**Project PF Fundamentals**

**Code:**

#include<iostream>

#include<cstdlib>

#include<ctime>

using namespace std;

bool winC1P1(int row); //win condition for player 1 when connect 4 at row

bool winC2P2(int col); //win condition for player 2 when connect 4 at column

bool winC1P2(int row); //win condition for player 2 when connect 4 at row

bool winC3P1(int row,int column); //win condition for player 1 when connect 4 at 1st diagnol

bool winC4P1(int row, int column); //win condition for player 1 when connect 4 at 2nd diagnol

bool winC3P2(int row, int column); //win condition for player 2 when connect 4 at first diagnol

bool winC2P1( int ); //win condition for player 1 when connect 4 at column

bool winC4P2(int row, int column);//win condition for player 1 when connect 4 at 2nd diagnol

void credits(); // credits function for print credits

void playgame(); // play game function for run the whole game

void instruction(); // instructions function is make for rules of games

int turn(int); // turn function is make for calculating row when user entered column

void board(int,int,char); // board function is make for print board and changing characters in board

int col1 = 8, col2 = 8, col3 = 8, col4 = 8, col5 = 8, col6 = 8, col7 = 8,col8=8;

char arr[8][8] = {{'\*','\*','\*','\*','\*','\*','\*','\*'},

{'\*','\*','\*','\*','\*','\*','\*','\*'},

{'\*','\*','\*','\*','\*','\*','\*','\*'},

{'\*','\*','\*','\*','\*','\*','\*','\*'},

{'\*','\*','\*','\*','\*','\*','\*','\*'},

{'\*','\*','\*','\*','\*','\*','\*','\*'},

{'\*','\*','\*','\*','\*','\*','\*','\*'},

{'\*','\*','\*','\*','\*','\*','\*','\*'} };

int main()

{

cout << "\t\t Select the menu\t" << endl;

cout << "\t\tEnter 1 for instructions" << endl;

cout << "\t\tEnter 2 for credit" << endl;

cout << "\t\tEnter 3 for play game" << endl;

cout << "\t\tEnter 4 for exit the game" << endl;

cout << "\t\tEnter Input : ";

int n;

cin >> n;

switch (n) // switch case is make for the menu driven program

{

case 1:

instruction();

break;

case 2:

credits();

break;

case 3:

playgame();

break;

case 4:

break;

}

}

void credits() //function defination of credits function

{

cout << "\t\tMuhammad Ammar\t\t" << "\t\tAbdul Basit\t\t";

}

void instruction() //function defination of instruction function

{

cout << " \*Instructions\*" << endl;

cout << "In this game two players are Participated" << endl;

cout << "Player 1 should have A element & Player 2 should have B elsment" << endl;

cout << "Turns of players are one by one" << endl;

cout << "When 4 element of a player same at row, column and diagnol appears firstly than he wins the game" << endl;

}

void board(int r, int c, char ch) // function defination of board function

{

arr[r][c - 1] = ch;

for (int i = 1; i <=8; i++) // this loop is only used for print column numbers

{

cout << i << '|';

}

cout << endl;

for (int i = 0; i < 8; i++) //this loop is used for print characters that stored in array

{

for (int j = 0; j < 8; j++)

{

cout << arr[i][j] << '|';

}

cout << endl;

}

}

int turn(int t) // function defiantion for calculating the rows

{

if (t == 1)

{

if (col1 > 0)

{

col1--;

return col1;

}

else

return -1;

}

else if (t == 2)

{

if (col2 > 0)

{

col2--;

return col2;

}

else

return -1;

}

else if (t == 3)

{

if (col3 > 0)

{

col3--;

return col3;

}

else

return -1;

}

else if (t == 4)

{

if (col4 > 0)

{

col4--;

return col4;

}

else

return -1;

}

else if (t == 5)

{

if (col5 > 0)

{

col5--;

return col5;

}

else

return -1;

}

else if (t == 6)

{

if (col6 > 0)

{

col6--;

return col6;

}

else

return -1;

}

else if (t == 7)

{

if (col7 > 0)

{

col7--;

return col7;

}

else

return -1;

}

else if (t == 8)

{

if (col8 > 0)

{

col8--;

return col8;

}

else

return -1;

}

else

return -1;

}

// functions definations for winning condition starting from this

bool winC1P1(int row)

{ //row condition for player 1

int count = 0;

for (int i = 0; i < 8; i++)

{

if (arr[row][i] == 'A') //we fix row because we check condition of connect 4 at row

{

count++;

if (count == 4)

return true;

}

else

count = 0;

}

return false;

}

bool winC1P2(int row) //row condition for player2

{

int count = 0;

for (int i = 0; i < 8; i++) //we fix row because we check condition of connect 4 at row

{

if (arr[row][i] == 'B')

{

count++;

if (count == 4)

return true;

}

else

count = 0;

}

return false;

}

bool winC2P1(int a) // column condition player 1

{

int count = 0;

a--; //this decrement is used for we set our board for user input from 1 to 8 column

for (int j = 0; j < 8; j++)

{

if (arr[j][a] == 'A') //we fix column because we check condition of connect 4 at column

{

count++;

if (count == 4)

return true;

}

else

count = 0;

}

return false;

}

bool winC2P2(int a) //column condition for player 2

{

int count = 0;

a--;

for (int j = 0; j < 8; j++)

{

if (arr[j][a] == 'B')

{

count++;

if (count == 4)

return true;

}

else

count = 0;

}

return false;

}

bool winC3P1(int row, int column) //1st diagnol condition for win player 1

{

int count = 0;

column--;

if (row >= column){

row -= column;

column = 0;

while (row < 8){

if (arr[row][column] == 'A'){

count++;

if (count == 4)

return true;

}

else

count = 0;

row++;

column++;

}

}

else

{

column -= row;

row = 0;

while (column < 8)

{

if (arr[row][column] == 'A'){

count++;

if (count == 4)

return true;

}

else

count = 0;

row++;

column++;

}

}

return false;

}

bool winC4P1(int row, int column) //2nd diagnol condition for win player 1

{

int count = 0;

column--;

int d = row + column;

if (d < 8 && d>3)

{

column = d;

row = 0;

while (row < 8)

{

if (arr[row][column] == 'A')

{

count++;

if (count == 4)

return true;

}

else

count = 0;

row++;

column--;

}

}

else if (d > 6 && d < 9)

{

column = 6;

row = d - 6;

while (row < 6)

{

if (arr[row][column] == 'A')

{

count++;

if (count == 4)

return true;

}

else

count = 0;

row++;

column--;

}

}

return false;

}

bool winC3P2(int row, int column) //1st diagnol condition for connect 4 for for player 2

{

int count = 0;

column--;

if (row >= column) {

row -= column;

column = 0;

while (row < 8) {

if (arr[row][column] == 'B') {

count++;

if (count == 4)

return true;

}

else

count = 0;

row++;

column++;

}

}

else

{

column -= row;

row = 0;

while (column < 8)

{

if (arr[row][column] == 'B') {

count++;

if (count == 4)

return true;

}

else

count = 0;

row++;

column++;

}

}

return false;

}

bool winC4P2(int row, int column) //2nd diagnol condition for connect 4 for player 2

{

int count = 0;

column--;

int d = row + column;

if (d < 7 && d>2){

column = d;

row = 0;

while (row < 8)

{

if (arr[row][column] == 'B'){

count++;

if (count == 4)

return true;

}

else

count = 0;

row++;

column--;

}

}

else if (d > 6 && d < 9)

{

column = 6;

row = d - 6;

while (row < 6)

{

if (arr[row][column] == 'B'){

count++;

if (count == 4)

return true;

}

else

count = 0;

row++;

column--;

}

}

return false;

}

void playgame()

{

int x;

cout << " \t\t\*Connect 4 Game" << endl;

for (int i = 1; i <=8; i++){

cout << i << '|';

}

cout << endl; //loop is used for print board(\*) for first time

for (int i = 0; i < 8; i++){

for (int j = 0; j < 8; j++){

cout << arr[i][j] << '|';

}

cout << endl;

}

int count = 1;

while (count < 64) {

int p1 = 0, p2 = 0;

int col = 0;

int row = 0;

while (p1 < 1) {

cout << "Player1 Turn" << endl << "Enter colmn in which you place your: ";//take move of p1

cin >> col;

system("cls");

row = turn(col);

while (row == -1) {

cout << "No space in this Column Try in another column: ";

cin >> col;

row = turn(col);

}

board(row, col, 'A');

p1++;

} //condition checking is player 1 winning or not

if (winC1P1(row) == true) {

cout << "Congratulations!! Player 1 is Winner" << endl;

break;

}

if (winC2P1(col) == true) {

cout << "Congratulations!! Player 1 is Winner" << endl;

break;

}

if (winC3P1(row, col) == true) {

cout << "Congratulations!! Player 1 is Winner" << endl;

break;

}

if (winC4P1(row, col) == true) {

cout << "Congratulations!! Player 1 is Winner" << endl;

break;

}

while (p2 < 1) {

cout << "Player2 Turn" << endl << "Enter colmn in which you Entered your element: ";

col = 0;

cin >> col;

system("cls");

row = turn(col);

while (row == -1) {

cout << "No Space in this column Try in another column";

cin >> col;

row = turn(col);

}

board(row, col, 'B');

p2++;

} //condition checking is player 2 is winning or not

if (winC1P2(row) == true) {

cout << "Player 2 is Winner" << endl;

break;

}

if (winC2P2(col) == true) {

cout << "Player 2 is Winner" << endl;

break;

}

if (winC3P2(row, col) == true) {

cout << "Player 2 is Winner" << endl;

break;

}

if (winC4P2(row, col) == true) {

cout << "Player 2 is Winner" << endl;

break;

}

count++;

if (count == 64) { //if statement is used for draw statement

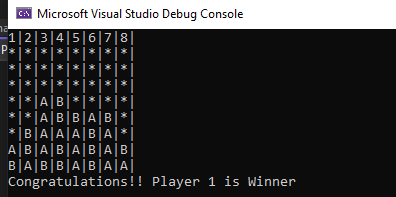
cout << "Game is Draw";

}

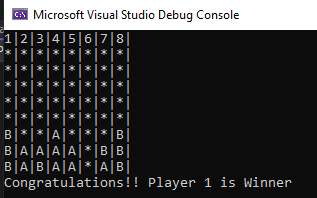
}

}

**Win at Column Condition**



**Win at Row Condition**



**Win at Diagnol Condition**

