Mastermind (Board Game)

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**About the Mastermind Board Game:**

Mastermind is a coding game that challenges user to solve random codes.

Total of 8 colors are given.

4 random colors are chosen.

User must guess all the right colors as well as getting the colors in the right place to win the game.

The colors may overlap.

There will be only 10 turns for the user to experiment different color codes.

The Program will tell the user if the color is right.

The Program will tell the user if the place is right.

The user must think it through to solve the code.

**How I started coding:**

Utilized random number generator.

Begin creating outline with if-statements.

Converted random numbers (1-8) into colors.

Created switch statement and do/while loop to set difficulty.

R = Red, B = Blue, G = Green, Y = Yellow, O = Orange,

P = Purple, W = White, and L = Black.

To convert numbers into characters, utilized Ternary Op.

Mainly used Array to organize the numbers.

For Loop was used to make turn counter.

Used Boolean statement to compare and display if user input and answer matched.

When all Boolean codes matched, returned true, displayed Win.

**Code:**

/\*

\* File: main.cpp

\* Author: Minkyu R. Park

\* Created on May 22, 2018, 10:00 AM

\* Purpose: Implementing Master Mind Game 2

\*/

//System Libraries Here

#include <iostream>//I/O Library -> cout, endl

#include <cstdlib>//Rand/Srand

#include <ctime>//Time Fuction

#include <cstring>//String Fuction

#include <vector>//Vector Function

using namespace std;

//User Libraries Here

//Global Constants Only, No Global Variables

//Like PI, e, Gravity, or conversions

//Function Prototypes Here

char LEVEL(char); //Set Difficulty Level

void answer1(int [], char []); //Set Answers for Level 1

void answer2(int \*, char \*); //Set Answers for level 2

bool checkWon(char [], char []); //Check Answers for Level 1

bool checkWon2(vector<char>, char \*); //Check Answers for Level 2

//Program Execution Begins Here

int main(int argc, char\*\* argv) {

//Set Random Number Seed

srand(static\_cast<unsigned int> (time(0)));

//Declare all Variables Here

int color[5]; //Number of Colors Array

for (int i = 0; i < 5; i++) { //Set Random Answers using For Loop

color[i] = rand() % 8; //Random Colors (1, 8)

}

char ans[5]; //Number of Answers Array

char usrCh[5];//Input User Choice Array

char choice;

bool clRight1[4]; //bool Color Right

bool plRight1[4]; //bool Place Right

vector<bool> clRight2(5); //Vector bool Color Right

vector<bool> plRight2(5); //Vector bool Place Right

string level; //String level comment

level = "\*\*\*DIFFICULTY LEVEL\*\*\* ";

//Display menu

choice = LEVEL(choice);

if (choice >= '1' && choice <= '2') { //Input 1 for Difficulty Level 1

switch (choice) { //Input 2 for Difficulty Level 2

case '1':

{

//Four color is randomly chosen from here

//Using switch, color 1 - 4 is randomly chosen here as answers

//User must figure out what the code is in correct order

answer1(color, ans); //Call Function Random Set Answers 1

for (int i = 0; i < 4; i++) { //Initialize Color Right, Place Right

clRight1[i] = false;

plRight1[i] = false;

}

cout << level << "1" << endl;

cout << "You must try to solve the 4 colors randomly assigned. ";

cout << "You have up to 10 guesses to get the 4 colors right." << endl;

//Main game programming starts here

//Counter is set from 0 to 9 for user to have total of 10 tries

//User guesses and the program will display to user if

//the guess are correct, right color but wrong place, or incorrect

for (int counter = 0; counter <= 9; counter++) {

cin >> usrCh[0] >> usrCh[1] >> usrCh[2] >> usrCh[3];

cout << "The colors consist of : R=RED, B=BLUE, G=GREEN, Y=YELLOW, "

<< "O=ORANGE,P=PURPLE, W=WHITE, and L=BLACK" << endl;

cout << "HINT: THE COLORS MAY OVERLAP. TRY ALL POSSIBLE COLORS "

<< "AND IF THE ANSWER IS NOT FOUND, TRY OVERLAPPING COLORS " << endl;

if (checkWon(usrCh, ans)) { //Call Function to Compare User Choice and Answers

cout << "You Win!!" << endl;

exit(0);

} else if (counter == 9) { //Counter starts 0-9; User Lose Game Ends

cout << "You Lose!!" << endl;

cout << "The answer is! " << ans[0] << " " << ans[1] << " " << ans[2] << " " << ans[3] << endl;

exit(0);

}

}

case '2':

{

//Five color is randomly chosen from here

//Using switch, color 1 - 5 is randomly chosen here as answers

//User must figure out what the code is in correct order

answer2(color, ans); //Call Function Random Set Answers 2

for (int i = 0; i < 5; i++) { //Initialize Color Right, Place Right

clRight2[i] = false;

plRight2[i] = false;

}

cout << "Wow did you beat difficulty level 1 already? " << endl;

cout << level << "2" << endl;

cout << "You must try to solve the 5 colors randomly assigned. "

<< "You have up to 10 guesses to get the 5 colors right." << endl;

//Main game programming starts here

//Counter is set from 0 to 9 for user to have total of 10 tries

//User guesses and the program will display to user if

//the guess are correct, right color but wrong place, or incorrect

}

for (int counter = 0; counter <= 9; counter++) {

cin >> usrCh[0] >> usrCh[1] >> usrCh[2] >> usrCh[3] >> usrCh[4];

cout << "The colors consist of : R=RED, B=BLUE, G=GREEN, Y=YELLOW, "

<< "O=ORANGE,P=PURPLE, W=WHITE, and L=BLACK" << endl;

cout << "HINT: THE COLORS MAY OVERLAP. TRY ALL POSSIBLE COLORS "

<< "AND IF THE ANSWER IS NOT FOUND, TRY OVERLAPPING COLORS " << endl;

vector<char>usrVect; //Using Vector to Fill User Choice

for (int i=0; i<5; i++){

usrVect.push\_back(usrCh[i]);

}

if (checkWon2(usrVect, ans)){ //Call Function to Compare User Choice and Answers

cout << "You Win!!" << endl;

exit(0);

} else if (counter == 9) { //Counter starts 0-9; User Lose Game Ends

cout << "You Lose!!" << endl;

cout << "The answer is! " << ans[0] << " " << ans[1]

<< " " << ans[2] << " " << ans[3] << endl;

exit(0);

}

}

}

}

}

//Exit

return 0;

}

char LEVEL(char choice) {

//Basic explanation of how the game works is written here

//This information will display for user to follow while playing the game

//The note of R=Red, B=Blue, G=Green, Y=Yellow, O=Orange, P=Purple, W=White and L=Black

//will continue to display for the player while playing

cout << "This Program plays a game called MasterMind" << endl;

cout << "There is 8 colors you can choose from to solve the code" << endl;

cout << "Find specific colors and the orders of the colors"

<<"that matches exactly with the answer" << endl;

cout << "The colors consist of : R=RED, B=BLUE, G=GREEN, Y=YELLOW, "

<< "O=ORANGE,P=PURPLE, W=WHITE, and L=BLACK" << endl;

cout << "Input your choice of colors as following" << endl;

cout << "ALL CAPS; 1stChoice 2ndChoice 3rdChoice 4thChoice" << endl;

do {

cout << "Choose from the following Menu" << endl;

cout << "Type 1 for MasterMind Difficulty Level 1" << endl;

cout << "Type 2 for MasterMind Difficulty Level 2" << endl;

cin>>choice;

} while (choice == 1 || choice == 2);

return choice;

}

void answer1(int color[], char ans[]) { //Void Function, Set Answer 1

ans[0] = (color[0] == 0 ? 'R' : (color[0] == 1 ? 'B' :

(color[0] == 2 ? 'G' : (color[0] == 3 ? 'Y' :

(color[0] == 4 ? 'O' : (color[0] == 5 ? 'P' :

(color[0] == 6 ? 'W' : 'L')))))));

ans[1] = (color[1] == 0 ? 'R' : (color[1] == 1 ? 'B' :

(color[1] == 2 ? 'G' : (color[1] == 3 ? 'Y' :

(color[1] == 4 ? 'O' : (color[1] == 5 ? 'P' :

(color[1] == 6 ? 'W' : 'L')))))));

ans[2] = (color[2] == 0 ? 'R' : (color[2] == 1 ? 'B' :

(color[2] == 2 ? 'G' : (color[2] == 3 ? 'Y' :

(color[2] == 4 ? 'O' : (color[2] == 5 ? 'P' :

(color[2] == 6 ? 'W' : 'L')))))));

ans[3] = (color[3] == 0 ? 'R' : (color[3] == 1 ? 'B' :

(color[3] == 2 ? 'G' : (color[3] == 3 ? 'Y' :

(color[3] == 4 ? 'O' : (color[3] == 5 ? 'P' :

(color[3] == 6 ? 'W' : 'L')))))));

}

void answer2(int \*color, char \*ans) { //Void Function, Set Answer 2

\*(ans + 0) = (\*(color + 0) == 0 ? 'R' : (\*(color + 0) == 1 ? 'B' :

(\*(color + 0) == 2 ? 'G' : (\*(color + 0) == 3 ? 'Y' :

(\*(color + 0) == 4 ? 'O' : (\*(color + 0) == 5 ? 'P' :

(\*(color + 0) == 6 ? 'W' : 'L')))))));

\*(ans + 1) = (\*(color + 1) == 0 ? 'R' : (\*(color + 1) == 1 ? 'B' :

(\*(color + 1) == 2 ? 'G' : (\*(color + 1) == 3 ? 'Y' :

(\*(color + 1) == 4 ? 'O' : (\*(color + 1) == 5 ? 'P' :

(\*(color + 1) == 6 ? 'W' : 'L')))))));

\*(ans + 2) = (\*(color + 2) == 0 ? 'R' : (\*(color + 2) == 1 ? 'B' :

(\*(color + 2) == 2 ? 'G' : (\*(color + 2) == 3 ? 'Y' :

(\*(color + 2) == 4 ? 'O' : (\*(color + 2) == 5 ? 'P' :

(\*(color + 2) == 6 ? 'W' : 'L')))))));

\*(ans + 3) = (\*(color + 3) == 0 ? 'R' : (\*(color + 3) == 1 ? 'B' :

(\*(color + 3) == 2 ? 'G' : (\*(color + 3) == 3 ? 'Y' :

(\*(color + 3) == 4 ? 'O' : (\*(color + 3) == 5 ? 'P' :

(\*(color + 3) == 6 ? 'W' : 'L')))))));

\*(ans + 4) = (\*(color + 4) == 0 ? 'R' : (\*(color + 4) == 1 ? 'B' :

(\*(color + 4) == 2 ? 'G' : (\*(color + 4) == 3 ? 'Y' :

(\*(color + 4) == 4 ? 'O' : (\*(color + 4) == 5 ? 'P' :

(\*(color + 4) == 6 ? 'W' : 'L')))))));

}

bool checkWon(char usrCh[], char ans[]) { //bool Function, Compare User Choice and Answer 1

bool clRight[4];

bool plRight[4];

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

clRight[i] = false;

plRight[i] = false;

}

//Checking if won

if (usrCh[0] == ans[0]) {

plRight[0] = true;

cout << "You Guessed Answer 1 Right!" << endl;

} else if (usrCh[0] == ans[1] || usrCh[0] == ans[2] || usrCh[0] == ans[3]) {

clRight[0] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[0] = false;

clRight[0] = false;

cout << "Try again" << endl;

}

if (usrCh[1] == ans[1]) {

plRight[1] = true;

cout << "You Guessed Answer 2 Right!" << endl;

} else if (usrCh[1] == ans[0] || usrCh[1] == ans[2] || usrCh[1] == ans[3]) {

clRight[1] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[1] = false;

clRight[1] = false;

cout << "Try again" << endl;

}

if (usrCh[2] == ans[2]) {

plRight[2] = true;

cout << "You Guessed Answer 3 Right!" << endl;

} else if (usrCh[2] == ans[0] || usrCh[2] == ans[1] || usrCh[2] == ans[3]) {

clRight[2] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[2] = false;

clRight[2] = false;

cout << "Try again" << endl;

}

if (usrCh[3] == ans[3]) {

plRight[3] = true;

cout << "You Guessed Answer 4 Right!" << endl;

} else if (usrCh[3] == ans[0] || usrCh[3] == ans[1] || usrCh[3] == ans[2]) {

clRight[3] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[3] = false;

clRight[3] = false;

cout << "Try again" << endl;

}

//End Part

if (plRight[0] && plRight[1] && plRight[2] && plRight[3]) {

return true;

} else {

return false;

}

}

bool checkWon2(vector<char> usrCh, char \*ans) { //bool Function, Compare User Choice and Answer 2

bool clRight[5];

bool plRight[5];

for (int i = 0; i < 5; i++) {

clRight[5] = false;

plRight[5] = false;

}

//Checking if won

if (usrCh[0] == ans[0]) {

plRight[0] = true;

cout << "You Guessed Answer 1 Right!" << endl;

} else if (usrCh[0] == ans[1] || usrCh[0] == ans[2] || usrCh[0] == ans[3] || usrCh[0] == ans[4]) {

clRight[0] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[0] = false;

clRight[0] = false;

cout << "Try again" << endl;

}

if (usrCh[1] == ans[1]) {

plRight[1] = true;

cout << "You Guessed Answer 2 Right!" << endl;

} else if (usrCh[1] == ans[0] || usrCh[1] == ans[2] || usrCh[1] == ans[3] || usrCh[1] == ans[4]) {

clRight[1] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[1] = false;

clRight[1] = false;

cout << "Try again" << endl;

}

if (usrCh[2] == ans[2]) {

plRight[2] = true;

cout << "You Guessed Answer 3 Right!" << endl;

} else if (usrCh[2] == ans[0] || usrCh[2] == ans[1] || usrCh[2] == ans[3] || usrCh[2] == ans[4]) {

clRight[2] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[2] = false;

clRight[2] = false;

cout << "Try again" << endl;

}

if (usrCh[3] == ans[3]) {

plRight[3] = true;

cout << "You Guessed Answer 4 Right!" << endl;

} else if (usrCh[3] == ans[0] || usrCh[3] == ans[1] || usrCh[3] == ans[2] || usrCh[3] == ans[4]) {

clRight[3] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[3] = false;

clRight[3] = false;

cout << "Try again" << endl;

}

if (usrCh[4] == ans[4]) {

plRight[4] = true;

cout << "You Guessed Answer 5 Right!" << endl;

} else if (usrCh[4] == ans[0] || usrCh[4] == ans[1] || usrCh[4] == ans[2] || usrCh[4] == ans[3]) {

clRight[4] = true;

cout << "Right color, Wrong Place!" << endl;

} else {

plRight[4] = false;

clRight[4] = false;

cout << "Try again" << endl;

}

//End Part

if (plRight[0] && plRight[1] && plRight[2] && plRight[3] && plRight[4]) {

return true;

} else {

return false;

}

}

**END OF CODE.**

**Thank You for Reviewing.**

**Reference:**

Dr. Lehr’s Lectures & Lab

“Starting Out with C++: From Control Structures through Objects” Gaddis, Tony. 8th Edition. (Textbook)