National University of Computer and Emerging Sciences

Lab Manual # 7
Programming Fundamentals
(Section BCS- IA)

Course Instructor	Dr. Aamir Wali
Lab Instructor(s)	M.Naveed M.Faraz
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Department of Computer Science

FAST-NU, Lahore, Pakistan

Lab Manual

Objectives

The objectives of this lab are to cover the following:

- For loop (page 273 of textbook)
- do-while loop (page 284 of textbook)
- nested loops (page 291 of textbook)

Exercise 1 (for loop):

Write a program in C++ that checks if a number entered by the user is Palindrome or not.

Palindrome: A palindrome is a word, number, phrase, or other sequence of characters which reads the same backward as forward, such as madam or racecar or the number 10201

For example:

11211 is palindrome
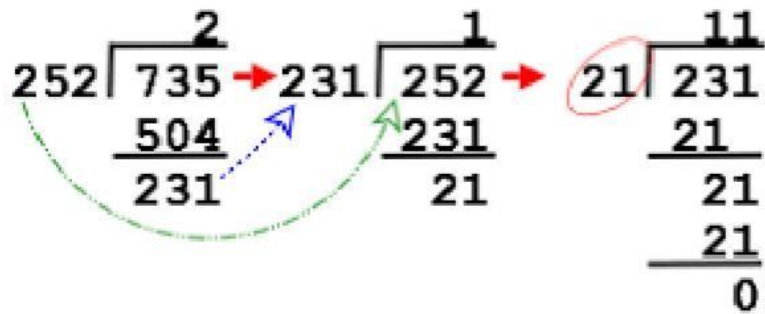
1222 is not a palindrome.

4444 is a palindrome.

Exercise 2 (do-while loop):

The greatest common divisor (GCD) of two integers is the largest integer that evenly divides each of the numbers. Write a C++ program that gives the greatest common divisor of two positive integers. Take these two numbers from the user.

Remember that the GCD of two numbers can be computed using Euclidean Algorithm as follows

```
Euclidean Algorithm Demo:

        2              1              11
   252| 735  → 231| 252  →  21| 231
        504            231            21
        231            21             21
                                      21
                                       0

        GCD(252,735) = 21
```

Sample Run:
Input num1: 252
Input num2: 735

Output
GCD: 21

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Exercise 3 (nested loops):

Write a C++ program that displays the following pattern:

> **For user input** *Starting Number* = 5 and *Rows* = 6, output should be:
> 5 * 6 * 7 * 8 * 9 * 0 *
> 1 * 2 * 3 * 4 * 5 *
> 6 * 7 * 8 * 9 *
> 0 * 1 * 2 *
> 3 * 4 *
> 5 *

Note: Code should be generic i.e. it should run for any starting number ranging from 0 to 9 and any row number.