**Project 1**

Title

**Mastermind**

Course

**CSC-7**

Section

**42486**

Due Date

**April 16, 2018**

Author

**Josh McIntyre**

Rules & Overview:

Mastermind is a single player game where the objective is to guess the 4 digit randomly generated key. The player has a maximum of 10 guesses otherwise they lose and they can either choose to play again to exit the game. If the player guess the key correctly before all 10 of their attempts are up they win the game and can either choose to play again or exit. Generally it is in the player’s best interest to try and use as few of their guesses as they can. The game is played by asking the player to input his guesses for each digit, and the game will respond with a count of how many digits were correct, and how many digits were correct and in the same spot; however, if the digits are in the correct spot and it is the correct digit it will not be duplicately displayed as a correct digit in the other hint. Therefore, a maximum of 4 hints will be given per turn.

Pseudocode:

1. The game begins by welcoming the user to the game, and displays a basic menu to the player where they can view the rules, play the game, or exit.
2. The program proceeds to the game loop where the key is randomly generated and the user is presented with the user interface to input their guesses
3. After all 4 guesses are submitted each turn the player is given their hints
4. After the hints are displayed the next turn begins until the player either guess the key correctly or until they use up all 10 of their turns
5. Once the game is over, the user is asked if they would like to play again or not, if the choose yes then the game starts again, if the choose no the program exits

Code:

/\*

\* File: main.cpp

\* Author: Josh McIntyre

\* Created on April 15, 2018, 4:06 PM

\*/

//Global Constants

//System Libraries

#include <iostream>

#include <ctime>

#include <cstdlib>

using namespace std;

//User Libraries

//Function Prototypes

bool used(int[],int,int);

//Main Function

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

//Seed Random Function with Time

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

//Declare Variables

bool valid=false;

int input;

//Seed Random Function With Time

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

//Player Menu

cout<<"Welcome to MasterMind by Josh McIntyre\nPress 0 to Exit\nPress 1 to Play\nPress 2 for Rules\n\n";

do{

cin>>input;

if(input>=0&&input<=2) valid=true;

else cout<<"Invalid input, press 0, 1, or 2";

}while(!valid);

switch(input) {

//Exits Game

case 0:{

cout<<"Hope to see you again soon!"<<endl;

return 0;

//Exits Switch Statement

break;

}

//Plays Game

case 1:{

//Declare Variables

int key[4]={};

int turns=0;

bool won=false;

//Initialize the Key

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

bool val=false;

do{

int n=rand()%8 + 1;

if(!used(key,i,n)) {key[i]=n;val=true;}

}while(!val);

cout<<key[i]<<" ";

}

//Game Loop

do{

int slots=0,colors=0;

int color[4]={0,0,0,0};

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

int num;

cout<<"Please guess a number[1-8] to put into column "<<i+1<<": ";

cin>>num;

if(key[i]==num)slots++;

if(used(key,4,num)&&!used(color,4,num))colors++;

color[i]=num;

}

//Displays Hints

cout<<"Correct Slots: "<<slots<<endl;

cout<<"Correct Colors: "<<colors<<endl;

//Checks if Player Won

if(slots==4&&colors==4) {

won=true;

cout<<"Congrats you won the game in "<<turns+1<<" turns!!!"<<endl;

}

//Increments Turns

turns++;

}while(turns<10&&!won);

if(!won) cout<<"Sorry you lost!!!"<<endl;

//Exits Switch Statement

break;

}

//Displays Rules

case 2:{

cout<<"The player will be given 10 turns to try and decrypt the secret key given only 2 hints per turn:\n";

cout<<"1) the number of correct slots they guessed\n";

cout<<"2) the number of correct colors they guessed\n";

cout<<"The key is 4 characters long and each character is one of the numbers 1 through 8,\ntherefore, the player must make guesses of only the numbers 1 through 8";

//Exits Switch Statement

break;

}

}

//Exits Program

return 0;

}

//Checks to see if the value is already being used

bool used(int array[], int n, int num){

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

if(array[i]==num) return true;

}

return false;

}