```cpp
/*****************************************************************************
 * 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)
```

```
 56     * LAB_NAME    : Title of the Assignment
 57     *****************************************************************************/
 58     const string PROGRAMMER = "Ali Eshghi";
 59     const string CLASS      = "CS1B";
 60     const string SECTION= "MW: 7:30p - 9:50p";
 61     const int    ASSIGN_NUM = 2;
 62     const string ASSIGN_NAME= "Tic-Tac-Toe game";
 63
 64     PrintHeader(PROGRAMMER, CLASS, SECTION, ASSIGN_NUM, ASSIGN_NAME);
 65
 66
 67     /*************
 68      * VARIABLES *
 69      *************/
 70
 71     string  playerX; //IN & OUT - name of player for token X
 72     string  playerO; //IN & OUT - name of player for token O
 73     int     option;      //IN & PROCESS - single or multi player
 74     int     randToken;   //PROCESS      - random token to start the game
 75     chartoken;       //PROCESS      - deciding the turn for the players
 76     charwonPlayer;   //PROCESS & OUT- which token won the game
 77     char    tokenChoice; //IN & PROCESS - choice of token in single player mode
 78     charcompToken;   //PROCESS      - system's token in single player mode
 79
 80     char boardAr[ROW_SIZE][COL_SIZE]; // PROCESS - 2 dimensional array for game
 81
 82
 83     InitBoard(boardAr);
 84     //This function initializes each spot in the board to a space ' '.
 85
 86
 87     OutputInstruct();
 88     //This function outputs instructions to the users.
 89
 90
 91     do  // do while loop for continuing the game if the player played the single
 92     {   //player mode or the game ended in tie
 93
 94         /*****************************************************************************
 95         * INPUT - gets the input for the option in the menu
 96         *****************************************************************************/
 97         time(NULL);
 98
 99         InitBoard(boardAr);
100         //This function initializes each spot in the board to a space ' '.
101
102         cout << "MENU:"             << endl;
103         cout << "---------------"   << endl;
104         cout << "1 - Single Player" << endl;
105         cout << "2 - Multiplayer"   << endl;
106         cout << "0 - Exit the Game" << endl << endl;
107
108         cout << "Enter your option to play: ";
109         cin  >> option;
110         cout << endl << endl;
```

```
111
112         if(option == 1) //option = 1 -> single player mode
113         {
114
115             GetPlayers(playerX, playerO, compToken,tokenChoice, option);
116             //This function prompts the user and gets the input for the players'
117             //names.
118
119             DisplayBoard(boardAr);
120             //This function outputs the tic-tac-toe board including the tokens
121             // played in the proper format
122
123
124             /*************************************************************************
125             * PROCESS - random number generator to get which player starts the
126             *           game
127             *************************************************************************/
128             srand(time(NULL));
129
130             randToken = rand() % 2 + 1;
131
132             if(randToken == 1)
133             {
134                 token = 'X';
135             }
136             else if(randToken == 2)
137             {
138                 token = 'O';
139             }
140
141             wonPlayer = CheckWin(boardAr);
142             //This function checks to see if either player has won.
143
144             while(wonPlayer == 'K') //while loop to keep the game going until
145             {                       //one of the player has won or the game ends
146                                     //in tie
147
148                 GetAndCheckInp(boardAr, token, playerX, playerO,
149                                option, tokenChoice, compToken);
150                 //This functions gets each player's play and checks the inputed
151                 //numbers are in the domain of the row and column of the game.
152
153                 cout << endl;
154
155                 DisplayBoard(boardAr);
156                 //This function outputs the tic-tac-toe board including the
157                 //tokens played in the proper format
158
159                 wonPlayer = CheckWin(boardAr);
160                 //This function checks to see if either player has won.
161
162
163
164                 if(wonPlayer == 'K') //if no one has one the game, or ended in
165                 {                    //tie, the game continues
```

```
166
167                 token = SwitchToken(token);
168                 //This function switches the active player.
169             }
170
171         }
172
173         OutputWinner(wonPlayer, playerX, playerO, tokenChoice, compToken,
174                      option);
175
176     }
177
178
179
180
181
182     else if(option == 2) //option = 1 -> single player mode
183     {
184         GetPlayers(playerX, playerO, compToken ,tokenChoice, option);
185         //This function prompts the user and gets the input for the players'
186         //names.
187
188
189         DisplayBoard(boardAr);
190         //This function outputs the tic-tac-toe board including the tokens
191         // played in the proper format
192
193
194         /*************************************************************************
195         * PROCESS - random number generator to get which player starts the
196         *           game
197         *************************************************************************/
198         srand(time(NULL));
199
200         randToken = rand()% 2 + 1;
201
202         if(randToken == 1)
203         {
204             token = 'X';
205         }
206         else if(randToken == 2)
207         {
208             token = 'O';
209         }
210
211         wonPlayer = CheckWin(boardAr);
212         //This function checks to see if either player has won.
213
214
215         while(wonPlayer == 'K') //while loop to keep the game going until
216                                 //one of the player has won or the game ends
217                                 //in tie
218         {
219
220             GetAndCheckInp(boardAr, token, playerX, playerO,
```

```
221                                 option, tokenChoice, compToken);
222                 //This functions gets each player's play and checks the inputed
223                 //numbers are in the domain of the row and column of the game.
224
225                 cout << endl;
226
227                 DisplayBoard(boardAr);
228                 //This function outputs the tic-tac-toe board including the
229                 //tokens played in the proper format
230
231
232                 wonPlayer = CheckWin(boardAr);
233                 //This function checks to see if either player has won.
234
235
236                 if(wonPlayer == 'K') //if no one has one the game, or ended in
237                 {                    //tie, the game continues
238                     token = SwitchToken(token);
239                 }
240
241             }
242
243
244
245             OutputWinner(wonPlayer, playerX, playerO, tokenChoice, compToken,
246                          option);
247
248
249
250         }
251
252     }while(wonPlayer == 'N' || option != 0 || option == 1);
253
254
255     cout << "Thank you for playing my tic-tac-toe game. Have a Great day";
256
257
258     return 0;
259 }
260
```