Project 2

<Random Number Guessing>

**CSC 5**

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**Date: 12/11/17**

**Introduction**

**The random guessing game is played by one person who wants to test their skills at being able to narrow down a number from a range chosen by the player. The program is written to have the player chose a difficulty they would like to attempt or a challenge mode to see how long they can keep going. There are tricks to be able to narrow down the number quickly and can be helpful when playing this game.**

**How to Play**

1. **The player is prompt to choose a difficulty**
2. **The player then sets the ranges they want to play with**
3. **After they begin by inputting their first guess and keep going till they reach their limit on guesses**
4. **However, in challenge mode the player is asked if they would like to keep going and continue until they either decide to stop or lose**

**Approach**

**The approach I took on it was to make sure that it would perform the guessing a number of times. I also made sure that the player got hints to give them an idea of how close the person is to the random number generated. Looking in the text book to make sure that the random number generated was done correctly. Using a swap to correct the ranges and absolute value function to assure for no negative values.**

**References**

1. **Dr. Mark Lehr’s Lecture and Lab**
2. **Starting out with C++ by Tony Gaddis 8th Edition (Textbook)**

**Constructs & Concepts Used**

**IO Stream Library**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **Cout** | **33** | **Output data** | **Throughout** |
| **Cin** | **10** | **Input Data** | **Throughtout** |
| **Getline()** | **1** | **Reads String Data** | **40** |
| **Static\_cast** | **1** | **Statically Cast as different variable** | **33** |

**Cstdlib Library**

|  |  |  |  |
| --- | --- | --- | --- |
| **Names** | **Frequency** | **Description** | **Lines Appeared** |
| **srand()** | **1** | **Random # seed** | **33** |
| **Rand()** | **4** | **Generates Random #** | **77,125,158,192** |

**Ctime Library**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **Time** | **1** | **Sets current time** | **33** |

**Iomanip Library**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **Setw()** | **1** | **Formats width** | **105** |

**Cmath Library**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **Abs()** | **6** | **Neg score to positive score** | **122,123,155,**  **156,189,190** |

**String Library**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **String** | **10** | **Declare Variables** | **Throughout** |

**Data Types**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **Int** | **9** | **Declare Variable** | **23,31,64,66,101,112,**  **148,182,216,230** |
| **Short** | **2** | **Declare Variable** | **36,218** |
| **Char** | **2** | **Declare Variable** | **31,68** |
| **Bool** | **16** | **Declare Variable** | **69,117,152,186** |
| **Int &** | **20** | **Pass by reference** | **24,25,26,27,28,62,111,**  **147,181,229** |
| **Short &** | **8** | **Pass by reference** | **24,25,26,27,28,62,111,**  **147,181** |
| **Unsigned int** | **1** | **Declare variable** | **33** |
| **String** | **12** |  | **23,24,25,26,27,28,35,62,**  **111,147,181,215** |
| **Const int** | **1** | **Declare as Constant** | **63** |

**Conditional Statements**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **If** | **4** |  | **89,100,124,157** |
| **If else if** | **16** |  | **81,82,83,92,131,132,**  **133,139,164,165,166,**  **172,198,199,200,206** |
| **switch** | **1** |  | **219** |

**Loops**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **while** | **1** |  | **41** |
| **Do-while** | **10** |  | **76,78,99,107,126,**  **145,159,178,193,**  **212** |
| **For** | **1** |  | **101** |
|  |  |  |  |

**Arithmetic Operators**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Frequency** | **Description** | **Lines Appeared** |
| **++** | **5** | **Increment by 1** | **98,101,130,163,197** |
| **\*=** | **2** | **Multiply by** | **120,121** |
| **==** | **9** | **Equal to** | **83,92,100,133,139,**  **166,172,200,206** |
| **>=,>** | **5** | **Greater than or equal to** | **41,82,142,132,157,**  **165,191,199** |
| **<=,<** | **5** | **Less than or equal to** | **41,81,131,164,198** |

**Pseudocode**

/\*

\* File: main.cpp

\* Author: Ivan Burgos

\* Created on November 4, 2017, 12:22 AM

\* Purpose: Guessing Game Project

\*/

System Libraries

Input/output Stream Library

Formatting Library

Used for math Properties

Used for random number generator

Used for srand

For inputting sentences or names

Standard Name-space under which system Libraries Reside

User Libraries

Global Constants - No variables only Math/Science/Conversion constants

Function Prototypes

Function used for the menu

Function that runs easy difficulty

Function that runs medium difficulty

Function that runs hard difficulty

Function the runs challenge mode

Function to swap range

Execution Begins Here

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

Setting the Random number seed

Declare Variables

The player's name

User's choice in difficulty

Initialize Variables

Output to ask player's name

Inputing the user's name

While loop checking for user input

Displaying the difficulties

Output Easy difficulty option

Output Normal difficulty option

Output Hard difficulty option

Output Challenge mode option

User inputs choice

Call the menu function

Input Data/Variables

Process or map the inputs to the outputs

Display/Output all pertinent variables

Exit the program

Runs Challenge mode function

Size 20 of an array

Array for the number of guesses values

Array for the random number values

random number to be guessed

User's guess

Answer of player if they wish to keep playing

Used to enter and exit do-while loop

Starting number of guesses is 0

Outputs rules of challenge mode

<<",will be given 8 guesses as your limit"<<endl

<<",and have a range from 1 to 540"<<endl<<endl;

Range a is 1

Range b is 540

Do-while used to rerun game

Random number to be generated

Do-while loop used to allow player to make guesses

Prompt player for guess

User input for the guess

Hint stating lower that random number

Hint stating higher than random number

If statement showing player has won game if guessed the correct number

Input answer of player

Exit the function if player wants to stop

Used to exit the loop by using booleans

If statement showing player has lost game if d is equal to 8

Used to exit the loop by using booleans

Increment the number of guesses made

If d is equal to 8 loop = true

For loop that fills array with random number and number of guesses used

Runs hard difficulty function

random number to be guessed

User's guess

Outputs the rules

Used to enter and exit the do-while

Prompts player for ranges

User input of the ranges

Doubles the values of a and b

Absolute value of a and b

Calls the swap function if a>b

Random number to be generated

Do-while to keep game going till out of guesses

Used to run loop

Prompt player for guess

User input for the guess

Increment the number of guesses the player has made

Hints letting player know they are lower

Hints letting player know they are higher

If statement showing player has won game

Used to exit the loop by using booleans

If statement showing player has lost game

Used to exit the loop by using booleans

Runs medium difficulty function

random number to be guessed

User's guess

Output the rules

Used to enter and exit the do-while

Prompt user for the ranges

User input of the ranges

Absolute value of a and b;

Calls the swap function if a>b

Random number to be generated

Do-while loop used for guesses

Used to run loop

Prompt User for guess

User input for the guess

Increment The number of guesses the player has made

Hints to let player know they are lower

Hints to let player know they are higher

If statement showing player has won game

Used to exit the loop by using booleans

If statement showing player has lost game

Used to exit the loop by using booleans

Run easy difficulty function

random number to be guessed

User's guess

Output the rules of difficulty

<<"and will be given 8 guesses as your limit"<<endl;

Used to enter and exit the do-while

Prompt user for ranges

User input of the ranges

Absolute value of a and b

Calls swap function if a>b

Random number to be generated

Do-while used to allow player to make guesses

Used to run loop

Prompt user for guess

User input for the guess

Increment number of guesses made

Hint stating lower that random number

Hint stating higher than random number

If statement showing player has won game

Used to exit the loop by using booleans

If statement showing player has lost game

Used to exit the loop by using booleans

Run menu function

First number in the range

Second number in the range

The number of guesses the player starts with

the menu for choosing your difficulty

Call First choice easy difficulty

Call Second choice normal difficulty

Call Third choice hard difficulty

Call Forth choice challenge mode

Used to swap values

Set temp = a value

Set a = b value

Set b = temp value

**Program**

/\*

\* File: main.cpp

\* Author: Ivan Burgos

\* Created on November 4, 2017, 12:22 AM

\* Purpose: Guessing Game Project

\*/

//System Libraries

#include <iostream> //Input/output Stream Library

#include <iomanip> //Formatting Library

#include <cmath> //Used for math Properties

#include <cstdlib> //USed for random nuber generator

#include <ctime> //Used for srand

#include <string> //For inputing sentences or names

using namespace std;//Standard Name-space under which system Libraries Reside

//User Libraries

//Global Constants - No variables only Math/Science/Conversion constants

//Function Prototypes

void menu(int,string); //Function used for the menu

void easy(int &,int &,string,short &); //Function that runs easy difficulty

void medium(int &,int &,string,short &); //Function that runs medium difficulty

void hard(int &,int &,string,short &); //Function that runs hard difficulty

void chllnge(int &,int &,string,short &); //Function the runs challenge mode

void swap(int &,int &); //Function to swap range

//Execution Begins Here

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

//Setting the Random number seed

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

//Declare Variables

string name; //The player's name

short choice; //User's choice in difficulty

//Initialize Variables

cout<<"Enter your full name"<<endl; //Output to ask player's name

getline(cin,name); //Inputing the user's name

while(choice<=0||choice>=5){ //While loop checking for user input

cout<<"Choose the difficulty"<<endl//Displaying the difficulties

<<"1.Easy"<<endl //Output Easy difficulty option

<<"2.Normal"<<endl //Output Normal difficulty option

<<"3.Hard"<<endl //Output Hard difficulty option

<<"4.Challenge Mode"<<endl; //Output Challenge mode option

cin>>choice; //User inputs choice

}

//Input user's choice

menu(choice,name); //Call the menu function

//Input Data/Variables

//Process or map the inputs to the outputs

//Display/Output all pertinent variables

cout<<"Thank you "<<name<<" for playing the game"<<endl;

//Exit the program

return 0;

}

void chllnge(int &a,int &b,string c,short &d){

const int SIZE=20;

int array[SIZE]={}, //Array for the number of guesses values

anum[SIZE]={}; //Array for the random number values

int rnum, //random number to be guessed

guess; //User's guess

char ans;

bool loop=true; //Used to enter and exit do-while loop

d=0;

cout<<"You have chosen challenge mode"<<endl

<<",will be given 8 guesses as your limit"<<endl

<<",and have a range from 1 to 540"<<endl<<endl;

a=1;

b=540;//User input of the ranges

do{ //do while

rnum=(rand()%(b-a+1))+a; //number to be generated

do{ //do-while loop used to allow player to make guesses

cout<<"Please enter your guess"<<endl;

cin>>guess; //User input for the guess

if (guess<rnum)cout<<"You are to low"<<endl; //Hint stating lower that random number

else if(guess>rnum)cout<<"You are to high"<<endl; //Hint stating higher than random number

if (guess==rnum){ //If statement showing player has won game

cout<<"You have guessed the correct number "<<rnum<<endl

<<c<<" has won the game"<<endl

<<"Number of guesses made "<<d<<endl;

cout<<"Would you like to keep going?(Y=yes,N=no)"<<endl;

cin>>ans;

if (ans!='Y'||ans!='y')exit(0); //exits the function if player wants to stop

loop=false; //Used to exit the loop by using booleans

}

else if (d==8){ //If statement showing player has lost game

cout<<"You are out of guesses "<<d<<endl

<<c<<" have lost "<<endl

<<"Correct number "<<rnum<<endl;

loop=false; //Used to exit the loop by using booleans

}

d++;

}while(loop);

if (d==8)loop=true;

for(int i;i<SIZE;i++){

array[i]=d;

cout<<array[i];

anum[i]=rnum;

cout<<setw(5)<<anum[i]<<endl;

}

}while(!loop);

}

void hard(int &a,int &b,string c,short &d){

int rnum, //random number to be guessed

guess; //User's guess

cout<<"You have chosen Hard difficulty"<<endl

<<"and will be given 10 guesses as your limit"<<endl

<<"but your ranges will be doubled"<<endl;

bool loop; //Used to enter and exit the do-while

cout<<"Please enter values for range"<<endl;

cin>>a>>b; //User input of the ranges

a=a\*2;

b=b\*2;

abs(a);

abs(b);

if (a>b)swap(a,b); //Calls the swap function if a>b

rnum=(rand()%(b-a+1))+a; //number to be generated

do{ //Do-while to keep game going till out of guesses

loop=true;

cout<<"Please enter your guess"<<endl;

cin>>guess; //User input for the guess

d++;

if (guess<rnum)cout<<"You are to low"<<endl; //Hints letting player know they are lower

else if(guess>rnum)cout<<"You are to high"<<endl; //Hints letting player know they are higher

if (guess==rnum){ //If statement showing player has won game

cout<<"You have guessed the correct number "<<rnum<<endl

<<c<<" has won the game"<<endl

<<"Number of guesses made "<<d<<endl;

loop=false; //Used to exit the loop by using booleans

}

else if (d==10){ //If statement showing player has lost game

cout<<"You are out of guesses "<<d<<endl

<<c<<" have lost "<<endl

<<"Correct number "<<rnum<<endl;

loop=false; //Used to exit the loop by using booleans

}

}while(loop);

}

void medium(int &a,int &b,string c,short &d){ //Runs medium difficulty function

int rnum, //random number to be guessed

guess; //User's guess

cout<<"You have chosen normal difficulty"<<endl

<<"and will be given 6 guesses as your limit"<<endl;

bool loop; //Used to enter and exit the do-while

cout<<"Please enter values for range"<<endl;

cin>>a>>b; //User input of the ranges

abs(a);

abs(b);

if (a>b)swap(a,b); //Calls the swap function if a>b

rnum=(rand()%(b-a+1))+a; //number to be generated

do{

loop=true;

cout<<"Please enter your guess"<<endl;

cin>>guess; //User input for the guess

d++;

if (guess<rnum)cout<<"You are to low"<<endl; //Hints to let player know they are lower

else if(guess>rnum)cout<<"You are to high"<<endl; //Hints to let player know they are higher

if (guess==rnum){ //If statement showing player has won game

cout<<"You have guessed the correct number"<<rnum<<endl

<<c<<"has won the game"<<endl

<<"Number of guesses made "<<d<<endl;

loop=false; //Used to exit the loop by using booleans

}

else if (d==6){ //If statement showing player has lost game

cout<<"You are out of guesses "<<d<<endl

<<c<<" have lost "<<endl

<<"Correct number "<<rnum<<endl;

loop=false; //Used to exit the loop by using booleans

}

}while(loop);

}

void easy(int &a,int &b,string c,short &d){

int rnum, //random number to be guessed

guess; //User's guess

cout<<"You have chosen easy difficulty"<<endl

<<"and will be given 8 guesses as your limit"<<endl;

bool loop; //Used to enter and exit the do-while

cout<<"Please enter values for range"<<endl;

cin>>a>>b; //User input of the ranges

abs(a);

abs(b);

if (a>b)swap(a,b);

rnum=(rand()%(b-a+1))+a; //number to be generated

do{ //Do-while used to allow player to make guesses

loop=true;

cout<<"Please enter your guess"<<endl;

cin>>guess; //User input for the guess

d++;

if (guess<rnum)cout<<"You are to low"<<endl; //Hint stating lower that random number

else if(guess>rnum)cout<<"You are to high"<<endl;//Hint stating higher than random number

if (guess==rnum){ //If statement showing player has won game

cout<<"You have guessed the correct number"<<rnum<<endl

<<c<<"has won the game"<<endl

<<"Number of guesses made"<<d<<endl;

loop=false; //Used to exit the loop by using booleans

}

else if (d==8){ //If statement showing player has lost game

cout<<"You are out of guesses "<<d<<endl

<<c<<" have lost "<<endl

<<"Correct number "<<rnum<<endl;

loop=false; //Used to exit the loop by using booleans

}

}while(loop);

}

void menu(int a,string b){

int nrnge1=0, //First number in the range

nrnge2=0; //Second number in the range

short nguess=0; //The number of guesses the player starts with

switch(a) //the menu for choosing your difficulty

{

case 1:easy(nrnge1,nrnge2,b,nguess);break; //Call First choice easy difficulty

case 2:medium(nrnge1,nrnge2,b,nguess);break; //Call Second choice normal difficulty

case 3:hard(nrnge1,nrnge2,b,nguess);break; //Call Third choice hard difficulty

case 4:chllnge(nrnge1,nrnge2,b,nguess);break;//Call Forth choice challenge mode

}

}

void swap(int &a,int &b){ //Used to switch values

int temp=a; //Set temp = a value

a=b; //Set a = b value

b=temp; //Set b = temp value

}