Write C++ programs for the following problems. Ensure that your program compiles and runs correctly. Upload the .cpp files. Name your files exactly as your instructor has specified.

For this project, you have the option of working in a **group of two** students. If you decide to work in a group, please notify your instructor about your intention and the name of your group mate. **Only one submission needs to be made per group.**

Programming Project on Chapter 7
Arrays and Vectors

1. **Lo Shu Magic Square (8 pts) – LoShuMagicSquare.cpp**

   The Lo Shu Magic Square is a grid with 3 rows and 3 columns shown in Figure 1.

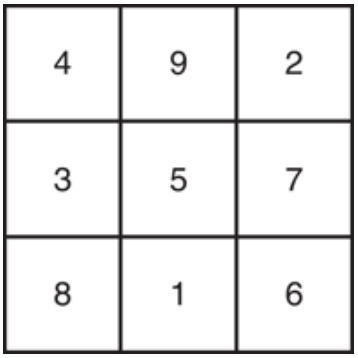

Figure 1: Lo Shu Magic Square

   - The grid contains the numbers 1 through 9 exactly.
   - The sum of each row, each column, and each diagonal all add up to the same number. This is shown in Figure 2.

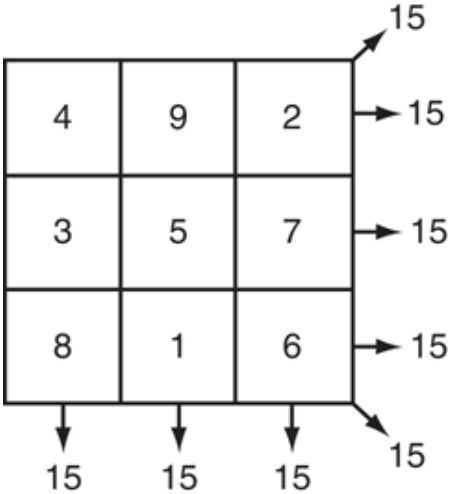

Figure 2: Sums of rows, columns and diagonals

In a program, you can simulate a magic square using a two-dimensional array. Write a function that accepts a two-dimensional array as an argument, and determines whether the array is a Lo Shu Magic Square. Test the function in a program.

2. **Tic, Tac, Toe game (12 pts) – ticTacToe.cpp**

Write a program that allows two players to play a game of tic-tac-toe. Use a two-dimensional `char` array with three rows and three columns as the game board. Each element of the array should be initialized with an asterisk (*). The program should run a loop that does the following:

- Displays the contents of the board array.
- Allows player 1 to select a location on the board for an X. The program should ask the user to enter the row and column numbers.
- Allows player 2 to select a location on the board for an O. The program should ask the user to enter the row and column numbers.
- Determines whether a player has won, or a tie has occurred. If a player has won, the program should declare that player the winner and end. If a tie has occurred, the program should display an appropriate message and end.

Player 1 wins when there are three Xs in a row on the game board. The Xs can appear in a row, in a column, or diagonally across the board. Player 2 wins when there are three Os in a row on the game board. The Os can appear in a row, in a column, or diagonally across the board. A tie occurs when all of the locations on the board are full, but there is no winner.