TASK 4

#include <iostream>

#include <vector>

using namespace std;

const int ROWS = 6;

const int COLS = 7;

const char EMPTY = ' ';

const char PLAYER1 = 'X';

const char PLAYER2 = 'O';

void printBoard(const vector<vector<char>>& board) {

for (int i = 0; i < ROWS; ++i) {

for (int j = 0; j < COLS; ++j) {

cout << "| " << board[i][j] << " ";

}

cout << "|\n";

}

cout << "-----------------------------\n";

cout << "| 1 | 2 | 3 | 4 | 5 | 6 | 7 |\n";

cout << "-----------------------------\n";

}

bool isValidMove(const vector<vector<char>>& board, int col) {

return col >= 0 && col < COLS && board[0][col] == EMPTY;

}

void makeMove(vector<vector<char>>& board, int col, char player) {

for (int i = ROWS - 1; i >= 0; --i) {

if (board[i][col] == EMPTY) {

board[i][col] = player;

break;

}

}

}

bool isBoardFull(const vector<vector<char>>& board) {

for (int i = 0; i < ROWS; ++i) {

for (int j = 0; j < COLS; ++j) {

if (board[i][j] == EMPTY) {

return false;

}

}

}

return true;

}

bool checkWin(const vector<vector<char>>& board, char player) {

for (int i = 0; i < ROWS; ++i) {

for (int j = 0; j <= COLS - 4; ++j) {

if (board[i][j] == player && board[i][j + 1] == player &&

board[i][j + 2] == player && board[i][j + 3] == player) {

return true;

}

}

}

for (int i = 0; i <= ROWS - 4; ++i) {

for (int j = 0; j < COLS; ++j) {

if (board[i][j] == player && board[i + 1][j] == player &&

board[i + 2][j] == player && board[i + 3][j] == player) {

return true;

}

}

}

for (int i = 0; i <= ROWS - 4; ++i) {

for (int j = 0; j <= COLS - 4; ++j) {

if (board[i][j] == player && board[i + 1][j + 1] == player &&

board[i + 2][j + 2] == player && board[i + 3][j + 3] == player) {

return true;

}

}

}

for (int i = 3; i < ROWS; ++i) {

for (int j = 0; j <= COLS - 4; ++j) {

if (board[i][j] == player && board[i - 1][j + 1] == player &&

board[i - 2][j + 2] == player && board[i - 3][j + 3] == player) {

return true;

}

}

}

return false;

}

int main() {

vector<vector<char>> board(ROWS, vector<char>(COLS, EMPTY));

bool player1Turn = true;

cout << "Welcome to Connect 4!\n";

while (true) {

printBoard(board);

char currentPlayer = (player1Turn) ? PLAYER1 : PLAYER2;

cout << "Player " << currentPlayer << ", enter your move (1-7): ";

int col;

cin >> col;

col--;

if (isValidMove(board, col)) {

makeMove(board, col, currentPlayer);

if (checkWin(board, currentPlayer)) {

printBoard(board);

cout << "Player " << currentPlayer << " wins! \n";

cout << "Congratulations!\n";

break;

}

if (isBoardFull(board)) {

printBoard(board);

cout << "It's a tie! Well played, both players!\n";

break;

}

player1Turn = !player1Turn;

} else {

cout << "Invalid move.\n";

}

}

return 0;

}