National University of Computer and Emerging Sciences

Fast School of Computing Spring 2025

CS1002-Programming Fundamentals Assignment 03 [CLO-2]

Instructions for submission:

Dear students we will be using auto-grading tools, so failure to submit according to the below format would result in zero marks in the relevant evaluation instrument.

1. For each question in your assignment, make a separate cpp file e.g. for question 1, make ROLL-NUM_SECTION_Q#.cpp (24i-0001_A_Q1.cpp) and so on. Each file that you submit must contain your name, student-id, and assignment # on top of the file in comments.
2. Combine all your work in one folder. The folder must contain only .cpp files (no binaries, no exe files etc.).
3. Run and test your program on a lab machine before submission.
4. Rename the folder as ROLL-NUM_SECTION (e.g. 24i-0001_A) and compress the folder as a zip file. (e.g. 24i- 0001_A.zip). do not submit .rar file.
5. Submit the .zip file on Google Classroom within the deadline.
6. Submission other than Google classroom (e.g. email etc.) will not be accepted.
7. The student is solely responsible to check the final zip files for issues like corrupt file, virus in the file, mistakenly exe sent. **If we cannot download the file from Google classroom due to any reason it will lead to zero marks in the assignment**.
8. Displayed output should be well mannered and well presented. Use appropriate comment and indentation in your source code.
9. **Total Marks: 100**.
10. If there is a syntax error in code, zero marks will be awarded in that part of assignment.
11. Your code must be generic.
12. Solve the assignment **using the concepts of nested loops and iterative structures**, as well as the concepts we have studied previously.
13. *You cannot use advanced constructs like pointers* for this assignment
14. Try to submit your assignment 3 hours before the deadline to avoid any problem (e.g. internet issues etc)

Deadline:

Deadline to submit assignment is 22nd March 2025 11:00 PM. You are supposed to submit your assignment on GOOGLE CLASSROOM. Only ".ZIP" files are acceptable. Other formats should be directly given ZERO. Correct and timely submission of the assignment is the responsibility of every student, hence no relaxation will be given to anyone. **Late Submission policy will be applied as described in course outline.**

Tip: For timely completion of the assignment, start as early as possible.

Plagiarism: Plagiarism is not allowed. If found plagiarized, you will be awarded zero marks in the assignment (copying from the internet is the easiest way to get caught).

Note: Follow the given instruction to the letter, failing to do so will result in a zero

National University of Computer and Emerging Sciences

Fast School of Computing Spring 2025

General Instructions for the assignment:

1. **Variable:** Use variables that reflect the context of the problem. Avoid generic names like `x`, `y`, or `z`.
2. **Logical Thinking:** In your code comments, explain why you chose specific variable names and why a particular operation (like `+` or `%`) is necessary for the problem's solution. These comments will be checked for correctness.
3. **Comments and Documentation:** Add a comment at the top of your code that includes your name, roll number, and a brief description of the program. Each function should have a comment explaining its purpose and parameters. Use comments to explain any non-obvious parts of your code.
4. **Input/Output Handling:** Provide clear instructions when taking input from the user. Format your output clearly, ensuring it's easy to understand and follows the requirements of the scenario in the assignment.

Evaluation Criteria

Your assignment will be evaluated based on:

1. Correctness: Does the program produce the correct results for all inputs?
2. Complexity: Are multiple conditions and adjustments applied using appropriate decision structures (e.g. switch, nested if-else statements and ternary operators etc)?
3. Efficiency: Is the code clean, efficient, and well-commented?
4. Comprehensive Output: Does the program handle all scenarios with clear and concise output?
5. Error Handling: Ensure the program manages invalid inputs gracefully

National University of Computer and Emerging Sciences

Fast School of Computing Spring 2025

Q1: Printing Simple Pattern [50 Marks]

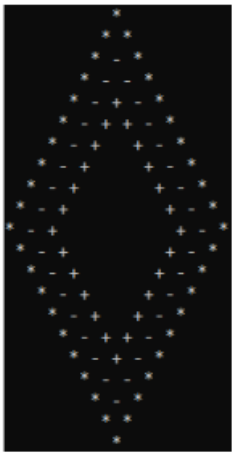
You are required to recreate these exact patterns using nested loops on the terminal.

Important Notes:

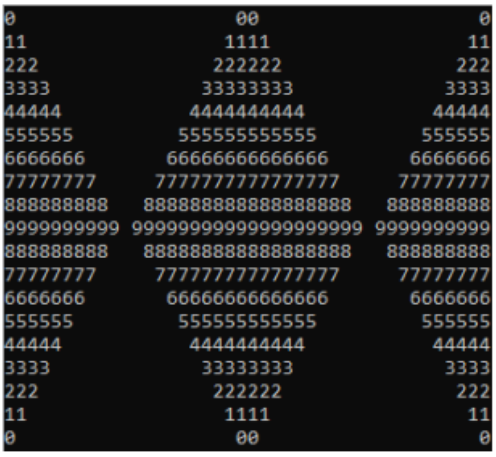
1. **Hard-coding these patterns will result in zero marks.**
2. The use of setw() and setfill() functions is strictly prohibited and will result in zero marks.

1) A) [10 Marks]

B) [10 Marks]



C) [10 Marks]



---

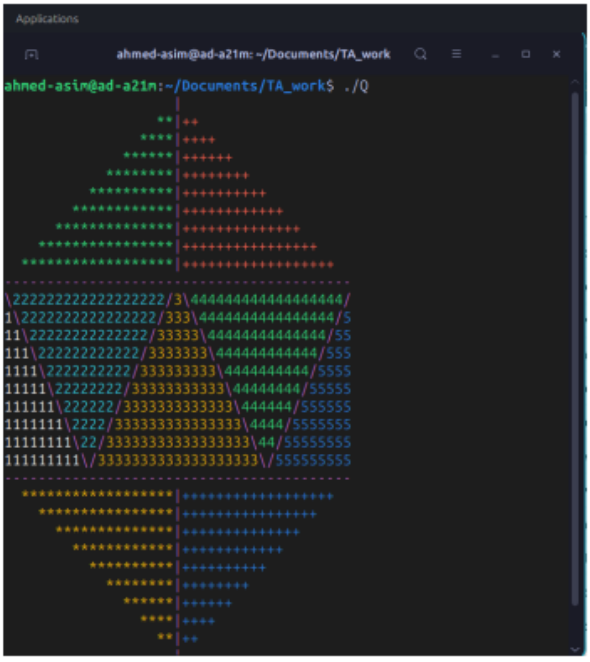
2) [20 Marks] The pattern includes specific colors. **To achieve this, use the command:** cout << "\033[92m" << "Hello World" << "\033[0m";

Here:

- '\033[92m' applies a shade of green to the spaces.
- '\033[0m' resets the color to default after each colored segment.

Note:

You may refer to this guide on GeeksforGeeks for help on changing console colors.



National University of Computer and Emerging Sciences

Fast School of Computing Spring 2025

Q2: Shape Drawing with Nested Loops [50 marks]

You are required to write a general code that can draw a diamond-shaped pattern using nested loops. The code should be flexible and able to generate the pattern based on user input. Below are the requirements and examples for clarification.

- **Input Specifications:**
  - You need to input **the number of lines (n)** which will define the height of the diamond. Where *(n >= 5)*
  - For the borders of the shape, input two characters: these characters will be printed in an alternating pattern as show in the example
- **Output**
  - Output should be the same as shown in the examples below. It is part of the assignment to calculate the size of each sub-shape(s) and the spaces between characters.
- **Examples**

```
Enter the number of lines you want to print : 30
For boders:
 Enter your first character : +
 Enter your second character : =

          +
         + =
        = + =
       = + = +
      + =   + =
     = +     = +
    + =       + =
   = +         = +
  + =           + =
 = +             = +
+ =               + =
= +   ++++1++++   = +
+ =   +++121+++   + =
= +   ++12321++   = +
+ =   +1234321+   + =
= +   123454321   = +
+ =   +1234   +   + =
= +   ++123  ++   = +
+ =   +++12 +++   + =
= +   ++++1++++   = +
+ =               + =
 = +             = +
  + =           + =
   = +         = +
    + =       + =
     = +     = +
      + =   + =
       = + = +
        + = +
         + =
          =
```

```
Enter the number of lines you want to print : 20
For boders:
 Enter your first character : &
 Enter your second character : $

     &
    &$&
   &$ &$
  $&   $&
 &$     &$
$&       $&
&$         &$
$&  &&1&&  $&
&$  &121&  &$
$&  12321  $&
&$  12321  &$
$&  &12 &  $&
&$  &&1&&  &$
$&         $&
 &$       &$
  $&     $&
   &$   &$
    $& $&
     &$&
      &
```

```
Enter the number of lines you want to print : 5
For boders:
 Enter your first character : {
 Enter your second character : }

 {
{ }
} {
 {
```

National University of Computer and Emerging Sciences

Fast School of Computing Spring 2025