**Project 1**

**<Clue V7>**

CIS-5 40561

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# **Introduction**

Title: Clue V7

This is a computer version of Clue the board game.

Clue is played on a 24 by 23 cube board. A player’s position on the board is determined by the character they pick.

The game is set up by picking a random suspect, weapon, and room.

When the game begins, the player can role a set of dice or make an accusation.

If the player decides to make an accusation, they pick who they believe did it, the weapon used, and where it happened. If they guess correctly, they win. If they guess wrong their turn starts over.

If the player decides to roll the dice, the player can move up, down, left or right a number of times set by a role of the dice. If they end up in a room they can make an accusation, name a suspect, or move on to their next turn.

If the player makes an accusation in a room, the same rules as stated previously apply except the room is where the player is located.

If the player names a suspect, they are told whether their suspicion confirmed or denied.

After each turn, they can bring up a list of all of their suspects.

# **Summary**

Project size: about 570 lines

Comments: about 130 lines

The number of variables: about 45

This project includes only the concepts that have been learned from the chapters in the book dedicated to this project. With future concepts this project can be simplified a lot, so it leaves a lor of room for improvement.

For example, implementing arrays and functions will take away a lot of repetitive code.

It took about a week to do, allowing me the time to think and take a breather. I could then come back and see my code in a new perspective. I did not have too much trouble; I just wish my final product was not as long as it is. Which will be fixed when implementing future concepts.

I am mostly satisfied with my project and look forward to improving it.

# **Description**

The main point of this project is to replicate a board game.

## **Flowchart**

Diagram, schematic

Description automatically generated

## **Pseudocode**

Initialize Random Seed

Declare Variables

Initialize Variables

Do – While ( ch = n)

Display Outputs

User Input

If Invalid Input

Exit Program

Switch case

Input 1?

Display Output

Initialize Variable

Input 2?

Display Output

Initialize Variable

Input 3?

Display Output

Initialize Variable

Input 4?

Display Output

Initialize Variable

Input 5?

Display Output

Initialize Variable

Input 6?

Display Output

Initialize Variable

Display Output

User Input

Initialize Variables

Create and Open New Output File

Do – While

Display Output

User Input

If Input = y

Display Output

User Input

If all conditions met

Initialize Variable

Else

Display Output

Display Output

Initialize Variable

Display Output

For Loop – (i < dice)

Display Output

User Input

If choice = u

Increment Variable

If vPos > 24

Display Output

Decrement Variables

Else If choice = d

Decrement Variable

If vPos < 0

Display Output

Increment Variables

Else If choice = l

Decrement Variable

If hPos < 0

Display Output

Increment Variables

Else If choice = r

Increment Variable

If vPos < 0

Display Output

Decrement Variables

Else if choice = n

Initialize Variable

Else

Display Output

Decrement Variable

If (Conditions met)

Initialize variables

Else If (Conditions met)

Initialize variables

Else If (Conditions met)

Initialize variables

Else If (Conditions met)

Initialize variables

Else If (Conditions met)

Initialize variables

Else If (Conditions met)

Initialize variables

Else If (Conditions met)

Initialize variables

Else If (Conditions met)

Initialize variables

Else If (Conditions met)

Initialize variables

Else

Initialize variable

Initialize Variable

If hint = 70

Display Output

Initialize Variable

If (slct1 == pick)

Increment

Initialize variable

Display Output

Output to File

If inRoom = true

Display Output

User Input

Display Output

User Input

If (Conditions met)

Initialize Variable

Else

Display Output

Else

Display Output

If ch = y

Display Output

User Input

Initialize spect

Output to File

Else

Display Output

Display Output

User Input

If (ch = y)

Open file for input

Take input from file

Close file

Close file

Display Output

Return 0

## **Major Variables**

|  |  |  |
| --- | --- | --- |
| **Type** | **Variable Name** | **Description** |
| **String** | file | Constant string for file name |
|  | lEnd | Constant string for line end |
|  | char1-6 | String for characters |
|  | wpon1-6 | String for weapons |
|  | room1-9 | String for rooms |
|  | killer | String for killer |
|  | wpon | String for weapon used |
|  | room | String for room used |
|  | pRoom | String for character location |
|  | spect | String for suspect |
|  |  |  |
| **Integer** | choice | Integer for selections |
|  | dice | Integer for dice |
|  | slct1-3 | Integer for case selections |
|  | ac1-1 | Integer for user accusations |
|  | sus | Integer for user suspects |
|  | pos | Integer for user position |
|  | pick | Integer for hint |
|  |  |  |
| **Float** | hint | Float for hint |
|  |  |  |
| **Character** | ch | Character for user input |
|  |  |  |
| **Boolean** | win | Boolean for win |
|  | inRoom | Boolean for character in room |

## **C++ Constructs**

|  |  |  |
| --- | --- | --- |
| **Chapter** | **Section** | **Topic** |
| 2 | 2 | cout |
|  | 3 | libraries |
|  | 4 | variables/literals |
|  | 5 | Identifiers |
|  | 6 | Integers |
|  | 7 | Characters |
|  | 8 | Strings |
|  | 9 | Floats No Doubles |
|  | 10 | Bools |
|  | 12 | Variables 7 characters or less |
|  | 14 | Arithmetic operators |
|  | 15 | Comments 20%+ |
|  | 16 | Named Constants |
|  |  |  |
| 3 | 1 | cin |
|  | 2 | Math Expression |
|  | 5 | Type Casting |
|  | 7 | Formatting output |
|  | 8 | Strings |
|  | 9 | Math Library |
|  |  |  |
| 4 | 1 | Relational Operators |
|  | 2 | if |
|  | 4 | If-else |
|  | 5 | Nesting |
|  | 6 | If-else-if |
|  | 8 | Logical operators |
|  | 11 | Validating user input |
|  | 13 | Conditional Operator |
|  | 14 | Switch |
|  |  |  |
| 5 | 1 | Increment/Decrement |
|  | 2 | While |
|  | 5 | Do-while |
|  | 6 | For loop |
|  | 11 | Files input/output both |

## **Reference**

1. Problem Solving with C++ - Walter Savitch
2. Starting out with C++ - Tony Gaddis
3. Class Lectures

## **Program**

/\*

\* File: main.cpp

\* Author: Janaye Jackson

\*

\* Created on February 3, 2022, 12:17 PM

\* Purpose: Clue V7

\*/

//System Level Libraries

#include <cmath> //Math Library

#include <cstdlib> //Random number Library

#include <ctime> //Time to set random seed

#include <fstream> //FileLibrary

#include <iostream> //Input-Output Library

#include <iomanip> //Format Library

using namespace std;

//User Defined Libraries

//Global Constants, not Global Variables

//These are recognized constants from the sciences

//Physics/Chemistry/Engineering and Conversions between

//systems of units

//Function Prototypes

//Execution begins here!

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

//Initialize Random Seed once here!

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

//Local Constants

const string file = "SuspectList.txt"; //String for file names

const string lEnd = ".\*"; //String for new line in input

//Strings

string char1, char2, char3, char4, char5, char6; //Strings for all the playable characters

string wpon1, wpon2, wpon3, wpon4, wpon5, wpon6; //Strings for all of the weapons

string room1, room2, room3, room4,room5, //Strings for all of the rooms

room6, room7, room8, room9;

string killer, wpon, room; //Strings for the killer, the weapon used, and room used

string pRoom, spect; //String for room player is in and who they suspect

//Integers

int choice; //User input for player to pick suspect and character

int dice; //Dice

int slct1, slct2, slct3; //Integers for case file picks

int ac1, ac2, ac3, sus; //Integers for user accusations or suspects

int vPos, hPos; //Integers for player position

int pick; //Integer for player hint

//Floats

float hint; //Float for player hint

//Chars

char ch; //User input for player to answer questions

//Booleans

bool win, inRoom; //Booleans for player win and for if player is in a room

//Set strings to name of players

char1 = "Colonel Mustard";

char2 = "Miss Scarlet";

char3 = "Professor Plum";

char4 = "Mr. Green";

char5 = "Mrs. White";

char6 = "Mrs. Peacock";

//Set strings to name of weapons

wpon1 = "Rope";

wpon2 = "Lead Pipe";

wpon3 = "Knife";

wpon4 = "Wrench";

wpon5 = "Candlestick";

wpon6 = "Revolver";

//Set strings to name of rooms

room1 = "Conservatory";

room2 = "Billiard Room";

room3 = "Library";

room4 = "Study";

room5 = "Ballroom";

room6 = "Hall";

room7 = "Kitchen";

room8 = "Dining Room";

room9 = "Lounge";

//Initialize boolean

win = false;

//fstream

fstream out;

fstream input;

//Player selection

do{

//List of players

cout<<" Players List"<<endl;

cout<<"1 - "<<setw(15)<<char1<<endl;

cout<<"2 - "<<setw(15)<<char2<<endl;

cout<<"3 - "<<setw(15)<<char3<<endl;

cout<<"4 - "<<setw(15)<<char4<<endl;

cout<<"5 - "<<setw(15)<<char5<<endl;

cout<<"6 - "<<setw(15)<<char6<<endl;

cout<<"\nWhich player would you like to play as?"<<endl; //User choice

cin>>choice;

cout<<endl;

if(choice < 1 || choice > 6) //Input Validation

{

cout<<"Not a Valid Option";

exit(1);

}

switch(choice){ //Setting character

case 1:{

cout<<"You are "<<char1<<endl;

vPos = 17;

hPos = 23;

break;

}

case 2:{

cout<<"You are "<<char2<<endl;

vPos = 24;

hPos = 16;

break;

}

case 3:{

cout<<"You are "<<char3<<endl;

vPos = 19;

hPos = 0;

break;

}

case 4:{

cout<<"You are "<<char4<<endl;

vPos = 0;

hPos = 9;

break;

}

case 5:{

cout<<"You are "<<char5<<endl;

vPos = 0;

hPos = 14;

break;

}

case 6:{

cout<<"You are "<<char6<<endl;

vPos = 6;

hPos = 0;

break;

}

}

//Character conformation

cout<<"Is this the character you want? (y or n)"<<endl;

cin>>ch;

}while(choice == 'n' || choice == 'N');

//Case File - Who, with what, where

slct1 = rand()%6+1;

switch(slct1){ //Killer picker

case 1: killer = char1;break;

case 2: killer = char2;break;

case 3: killer = char3;break;

case 4: killer = char4;break;

case 5: killer = char5;break;

case 6: killer = char6;break;

}

slct2 = rand()%6+1;

switch(slct2){ //Weapon picker

case 1: wpon = wpon1;break;

case 2: wpon = wpon2;break;

case 3: wpon = wpon3;break;

case 4: wpon = wpon4;break;

case 5: wpon = wpon5;break;

case 6: wpon = wpon6;break;

}

slct3 = rand()%9+1;

switch(slct3){ //Room picker

case 1: room = room1;break;

case 2: room = room2;break;

case 3: room = room3;break;

case 4: room = room4;break;

case 5: room = room5;break;

case 6: room = room6;break;

case 7: room = room7;break;

case 8: room = room8;break;

case 9: room = room9;break;

}

//Open file to place suspect

out.open(file, ios:: out);

//Game play

do{

//output player location

cout<<"\nYou are at v-"<<vPos<<" h-"<<hPos<<endl;

//Output room locations

cout<<"\nRoom | Vertical Location | Horizontal Location |"<<endl;

cout<<"Conservatory | between 0 and 5 | between 0 and 5 |"<<endl;

cout<<"Billiard Room | between 8 and 12 | between 0 and 5 |"<<endl;

cout<<"Library | between 14 and 18 | between 0 and 6 |"<<endl;

cout<<"Study | between 21 and 24 | between 0 and 6 |"<<endl;

cout<<"Ballroom | between 0 and 7 | between 8 and 15 |"<<endl;

cout<<"Hall | between 18 and 24 | between 9 and 14 |"<<endl;

cout<<"Kitchen | between 0 and 6 | between 18 and 23 |"<<endl;

cout<<"Dining Room | between 9 and 15 | between 16 and 23 |"<<endl;

cout<<"Lounge | between 19 and 24 | between 17 and 23 |"<<endl;

//Player choice

cout<<"Would you like to make an accusation? (y or n)"<<endl;

cin>>ch;

//Provide accusation choices

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

//List players to choose from

cout<<"\n Players List"<<endl;

cout<<"1 - "<<setw(15)<<char1<<endl;

cout<<"2 - "<<setw(15)<<char2<<endl;

cout<<"3 - "<<setw(15)<<char3<<endl;

cout<<"4 - "<<setw(15)<<char4<<endl;

cout<<"5 - "<<setw(15)<<char5<<endl;

cout<<"6 - "<<setw(15)<<char6<<endl;

//List weapons to choose from

cout<<"\n Weapons List"<<endl;

cout<<"1 - "<<setw(15)<<wpon1<<endl;

cout<<"2 - "<<setw(15)<<wpon2<<endl;

cout<<"3 - "<<setw(15)<<wpon3<<endl;

cout<<"4 - "<<setw(15)<<wpon4<<endl;

cout<<"5 - "<<setw(15)<<wpon5<<endl;

cout<<"6 - "<<setw(15)<<wpon6<<endl;

//List rooms to choose from

cout<<"\n Rooms List"<<endl;

cout<<"1 - "<<setw(15)<<room1<<endl;

cout<<"2 - "<<setw(15)<<room2<<endl;

cout<<"3 - "<<setw(15)<<room3<<endl;

cout<<"4 - "<<setw(15)<<room4<<endl;

cout<<"5 - "<<setw(15)<<room5<<endl;

cout<<"6 - "<<setw(15)<<room6<<endl;

cout<<"7 - "<<setw(15)<<room7<<endl;

cout<<"8 - "<<setw(15)<<room8<<endl;

cout<<"9 - "<<setw(15)<<room9<<endl;

//User accusation

cout<<"Choose a person, a weapon, and a room - (Ex. 1 1 1 would pick "<<char1<<" & "<<wpon1<<" & "<<room1<<")"<<endl;

cin>>ac1>>ac2>>ac3;

if(ac1 == slct1 && ac2 == slct2 && ac3 == slct3)

{

win = true; //if all accusations are true player wins

}

else{

cout<<"\nYour accusation is incorrect"<<endl;

}

}

//Else continue game

else{

//Dice rolling

cout<<"\nRolling Dice..."<<endl;

dice = rand()%12+1;

cout<<"You rolled a "<<dice<<endl;

//User movement

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

//Output player location

cout<<"Your position is v-"<<vPos<<", h-"<<hPos<<endl;

//Output room locations

cout<<"\nRoom | Vertical Location | Horizontal Location |"<<endl;

cout<<"Conservatory | between 0 and 5 | between 0 and 5 |"<<endl;

cout<<"Billiard Room | between 8 and 12 | between 0 and 5 |"<<endl;

cout<<"Library | between 14 and 18 | between 0 and 6 |"<<endl;

cout<<"Study | between 21 and 24 | between 0 and 6 |"<<endl;

cout<<"Ballroom | between 0 and 7 | between 8 and 15 |"<<endl;

cout<<"Hall | between 18 and 24 | between 9 and 14 |"<<endl;

cout<<"Kitchen | between 0 and 6 | between 18 and 23 |"<<endl;

cout<<"Dining Room | between 9 and 15 | between 16 and 23 |"<<endl;

cout<<"Lounge | between 19 and 24 | between 17 and 23 |"<<endl;

//Player movement

cout<<"\nYou have "<<dice-i<<" spaces left to move."<<endl;

cout<<"Would you like to move up, down, left, right, or not at all? (u, d, l, r, n)"<<endl;

cin>>ch;

if(ch == 'u' || ch == 'U'){ //Moving up

vPos++;

if(vPos > 24){

cout<<"You cannot move that way"<<endl;

vPos--;

i--;

}

}

else if(ch == 'd' || ch == 'D'){ //Moving down

vPos--;

if(vPos < 0){

cout<<"You cannot move that way"<<endl;

vPos++;

i--;

}

}

else if(ch == 'l' || ch == 'L'){ //Moving to the left

hPos--;

if(hPos < 0){

cout<<"You cannot move that way"<<endl;

hPos++;

i--;

}

}

else if(ch == 'r' || ch == 'R'){ //Moving to the right

hPos++;

if(hPos > 23){

cout<<"You cannot move that way"<<endl;

hPos--;

i--;

}

}

else if(ch == 'n' || ch == 'N'){ //Not moving

i = dice;

}

else{

cout<<"Invalid Option"<<endl;

i--;

}

}

//Is character in a room

if((vPos>=0 && vPos<=5) && (hPos>=0 && hPos<=5)){ //Conservatory

inRoom = true;

pRoom = room1;

}

else if((vPos>= 8 && vPos<=12) && (hPos>=0 && hPos<=5)){ //Billiard Room

inRoom = true;

pRoom = room2;

}

else if((vPos>=14 && vPos<=18)&& (hPos>=0 && hPos<=6)){ //Library

inRoom = true;

pRoom = room3;

}

else if((vPos>=21 && vPos<=24) && (hPos>=0 && hPos<=6)){ //Study

inRoom = true;

pRoom = room4;

}

else if((vPos>=0 && vPos<=7) && (hPos>=8 && hPos<=15)){ //Ballroom

inRoom = true;

pRoom = room5;

}

else if((vPos>=18 && vPos<=24) && (hPos>=9 && hPos<=14)){ //Hall

inRoom = true;

pRoom = room6;

}

else if((vPos>=0 && vPos<= 6) && (hPos>=18 && hPos<=23)){ //Kitchen

inRoom = true;

pRoom = room7;

}

else if((vPos>=9 && vPos<=15) && (hPos>=16 && hPos<=23)){ //Dining Room

inRoom = true;

pRoom = room8;

}

else if((vPos>=19 && vPos<=24) && (hPos>=17 && hPos<=23)){ //Lounge

inRoom = true;

pRoom = room9;

}

else{

inRoom = false;

}

//Initialize hint

hint = sqrt(pow(vPos, 3));

//Giving player semi-random hint

if(static\_cast<int>(hint) == 70){

cout<<"You have received a hint:"<<endl;

//Initialize hint

pick = (dice + 1) / 2;

//Pick hint to give

if(slct1 == pick){

pick++;

}

switch(pick){

case 1: spect = char1;break;

case 2: spect = char2;break;

case 3: spect = char3;break;

case 4: spect = char4;break;

case 5: spect = char5;break;

case 6: spect = char6;break;

}

cout<<spect<<" is not a suspect."<<endl;

out<<spect<<" is not a suspect .\*"<<endl;

}

if(inRoom == true){ //Player is in room

cout<<"\nYou are in "<<pRoom<<endl;

//Does user know who, what, and where?

cout<<"Would you like to make an accusation?(y or n)"<<endl;

cin>>ch;

if(ch == 'y' || ch == 'Y')//Provide Accusation choices

{

//List players to choose from

cout<<"\n Players List"<<endl;

cout<<"1 - "<<setw(15)<<char1<<endl;

cout<<"2 - "<<setw(15)<<char2<<endl;

cout<<"3 - "<<setw(15)<<char3<<endl;

cout<<"4 - "<<setw(15)<<char4<<endl;

cout<<"5 - "<<setw(15)<<char5<<endl;

cout<<"6 - "<<setw(15)<<char6<<endl;

//List weapons to choose from

cout<<"\n Weapons List"<<endl;

cout<<"1 - "<<setw(15)<<wpon1<<endl;

cout<<"2 - "<<setw(15)<<wpon2<<endl;

cout<<"3 - "<<setw(15)<<wpon3<<endl;

cout<<"4 - "<<setw(15)<<wpon4<<endl;

cout<<"5 - "<<setw(15)<<wpon5<<endl;

cout<<"6 - "<<setw(15)<<wpon6<<endl;

//User accusation

cout<<"Choose a person and a weapon - (Ex. 1 1 would pick "<<char1<<" & "<<wpon1<<")"<<endl;

cin>>ac1>>ac2;

if(ac1 == slct1 && ac2 == slct2 && pRoom == room)

{

win = true; //If all accusation are true player win

}

else

{

cout<<"Your accusation is incorrect"<<endl;

}

}

else{

//Does user suspect and item or person

cout<<"Would you like to name a suspect? (y or n)"<<endl;

cin>>ch;

if(ch == 'y' || ch == 'Y'){ //Provide list of suspect

//List players to choose from

cout<<"\n Players List"<<endl;

cout<<"1 - "<<setw(15)<<char1<<endl;

cout<<"2 - "<<setw(15)<<char2<<endl;

cout<<"3 - "<<setw(15)<<char3<<endl;

cout<<"4 - "<<setw(15)<<char4<<endl;

cout<<"5 - "<<setw(15)<<char5<<endl;

cout<<"6 - "<<setw(15)<<char6<<endl;

//List weapons to choose from

cout<<"\n Weapons List"<<endl;

cout<<"7 - "<<setw(15)<<wpon1<<endl;

cout<<"8 - "<<setw(15)<<wpon2<<endl;

cout<<"9 - "<<setw(15)<<wpon3<<endl;

cout<<"10 - "<<setw(15)<<wpon4<<endl;

cout<<"11 - "<<setw(15)<<wpon5<<endl;

cout<<"12 - "<<setw(15)<<wpon6<<endl;

//List rooms to choose from

cout<<"\n Rooms List"<<endl;

cout<<"13 - "<<setw(15)<<room1<<endl;

cout<<"14 - "<<setw(15)<<room2<<endl;

cout<<"15 - "<<setw(15)<<room3<<endl;

cout<<"16 - "<<setw(15)<<room4<<endl;

cout<<"17 - "<<setw(15)<<room5<<endl;

cout<<"18 - "<<setw(15)<<room6<<endl;

cout<<"19 - "<<setw(15)<<room7<<endl;

cout<<"20 - "<<setw(15)<<room8<<endl;

cout<<"21 - "<<setw(15)<<room9<<endl;

cout<<"Choose who or what you suspect - (Ex. 1 would pick "<<char1<<")"<<endl;

cin>>choice;

}

//Determine is user suspicion correct

if(choice <=6){ //Character suspect

if(choice != slct1){

cout<<"This is not a suspect. A user has this character."<<endl;

//Pick suspect to print to file

switch(choice){

case 1: spect = char1;break;

case 2: spect = char2;break;

case 3: spect = char3;break;

case 4: spect = char4;break;

case 5: spect = char5;break;

case 6: spect = char6;break;

}

//Print suspect to file

out<<spect<< " is not a suspect .\*"<<endl;

}

else{

cout<<"No user has this character. This is a suspect."<<endl;

//Print killer to file

out<<killer<<" is the killer .\*"<<endl;

}

}

else if(choice >6 && choice <=12){ //Weapon suspect

if(choice - 6 != slct2){

cout<<"This is not the weapon used. A user has this weapon."<<endl;

//Pick suspect to print to file

switch(choice){

case 7: spect = wpon1;break;

case 8: spect = wpon2;break;

case 9: spect = wpon3;break;

case 10: spect = wpon4;break;

case 11: spect = wpon5;break;

case 12: spect = wpon6;break;

}

//Print suspect to file

out<<spect<< " is not the weapon used .\*"<<endl;

}

else{

cout<<"No user has this weapon. This is a weapon used."<<endl;

//Print weapon to file

out<<wpon<<" is the weapon used .\*"<<endl;

}

}

else if(choice >12 && choice <=21){ //Room suspect

if(choice - 12 != slct3){

cout<<"This is not where the murder happened. A user has this room."<<endl;

//Pick suspect to print to file

switch(choice){

case 13: spect = room1;break;

case 14: spect = room2;break;

case 15: spect = room3;break;

case 16: spect = room4;break;

case 17: spect = room5;break;

case 18: spect = room6;break;

case 19: spect = room7;break;

case 20: spect = room8;break;

case 21: spect = room9;break;

}

//Print suspect to file

out<<spect<< " is not where the murder happened .\*"<<endl;

}

else{

cout<<"No user has this room. This is where the murder happened."<<endl;

//Print room to file

out<<"The "<<room<<" is where the murder happened .\*"<<endl;

}

}

}

}

else

{

cout<<"You are not in any room"<<endl; //User is not in a room

}

cout<<"\nWould you like to see your suspect list? (y or n)"<<endl;

cin>>ch;

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

//Open file

input.open(file.c\_str(), ios::in);

//Display user suspect list

while(input>>spect){

if(spect == lEnd)

cout<<endl;

else

cout<<spect<<" ";

}

//Close file

input.close();

}

}

}while(win == false); //Continue until player wins

//Close file

out.close();

//Display outputs

cout<<"You won!"<<endl;

cout<<"The killer was "<<killer<<" the weapon was "<<wpon<<" and it happened in the "<<room<<" room."<<endl;

//Exit the program

return 0;

}