National University of Computer and Emerging Sciences, Lahore Campus

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Lab No 9			
Course Name:	**Programming Fundamentals**	**Course Code:**	**CS 188**
Program:	**BS(SE)**	**Semester:**	**Fall 2020**
Duration:	**2.5 hours**	**Total Points:**	**40**
Lab Date:	**Saturday, December 5, 2020**	**Weight**	**3%**
Section:	**SE-1A and SE-1B**	**Page(s):**	

Instruction/Notes: **Cheating during the lab will result in negative marks**

Topics Covered: Loops and 2D Array

Us a text editor to create the program and use the g++ compiler to compile your program using the already installed MinGW compiler toolchain

NO ONLINE TOOLS TO BE USED IN THIS LAB ONWARDS

Problem [SHIFT LEFT/RIGHT/UP/DOWN] [10x4 Points]

SHIFT LEFT, SHIFT RIGHT, SHIFT UP, and **SHIFT DOWN** are the types of circular **SHIFTS** that can be performed on a single row/column of a 2D array. Examples of such **SHIFTS** are given in the following table

ROTATION OPERATIOM	Input ARRAY	After ROTATION
ROW 1 SHIFT LEFT	0 1 2 3 4 5 6 7 8 9 10 11	0 1 2 3 **5 6 7 4** 8 9 10 11
ROW 0 SHIFT RIGHT	0 1 2 3 4 5 6 7 8 9 10 11	**3 0 1 2** 4 5 6 7 8 9 10 11
COLUMN 1 SHIFT UP	0 1 2 3 4 5 6 7 8 9 10 11	0 **5** 2 **7** 4 **9** 6 **11** 8 **1** 10 **3**
COLUMN 3 SHIFT DOWN	0 1 2 3 4 5 6 7 8 9 10 11	0 1 2 **11** 4 5 6 **3** 8 9 10 **7**

In this lab we are going to write four functions to perform each of the four **SHIFTS** on a globally defined 2D array of size at most 10 x 10.

A skeleton code is provided with empty function bodies. Your job is to complete the function definitions and show the completed code.