for a number). Output must be well formatted, as in this example:

```
Enter a number (1-100): 0
Enter a number (1-100): 212
Enter a number (1-100): 27
  1  x    27  =     27
  2  x    27  =     54
  3  x    27  =     81
  4  x    27  =    108
  5  x    27  =    135
  6  x    27  =    162
  7  x    27  =    189
  8  x    27  =    216
  9  x    27  =    243
 10  x    27  =    270
```

19. Write a program in C++ that reads an operand (a real number), an operator (a character) and a second operand (a real number), all in one line (separated by spaces), and then shows the result of the operation (valid operators: +, -, * and /). The program will continue asking for operations until the first operand is 0.

```
Operand Operator Operand (0 to end): 12 + 4
12 + 4 = 16
Operand Operator Operand (0 to end): 12 * 3
12 * 3 = 36
Operand Operator Operand (0 to end): 12 / 5
12 / 5 = 2.4
Operand Operator Operand (0 to end): 12 - 4.2
12 - 4.2 = 7.8
Operand Operator Operand (0 to end): 0
```

20. Write a program in C++ that asks the user for two numbers: a product's price, and that product's units sold. Then the program will ask for a character indicating if there is a 15% discount for this sale (Y/N); the discount will be applied before calculating the corresponding VAT. Then the program will ask for some more data: a string with the full name of the client (several words), a string with the client id (NIF), a string with the client's postal address (several words), and another string with the product name.

Next the program will display on the screen a detailed invoice: client name, address and NIF, name of product, units sold, unit price, total (units by price), discount applied, total after discount, VAT percentage applied (21% at this moment), VAT amount and final price (adding VAT to total). Each piece of data in one line, preceded by its name (40 screen positions), and occupying exactly 10 screen positions, right aligned, and showing 2 decimals.

Example of program execution:

```
Product Price: 39.95
Units: 12
Discount (y/n)? y
Client Name: Luis Hernández Yáñez
Client NIF: 12345678-H
Client Address: C/ Mayor 15, 4º A, 28001 Madrid
Product Name: USB Memory 32 Gb 3.0

Invoice:
                              Luis Hernández Yáñez
                    C/ Mayor 15, 4º A, 28001 Madrid
                                          12345678-H

Product: USB Memory 32 Gb 3.0
Unitary Price                                39.95
Units                                           12
Total                                       479.40
Discount                                     15 %
                                            -71.91
Total after discount                        407.49
VAT                                          21 %
                                             85.57
Final Price                                 493.06
```