**Project 1:**

**Blackjack 21**

**CIS-5-40651**

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**02/01/18**

**Intro**

Game: Blackjack 21

Blackjack is a gambling card game in which the player starts by placing a bet valued between the minimum and maximum amount of money that the house allows. The player as well as the dealer are dealt two cards and of the two cards the dealer receives, one of them is revealed. The player, with the hand they are dealt can choose to stay (keep their current cards), hit (receive another card), double (add an additional bet equal to the first one and receive a singular extra card), or, if the first two cards are equal, split (add an additional bet and split the hand into two hands where both receive an additional card). If the ultimate value of the player’s hand is 21, greater than the dealer’s hand, or if the dealer busts, the player wins and receives double his/her gross bet. If the player and the dealer have the same hand without it being a bust it is a tie and there is no gain nor loss. If the player busts or if the dealer has a higher hand, the player loses the bet.

**Summary**

Size:239 lines (however, about 30 lines are used solely to explain the game)

It took about a week to make this and the first few days had staggered progress due to the midterm. The majority of the program’s length comes from the consistent usage of if and if-else statements to output results which will likely be replaced for more efficient arrays and functions in the project following this one.

**Psuedo Code**

*Initalize*

*Explain the procedure of the game*

*Ask for name*

*Input name*

*Do{*

*Declare player’s randomized cards*

*Declare dealer’s randomized cards*

*While both cards are the same and equal to eleven, re-randomize*

*Ask for player’s bet while it is out of bounds*

*Give player first two cards*

*Record the value of the greatest card for later*

*If the cards are equal to 21*

*The player automatically wins*

*Else Continue*

*Display one of dealer’s cards*

*Ask player’s what they want to do based on their hand*

*If they don’t have a split*

*Ask if they want to hit*

*Ask if they want to stay*

*Ask if they want to double*

*If they do have a split*

*Ask if they want to hit*

*Ask if they want to stay*

*Ask if they want to double*

*Ask if they want to split*

*Switch based on choice*

*Switch hit*

*Do*

*Randomize card 3*

*Compare value of card 3 to first 2 and store*

*Add to the total value of the cards*

*Display card 3*

*Display total value of cards*

*If total is less than 21*

*Ask if they want to hit again*

*Input decision to hit*

*Else they cannot hit again*

*While the total is less than 21 and if they want to hit again*

*Break out of switch*

*Switch stay*

*Break out of switch*

*Switch double*

*Increment the bet and display the bet*

*Display card 3*

*Display total value of cards*

*If card 3 is greater than card 2*

*Store value of card 3 for later*

*Else store the value of card 1*

*Break out of the switch*

*Switch split*

*Set card 1 equal to hand 1*

*Set card 2 equal to hand 2*

*Increment the bet*

*Deal the third card to the first hand*

*If card 3 is greater than card 2*

*If card 3 is greater than card 4*

*Store the value of card 3 for later*

*Deal the fourth card card to the second hand*

*If card 4 is greater than card 2*

*If card 4 is greater than card 3*

*Store the value of card 4 for later\*

*Total of the first hand*

*Total of the second hand*

*If the first hand is greater than the second hand*

*The total that will be used is the first hand*

*Else the total that will be used is the second hand*

*Break out of switch*

*If total is greater than 21 it is a bust and you lost*

*Else*

*The dealer’s total is calculated*

*The dealer’s second card is revealed*

*While the dealer’s total is less than 15 or less than the player’s*

*The dealer’s third card is randomized and displayed*

*If the dealer’s hand is greater than 21*

*The dealer busts and you win*

*Display the payout*

*Display the highest card in your hand*

*Else If your hand is greater than the dealer’s and less than or equal to 21*

*You beat the dealer*

*Display payout*

*Display highest card in your hand*

*Else If the dealer’s hand is higher than the player’s*

*The dealer beat you*

*Display bet lost*

*Else If the total of both the player’s and the dealer’s hand is equal*

*You tied, nothing was lost*

*Would you like to play again?*

*Input decision*

*}while the decision is yes*

**Flowchart**

Due to its size it is in a separate file within the folder

**Code**

/\*

\* File: main.cpp

\* Author: Dr Mark E. Lehr

\* Created on January 29, 2018, 6:20 PM

\* Purpose: Blackjack 21

\*/

//System Libraries

#include <iostream>

#include <iomanip>

#include <cstdlib>

#include <ctime>

#include <cmath>

#include <string>

#include <fstream>

using namespace std;

//User Libraries

//Global Constants - Math/Physics Constants, Conversions,

// 2-D Array Dimensions

//Function Prototypes

//Execution Begins Here

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

//Declare Variables

int bet,newbet,total,rng1,rng2,card1,card2,card3,card4,card5,payout;

int total1,total2,split1,split2,dealer1,dealer2,dealer3,dealtot;

char choice,hitagn,playagn;

bool win;

string name;

//Seed Random Number Generator

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

//Initialize Variables

//Rules of the Game

cout<<"Welcome to Blackjack 21!"<<endl;

cout<<"Here are the rules of the game. To start you must place a "<<endl;

cout<<"bet of at least $15 and up to a maximum of $500. Afterwards,"<<endl;

cout<<"you will be given two cards and the dealer will draw two cards for"

<<" himself."<<endl;

cout<<"The objective of the game is to keep the total"

<<" value of the cards at or under 21 and to beat the dealer."<<endl;

cout<<"Once you have seen your cards you can choose to either stay, hit,"

<<" double down, or split. To stay means to keep your current "<<endl;

cout<<"cards. To hit means to ask for another card. To double down is to"

<<" double your initial bet but this can only be done after"<<endl;

cout<<"recieving your first two cards meaning you cannot hit and then "

<<"double down. To split means to take two cards of matching "<<endl;

cout<<"value (Examples:A 9 of Hearts and a 9 of Spades) and split them into"

<<" two"<<endl;

cout<<"separate decks and a singular card will be added to each deck."

<<" On top of this your initial bet will also be doubled."<<endl;

cout<<"Beyond this it is relatively simple. You lose if the dealer"<<endl;

cout<<"gets a higher total than you that does not exceed 21 and you win if"

<<" you have a higher total than the dealer that also does not"<<endl;

cout<<"exceed 21. Also, if the dealer busts but you do not it is an"

<<" automatic win regardless of how small your numbers are."<<endl;

cout<<"Note: In the current state of the game, 1 and 11(which are the "

<<"values of an Ace) "<<endl;

cout<<"are separate values. This will be fixed in the next version "<<endl;

cout<<"and I apologize if this negatively impacts your experience "<<endl;

cout<<"with the game."<<endl;

//Process/Map inputs to outputs

cout<<"Before we begin, what is your name?"<<endl;

cin>>name;

do{

newbet=0;

bet=0;

card1=(rand()%11)+1;

card2=(rand()%11)+1;

card3=(rand()%11)+1;

card4=(rand()%11)+1;

card5=(rand()%11)+1;

dealer1=(rand()%11)+1;

dealer2=(rand()%11)+1;

dealer3=(rand()%11)+1;

while(card1==11&&card1==card2){

card2=(rand()%11)+1;

}

do{

cout<<"Mr./Mrs. "<<name<<" please enter a bet of at least $15 and at"

<<" most $500"<<endl;

cin>>bet;

}while(bet>500||bet<15);

cout<<"Your first two cards are:"<<endl;

cout<<card1<<" and "<<card2<<endl; //Deal The Cards

total=card1+card2;

//Record Largest Card's Value

if(card1>card2){

rng1=card1;

}else rng1=card2;

if(total==21){

win=true;

}else(win==false);

win=total>21?true:false;

if(win){ //If it is 21

cout<<"Your payout is:"<<endl;

cout<<"$"<<fixed<<setprecision(2)<<showpoint<<static\_cast<float>(bet)

<<endl;

}if(win){

exit(0);

}else cout<<endl;

cout<<"The dealer drew:"<<endl; //Dealer's Turn

cout<<dealer1<<endl;

if(card1==card2){ //Choices when you are able to split

cout<<"If you wish to Hit type H"<<endl;

cout<<"If you wish to Stay type S"<<endl;

cout<<"If you wish to Split type T"<<endl;

cout<<"If you wish to Double type D"<<endl;

}if(card1!=card2){ //Choices when you are unable to split

cout<<"If you wish to Hit type H"<<endl;

cout<<"If you wish to Stay type S"<<endl;

cout<<"If you wish to Double type D"<<endl;

}

cin>>choice;

while(choice!='H'&&choice!='S'&&choice!='T'&&choice!='D'){//Validating user input

cout<<"You have entered an invalid choice please try again"<<endl;

cin>>choice;

}if(choice=='T'&&card1!=card2){ //Inability to split when cards don't =

while(choice=='T')

cout<<"You cannot split because your cards are not the same. Please"

<<" enter a valid response"<<endl;

cin>>choice;

}

switch(choice){ //Begin switch based on input

case 'H':do{ //Choosing to hit

card3=(rand()%11)+1;

if(card3>card2){ //Saving input to determine max value

rng2=card3; //of a single card in a hand

}else rng2=card1;

total+=card3; //Incrementing total value of cards

cout<<"You have chosen to hit and your card is:"<<endl;

cout<<card3<<endl;

cout<<"Bringing your total to:"<<endl;

cout<<total<<endl;

if(total<=21){ //Choosing to hit again

cout<<"Would you like to hit again? If yes type"

<<" H and if not type any other character"<<endl;

cin>>hitagn;

}else cout<<"You cannot hit again"<<endl;

}while(hitagn=='H'&&total<=21);

cout<<endl;break;

case 'S':cout<<endl;break; //Choosing to stay

case 'D':bet+=bet; //Choosing to double and incrementing bet

cout<<"You have doubled your initial bet to"<<endl;

cout<<fixed<<setprecision(2)<<showpoint

<<static\_cast<float>(bet)<<endl;

cout<<"You will be given another card and cannot hit again"

<<endl;

cout<<"Your card is"<<endl;

cout<<card3<<endl;

cout<<"And your total is"<<endl;

total+=card3; //Incrementing total value of cards

if(card3>card2){ //Saving input to determine max value

rng2=card3; //of single card in a hand

}else rng2=card1;

cout<<total<<endl;break;

case 'T':split1=card1; //Splitting the hand

split2=card2;

cout<<"You have doubled your initial bet and split it into "

<<"two hands."<<endl;

bet+=bet; //Incrementing the bet

cout<<"The dealer will now add a card to both hands."<<endl;

cout<<"To the first hand the dealer added"<<endl;

cout<<card3<<endl; //Card added to the first hand

if(card3>card2){ //Saving input

if(card3>card4){

rng2=card3;

}

}else rng2=card1;

cout<<"To the second hand the dealer added"<<endl;

cout<<card4<<endl; //card added to second hand

if(card4>card2){

if(card4>card3){ //Saving input

rng2=card4;

}

}else rng2=card1;

total1=card1+card3; //Total value of each hand

total2=card2+card4;

cout<<"The total of the first pile is"<<endl;

cout<<total1<<endl;

cout<<"The total of the second pile is"<<endl;

cout<<total2<<endl;

if(total1>total2){ //Determine which hand is

total=total1; //Favorable

}else total=total2;

}if(total>21){ //It's a bust if > 21

cout<<"Sorry, your total of "<<total<<" is greater than 21. It's a "

<<"bust, thanks for your cash!"<<endl;

}else{

dealtot=dealer1+dealer2; //If it's not an immediate bust

cout<<"The dealer will now reveal their second card and choose whether "

<<"or not to hit"<<endl;

cout<<"The dealer's second card is:"<<endl;

cout<<dealer2<<endl;

while(dealtot<15||dealtot<total){ //Determine whether dealer hits

dealer3=(rand()%11)+1;

dealtot+=dealer3;

cout<<"The dealer chose to hit and the card drawn was:"<<endl;

cout<<dealer3<<endl;

}

cout<<"The dealer's total is:"<<endl;

cout<<dealtot<<endl;

if(dealtot>21){

cout<<"Congratulations, the dealer busts meaning you won!"<<endl;

cout<<"Your payout is $"<<fixed<<setprecision(2)<<showpoint

<<static\_cast<float>(bet)<<endl;

cout<<"And your largest card was "

<<static\_cast<int>(fmax(rng1,rng2))<<endl;

}

else if(total<=21&&total>dealtot){

cout<<"Congratulations you beat the dealer! Your payout is $"

<<fixed<<setprecision(2)<<showpoint

<<static\_cast<float>(bet)<<endl;

cout<<"And your largest card was "

<<static\_cast<int>(fmax(rng1,rng2))<<endl;

}else if(dealtot>total){

cout<<"Sorry, but the dealer beat you and you lost $"<<fixed

<<setprecision(2)<<showpoint<<static\_cast<float>(bet)<<endl;

}else if(dealtot==total){

cout<<"You and the dealer tied so you get to keep your $"<<fixed

<<setprecision(2)<<showpoint<<static\_cast<float>(bet)<<endl;

}

}

cout<<"If you would like to play again type A and if not type in"

<<" any other character."<<endl;

cin>>playagn;

}while(playagn=='A'||playagn=='a');

//Output data

//Exit stage right!

return 0;

}

**Check-off Sheet**

The check-off sheet is in a separate file within the folder. NOTE: It is distorted due to the transition from ods to pdf so I included the original ods format as well.