```
/*******************************************************************************
 * PROGRAMMER : Ali Eshghi
 * STUDENT ID : 1112261
 * CLASS      : CS1B
 * SECTION    : MW 7:30pm
 * Assign #2  : tic-tac-toe game (multi-dimensional arrays)
 * DUE DATE   : 19 September 2019
 ******************************************************************************/

#include "MyHeader.h"
/*******************************************************************************
* Assignment 2
* ------------------------------------------------------------------------------
* This program is a simulation of the tic-tac-toe game. based on the player's
* choice, they can play against the computer, or against a friend.
* If the player tries to play against the computer, randomly, the game starts
* by the player or the computer and the computer has the algorithm to block the
* player and win the game.
*
* If the player decides to start the game with a friend, randomly, the games
* by either of the players by chance. and the players play against each other
* ------------------------------------------------------------------------------
* INPUT  : option      -> play against the computer or a friend
*          tokenChoice -> choice of player to play as 'X' or 'O'
*          playerX     -> Name of the player X
*          playerO     -> Name of the player O
*          row         -> player('s) choice of the row
*          col         -> player('s) choice of the column
*
* ------------------------------------------------------------------------------
* PROCESS: Initializing the board
*          Getting Players name
*          getting players choice of play
*          deciding whose turn is it
*          getting the play from both players
*          checking for the input
*          checking for the win
*
*
* ------------------------------------------------------------------------------
* OUTPUT : Who has won the game
*******************************************************************************/


int main()
{
    /***************************************************************************
    * CONSTANTS
    * --------------------------------------------------------------------------
    * OUTPUT - USED FOR CLASS HEADING
    * --------------------------------------------------------------------------
    * PROGRAMMER  : Programmer's Name
    * CLASS       : Student's Course
    * SECTION     : Class Days and Time
    * LAB_NUM     : Lab Number (specific to this lab)
    * LAB_NAME    : Title of the Assignment
    ***************************************************************************/
    const string PROGRAMMER = "Ali Eshghi";
    const string CLASS      = "CS1B";
    const string SECTION= "MW: 7:30p - 9:50p";
    const int    ASSIGN_NUM = 2;
    const string ASSIGN_NAME= "Tic-Tac-Toe game";

    PrintHeader(PROGRAMMER, CLASS, SECTION, ASSIGN_NUM, ASSIGN_NAME);


    /*************
     * VARIABLES *
     ************/

    string  playerX; //IN & OUT - name of player for token X
    string  playerO; //IN & OUT - name of player for token O
    int     option;      //IN & PROCESS - single or multi player
    int     randToken;   //PROCESS      - random token to start the game
    chartoken;       //PROCESS      - deciding the turn for the players
    charwonPlayer;   //PROCESS & OUT- which token won the game
    char    tokenChoice; //IN & PROCESS - choice of token in single player mode
    charcompToken;   //PROCESS      - system's token in single player mode

    char boardAr[ROW_SIZE][COL_SIZE]; // PROCESS - 2 dimensional array for game


    InitBoard(boardAr);
    //This function initializes each spot in the board to a space ' '.


    OutputInstruct();
    //This function outputs instructions to the users.


    do  // do while loop for continuing the game if the player played the single
    {   //player mode or the game ended in tie

        /***********************************************************************
        * INPUT - gets the input for the option in the menu
        ***********************************************************************/
        time(NULL);

        InitBoard(boardAr);
        //This function initializes each spot in the board to a space ' '.

        cout << "MENU:"             << endl;
        cout << "---------------"   << endl;
        cout << "1 - Single Player" << endl;
        cout << "2 - Multiplayer"   << endl;
        cout << "0 - Exit the Game" << endl << endl;

        cout << "Enter your option to play: ";
        cin  >> option;
        cout << endl << endl;
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        if(option == 1) //option = 1 -> single player mode
        {

            GetPlayers(playerX, playerO, compToken,tokenChoice, option);
            //This function prompts the user and gets the input for the players’
            //names.

            DisplayBoard(boardAr);
            //This function outputs the tic-tac-toe board including the tokens
            // played in the proper format


            /********************************************************************
            * PROCESS - random number generator to get which player starts the
            *           game
            ********************************************************************/
            srand(time(NULL));

            randToken = rand() % 2 + 1;

            if(randToken == 1)
            {
                token = 'X';
            }
            else if(randToken == 2)
            {
                token = 'O';
            }

            wonPlayer = CheckWin(boardAr);
            //This function checks to see if either player has won.

            while(wonPlayer == 'K') //while loop to keep the game going until
            {                       //one of the player has won or the game ends
                                    //in tie

                GetAndCheckInp(boardAr, token, playerX, playerO,
                               option, tokenChoice, compToken);
                //This functions gets each player's play and checks the inputed
                //numbers are in the domain of the row and column of the game.

                cout << endl;

                DisplayBoard(boardAr);
                //This function outputs the tic-tac-toe board including the
                //tokens played in the proper format

                wonPlayer = CheckWin(boardAr);
                //This function checks to see if either player has won.



                if(wonPlayer == 'K') //if no one has one the game, or ended in
                {                    //tie, the game continues
```

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                    token = SwitchToken(token);
                    //This function switches the active player.
                }

            }

            OutputWinner(wonPlayer, playerX, playerO, tokenChoice, compToken,
                         option);

        }




        else if(option == 2) //option = 1 -> single player mode
        {
            GetPlayers(playerX, playerO, compToken ,tokenChoice, option);
            //This function prompts the user and gets the input for the players’
            //names.


            DisplayBoard(boardAr);
            //This function outputs the tic-tac-toe board including the tokens
            // played in the proper format


            /*******************************************************************
            * PROCESS - random number generator to get which player starts the
            *           game
            *******************************************************************/
            srand(time(NULL));

            randToken = rand()% 2 + 1;

            if(randToken == 1)
            {
                token = 'X';
            }
            else if(randToken == 2)
            {
                token = 'O';
            }

            wonPlayer = CheckWin(boardAr);
            //This function checks to see if either player has won.


            while(wonPlayer == 'K') //while loop to keep the game going until
                                    //one of the player has won or the game ends
                                    //in tie
            {

                GetAndCheckInp(boardAr, token, playerX, playerO,
                               option, tokenChoice, compToken);
                //This functions gets each player's play and checks the inputed
                //numbers are in the domain of the row and column of the game.

                cout << endl;

                DisplayBoard(boardAr);
                //This function outputs the tic-tac-toe board including the
                //tokens played in the proper format


                wonPlayer = CheckWin(boardAr);
                //This function checks to see if either player has won.


                if(wonPlayer == 'K') //if no one has one the game, or ended in
                {                    //tie, the game continues
                    token = SwitchToken(token);
                }

            }



            OutputWinner(wonPlayer, playerX, playerO, tokenChoice, compToken,
                         option);



        }

    }while(wonPlayer == 'N' || option != 0 || option == 1);


    cout << "Thank you for playing my tic-tac-toe game. Have a Great day";


    return 0;
}

```