***3.tic tac toe game:***

#include <iostream>

#include<list>

#include <cstdlib>

#include<string>

#include <ctime>

using namespace std;

typedef struct{

int \*row;

}WinList;

class Player {

private:

string name;

int score;

public:

Player() :Player {""}{}

Player(string n) :score{0}, name{n}{}

void won(){

score++;

}

int getScore(){

return this->score;

}

string getName(){

return this->name;

}

};

class Game {

private:

char board[9];

int emptyIndex[9];

int gameOn, againstComputer;

int emptyCount;

WinList winlist[8];

void displayBoard(){

system("cls");

cout<<"\t\t\t<=======================================>"<<endl;

cout<<"\t\t\t Tic Tac Toe "<<endl;

cout<<"\t\t\t<=======================================>"<<endl<<endl<<endl<<endl<<endl;

cout <<endl;

cout << "\t\t\t\t\t | | "<<endl;

cout << "\t\t\t\t\t "<< board[0] <<" | "<<board[1]<<" | "<<board[2]<<endl;

cout << "\t\t\t\t\t | | "<<endl;

cout << "\t\t\t\t\t-----------"<<endl;

cout << "\t\t\t\t\t | | "<<endl;

cout << "\t\t\t\t\t "<< board[3] <<" | "<<board[4]<<" | "<<board[5]<<endl;

cout << "\t\t\t\t\t | | "<<endl;

cout << "\t\t\t\t\t-----------"<<endl;

cout << "\t\t\t\t\t | | "<<endl;

cout << "\t\t\t\t\t "<< board[6] <<" | "<<board[7]<<" | "<<board[8]<<endl;

cout << "\t\t\t\t\t | | "<<endl;

cout <<endl;

}

void computerInput(){

int pos;

pos = rand()%10; //generate any value between 1-9 randomly

if(emptyIndex[pos] == 1){

if(emptyCount < 0)

return;

computerInput();

} else {

cout<< "Computer choose: " << pos+1 << endl;

emptyIndex[pos] =1;

emptyCount-=1;

board[pos] = 'O';

}

}

void playerInput(Player &player){

int pos;

cout << endl;

cout << "\t " << player.getName() <<" Turn"<<endl;

cout <<"\t Enter the position(1-9):" << endl;

cin >> pos;

pos -=1;

if(emptyIndex[pos] == 1){

cout << "-----Position not empty-------"<< endl;

playerInput(player);

} else {

emptyIndex[pos] =1;

emptyCount-=1;

player.getName().compare("Your") == 0 ? board[pos] ='X': board[pos] ='O';

}

}

void checkWin(Player &p1,Player &p2){

int i,j,k;

bool flag = false;

char first\_symbol;

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

first\_symbol = board[winlist[i].row[0]];

if((first\_symbol != 'X') && (first\_symbol != 'O')){

flag = false;

continue;

}

flag = true;

for(j=0;j<3;j++){

if(first\_symbol != board[winlist[i].row[j]]){

flag = false;

break;

}

}

if(flag){

gameOn = 0;

if(first\_symbol == 'X'){

cout << "-----------------------"<< endl;

cout << "\t You WIN"<< endl;

cout << "-----------------------"<< endl;

p1.won();

} else {

p2.won();

if(againstComputer){

cout << "-----------------------"<< endl;

cout << "\t Computer WON"<< endl;

cout << "-----------------------"<< endl;

} else {

cout << "-----------------------"<< endl;

cout << "\t Your friend WON"<< endl;

cout << "-----------------------"<< endl;

}

}

displayScore(p1,p2); //display the score of both the player

break;

}

}

}

void play(Player &p1,Player &p2){

char rematch ='\0';

int hand = 0;

gameOn =1;

displayBoard();

while((emptyCount > 0) && (gameOn != 0)){

if(againstComputer)

hand == 1 ? computerInput(): playerInput(p2);

else

hand == 1 ? playerInput(p1): playerInput(p2);

hand= !hand;

displayBoard();

checkWin(p1,p2);

}

if (emptyCount <=0){

cout << " -----------------------"<< endl;

cout << "\t No WINNER"<< endl;

cout << " -----------------------"<< endl;

}

cout<< endl;

cout << "Rematch Y/N: ";

cin >> rematch;

if((rematch == 'Y')||(rematch == 'y')){

init();

play(p1,p2);

}

}

void displayScore(Player &p1, Player &p2){

cout << endl;

cout << "\t SCORE: \t";

if(againstComputer)

cout<<" You: " <<p1.getScore()<<" \t Computer: "<<p2.getScore()<< endl;

else

cout<<" You: " <<p1.getScore()<<" \t Your friend: "<<p2.getScore()<< endl;

}

public:

Game(): emptyCount{0}, gameOn{1}, againstComputer{0}{

init();

winlist[0].row = new int[3]{0,1,2};

winlist[1].row = new int[3]{3,4,5};

winlist[2].row = new int[3]{6,7,8};

winlist[3].row = new int[3]{0,3,6};

winlist[4].row = new int[3]{1,4,7};

winlist[5].row = new int[3]{2,5,8};

winlist[6].row = new int[3]{0,4,8};

winlist[7].row = new int[3]{2,4,6};

}

void init(){

gameOn = 1;

emptyCount =0;

srand(time(0));

for(size\_t i=0; i<10; i++){

emptyIndex[i] = 0;

board[i] = ' ';

emptyCount++;

}

emptyCount--;

}

void onePlayerGame(){

Player p("Your");

Player c("Computer");

cout << " -----------------------"<< endl;

cout << "\t You: X \t Computer: O"<< endl;

cout << " -----------------------"<< endl;

cout << endl;

againstComputer = 1;

play(c,p);

}

void twoPlayerGame(){

Player p("Your");

Player c("Your friend");

cout << " -----------------------"<< endl;

cout << "\t You: X \t Your friend: O"<< endl;

cout << " -----------------------"<< endl;

cout << endl;

againstComputer = 0;

play(c,p);

}

};

int main()

{

system("color 0E");

system("title Tic Tac Toe @copyassignment");

int ch;

while(1){

cout<<"\t\t\t<=======================================>"<<endl;

cout<<"\t\t\t Welcome to the Game "<<endl;

cout<<"\t\t\t Tic Tac Toe "<<endl;

cout<<"\t\t\t<=======================================>"<<endl<<endl<<endl<<endl<<endl;

cout<< " <----------Please choose the Mode---------->" << endl << endl;

cout << "\t 1. Play with computer" <<endl;

cout << "\t 2. Play with friend" <<endl;

cout << "\t 3. To exit " <<endl;

cout <<" <------------------------------------------>" << endl;

cout << endl;

cout <<"\t Select an option from above" << endl;

cin >> ch;

switch(ch){

case 1:{

Game \*game = new Game;

game->init();

game->onePlayerGame();

}

break;

case 2:{

Game \*game = new Game;

game->init();

game->twoPlayerGame();

}

break;

case 3:

return 0;

default:

cout << "Invalid Option! TRY AGAIN";

}

}

return 0;

}

Output:

<=======================================>

Tic Tac Toe

<=======================================>

<----------Please choose the Mode---------->

1. Play with computer

2. Play with friend

3. To exit

<------------------------------------------>

Select an option from above

1

-----------------------

You: X Computer: O

-----------------------

<=======================================>

Welcome to the Game

Tic Tac Toe

<=======================================>

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Your Turn

Enter the position(1-9):

1

<=======================================>

Tic Tac Toe

<=======================================>

| |

X | |

| |

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| |

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| |

| |

| |

Computer choose: 4

<=======================================>

Tic Tac Toe

<=======================================>

| |

X | |

| |

-----------

| |

O | |

| |

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| |

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