CMPSC121: Intro to Programming Techniques

Homework 5: Multiplication Table (20 points)

Objectives

After this lab assignment, students should be able to:

- Design programs with looping logic
- Use Boolean logic to determine the program flow

Background

A **multiplication table** is a tool for learning the multiplication operation of small integers. Typically, the table displays the multiple integers ranging from 1 to 10, but they can be expanded infinitely. Below is an example of such a table, with a 7×7 dimension.

	1	**2**	**3**	**4**	**5**	**6**	**7**
1	1	2	3	4	5	6	7
2	2	4	6	8	10	12	14
3	3	6	9	12	15	18	21
4	4	8	12	16	20	24	28
5	5	10	15	20	25	30	35
6	6	12	18	24	30	36	42
7	7	14	21	28	35	42	49

Instructions

You will be writing a program that displays multiplication tables of various dimensions, based on user input.

Write a program named **`table.cpp`** that:

- Prompts the user for two integers between 1 and 12 (inclusive)
- Calculates and displays the multiplication table in a well-formatted output

- The table must include a label for each row and column

Sample Output

```
Let's build a multiplication table!
Enter the number of rows (1 to 12 inclusive): -10
Invalid input, try again!
Enter the number of rows (1 to 12 inclusive): 4
Enter the number of columns (1 to 12 inclusive): 16
Invalid input, try again!
Enter the number of columns (1 to 12 inclusive): 5

        1   2   3   4   5
   1    1   2   3   4   5
   2    2   4   6   8  10
   3    3   6   9  12  15
   4    4   8  12  16  20
```

Column header

Row header

Rubric

Programming source code criteria	Penalty points
Missing affidavit header	-1
The program failed to compile	-8
The program compiled with the warning message(s)	-1
The source code has bad indentations or poor variable naming	-2
Missing program run output(s) is attached at the end of the source code Program run output(s) must follow the sample runs given	-2
Using C++ syntaxes or constructs beyond what the lecture class has covered. The lab aims to exercise the lecture topics covered thus far	-3
The table are not aligned properly according to the sample runs	-4
No setw() is used in output alignment	-2
Missing validates user input, displaying an error message and prompting the user to enter another integer if the input is invalid, and repeating it as many times as necessary	-3
No nested loops are used to calculate and display the table	-3
Incorrect output calculations	-2

Submission

Submit the following file(s) to Canvas before the deadline:

1. **`table.cpp`**