// https://github.com/cpp-paredes1/cs2600-quiz2

```
#include <stdio.h>
#include <stdbool.h>
#include <time.h>

void printOptions(){
	printf("Options:\n");
	printf("a) 2 player mode\n");
	printf("b) 1 player mode (vs CPU)\n");
	printf("Enter option: ");
}

void printBoard(char board[3][3]){
	for(int i = 0; i < 3; i++){
		for(int j = 0; j < 3; j++){
			printf("%c ", board[i][j]);
		}
		printf("\n");
	}
}
bool checkWin(char board[3][3]){
	// horizontal check
	for(int i = 0; i < 3; i++){
		if(board[0][i] == board[1][i] && board[1][i] == board[2][i] && board[0][i] != '-'){
			return true;
		}
	}
	// vertical check
	for(int i = 0; i < 3; i++){
		if(board[i][0] == board[i][1] && board[i][1] == board[i][2] && board[i][0] != '-'){
			return true;
		}
	}
	// diagonal check
	if(board[0][0] == board[1][1] && board[1][1] == board[2][2] && board[0][0] != '-'){
		return true;
	}
	// diagonal check
	if(board[2][0] == board[1][1] && board[1][1] == board[0][2] && board[2][0] != '-'){
		return true;
	}
	return false;
}
bool checkValidMove(int row, int column, char board[3][3]){
	// if the board spot is empty and the spot isn't out of bounds it is valid
	if(board[row][column] == '-' && row >= 0 && row < 3 && column >= 0 && column < 3){
		return true;
	}
	return false;
}
```

```
void tictactoe(bool p2Human){

	// setup random based on time
	time_t t;
	srand((unsigned)time(&t));

	int turnCounter = 1;
	if(!p2Human){
		printf("Would you like to go first or second (1 = 1st; 2 = 2nd): ");
		scanf("%d",&turnCounter);
	}

	// initialize board to be empty
	char board[3][3];
	for(int i = 0; i < 3; i++){
		for(int j = 0; j < 3; j++){
			board[i][j] = '-';
		}
	}

	// track if game is finished
	bool gameFinished = false;
	bool validMove = false;

	// variables to track which row/column
	int row;
	int column;

	// game main loop
	while(!gameFinished){

		// output board
		printBoard(board);

		// if vs CPU, computer picks random spot
		if(!p2Human && turnCounter == 2){
			// random spot
			row = rand()%3;
			column = rand()%3;
			// check validity
			while(!checkValidMove(row, column, board)){
				// remake random spot
				row = rand()%3;
				column = rand()%3;
			}
			printf("The computer has picked: (%d,%d).\n", row,column);
		} else{
			// get p2 input
			printf("Input the row (0-2): ");
			scanf("%d", &row);
			printf("Input the column (0-2): ");
			scanf("%d", &column);
		}
		// check validity
```

```
            validMove = checkValidMove(row, column, board);
            // update board / turn counter
            if(turnCounter == 1){
                  if(validMove){
                        board[row][column] = 'x';
                        turnCounter = 2;
                  } else{
                        printf("Invalid row/column combination. Pick again.\n");
                  }
            } else {
                  if(validMove){
                        board[row][column] = 'o';
                        turnCounter = 1;
                  } else{
                        printf("Invalid row/column combination. Pick again.\n");
                  }
            }
            // check if board is in a winning state
            gameFinished = checkWin(board);
      }
      printBoard(board);
      if(turnCounter == 2){
            printf("Player 1 wins.");
      } else{
            printf("Player 2 wins.");
      }
}

int main(){
      // prompt for which gaem they wish to play
      printOptions();
      // read their option
      char option;
      scanf("%c",&option);
      // if its tictactoe --> run tictactoe program
      switch(option){
            case 'a':
                  tictactoe(true);
                  break;
            case 'b':
                  tictactoe(false);
                  break;
      }
      return 0;
}
```

```
PS C:\Users\minno\Documents\Code\CS2600\quiz\quiz 2> .\tac.exe
Options:
a) 2 player mode
b) 1 player mode (vs CPU)
Enter option: a
- - -
- - -
- - -
Input the row (0-2): 0
Input the column (0-2): 0
x - -
- - -
- - -
Input the row (0-2): 1
Input the column (0-2): 3
Invalid row/column combination. Pick again.
x - -
- - -
- - -
Input the row (0-2): 1
Input the column (0-2): 1
x - -
- o -
- - -
Input the row (0-2): 0
Input the column (0-2): 0
Invalid row/column combination. Pick again.
x - -
- o -
- - -
Input the row (0-2): 1
Input the column (0-2): 0
x - -
x o -
- - -
Input the row (0-2): 0
Input the column (0-2): 2
x - o
x o -
- - -
Input the row (0-2): 2
Input the column (0-2): 0
x - o
x o -
x - -
Player 1 wins.
```

```
PS C:\Users\minno\Documents\Code\CS2600\quiz\quiz 2> .\tac.exe
Options:
a) 2 player mode
b) 1 player mode (vs CPU)
Enter option: b
Would you like to go first or second (1 = 1st; 2 = 2nd): 1
- - -
- - -
- - -
Input the row (0-2): 0
Input the column (0-2): 0
x - -
- - -
- - -
The computer has picked: (1,2).
x - -
- - o
- - -
Input the row (0-2): 0
Input the column (0-2): 1
x x -
- - o
- - -
The computer has picked: (1,0).
x x -
o - o
- - -
Input the row (0-2): 0
Input the column (0-2): 2
x x x
o - o
- - -
Player 1 wins.
```