Black Jack

Card Game

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CIS 5

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40402

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Introduction

Title: Blackjack

Blackjack is the American version of a popular global banking game known as Twenty-One, It is a comparing card game between one or more players and a dealer, this project just containing one player and one dealer.

For the first round, the dealer is dealt two cards, normally one up (exposed) and one down (hidden), and two up for player. The value of cards two through ten is their pip value (2 through 10). Face cards (Jack, Queen, and King) are all worth ten. Aces can be worth one or eleven. A hand's value is the sum of the card values. Players are allowed to draw additional cards to improve their hands.

Once all the players have completed their hands, it is the dealer's turn. The dealer hand will not be completed if all players have either busted or received blackjacks. The dealer then reveals the hidden card and must hit until the cards total up to 17 points. At 17 points or higher the dealer must stay. (At most tables the dealer also hits on a "soft" 17, i.e. a hand containing an ace and one or more other cards totaling six.) You are betting that you have a better hand than the dealer. The better hand is the hand where the sum of the card values is closer to 21 without exceeding 21. The detailed outcome of the hand follows:

If the player is dealt an Ace and a ten-value card (called a "blackjack" or "natural"), and the dealer does not, the player wins and usually receives a bonus.

If the player exceeds a sum of 21 ("busts"); the player loses, even if the dealer also exceeds 21.

If the dealer exceeds 21 ("busts") and the player does not; the player wins.

If the player attains a final sum higher than the dealer and does not bust; the player wins.

If both dealer and player receive a blackjack or any other hands with the same sum, called a "push", no one wins.

Summary

Project size: about 268 lines

The number of variables including 2 arrays, and around 50 int variables

Including 6 Functions, to be specific, 1 for linear search and 1 for sorting using selection sort.

This project includes many concepts that we learned from the chapters in the book, using parts of previous Project as well as the codes from homework that I used to code. Due to the limited time and the coding ability I owned, I cannot develop the project perfectly; it still has many possibilities to be extended for other concepts. For instance, developing it to multiple players or developing banking system.

It took almost two weeks because I tried to do many debugging work for this project to check for the logic of the game, as the poker game has so many potential rules, I found there are some tiny problems when I was debugging , and I fix them one by one. Since I have already tried multiple test case, but there still may be some logic problems remain that professor may notice. Please tell me once find that. Thanks for your sincere help.

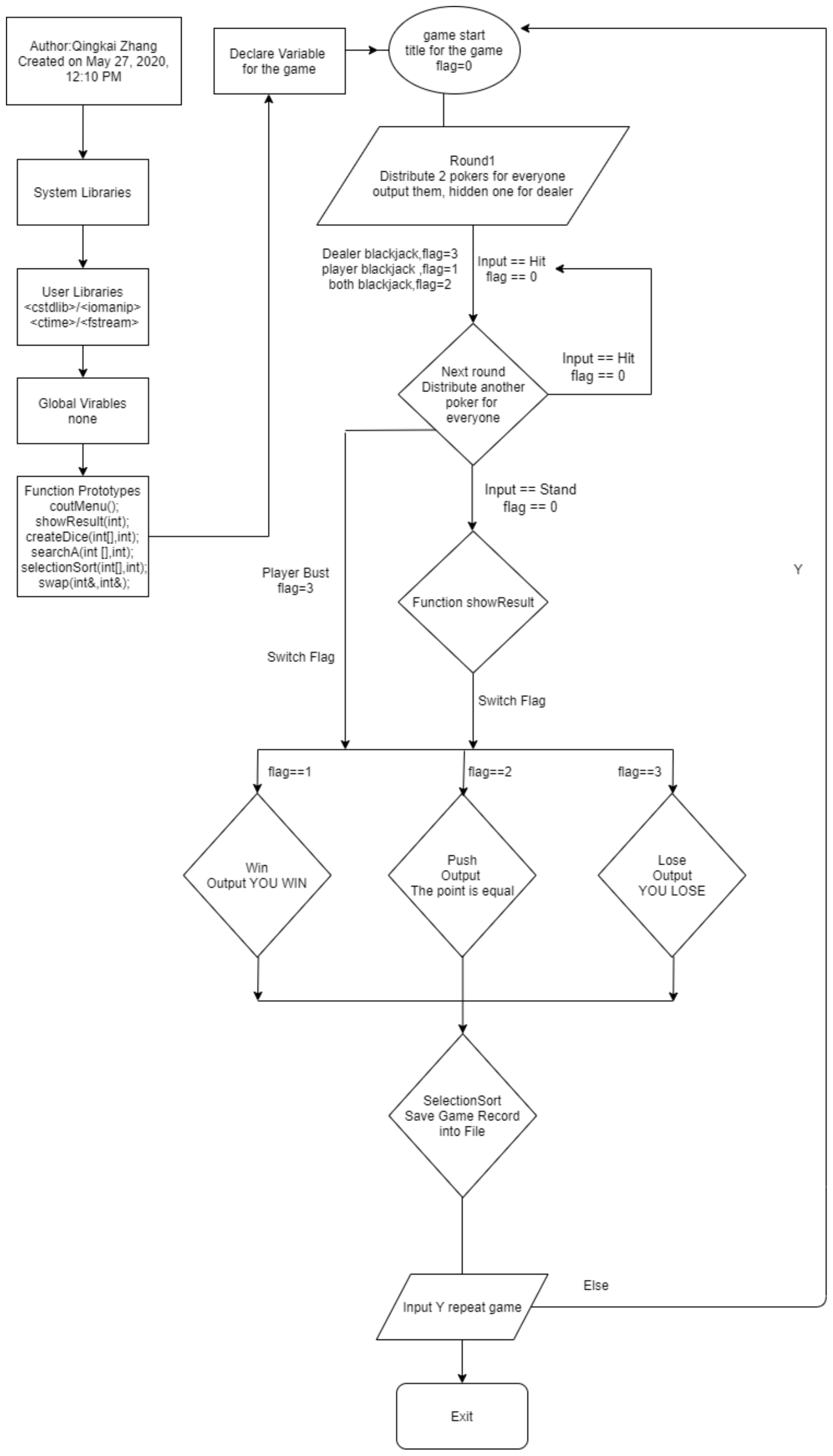
To be honest, I'm really satisfied with this project; it is a kind of fulfillment for me since it is the first time for me to develop such a complex mini-project.

Although this is a very simple game, I think I tried to reflect every concepts we have learned like for loop, if condition, while loop, and searching and sorting fo arrays etc.

Description

The main point that I programmed this project is the game logic. Although it is a poker game, it needs to check for the result at every round, and the situation is a little bit different from each other. I use flag to refer to the result, and switch flag to output the corresponding results. As a result, there is no need for me to output result every round. And when the game ends, it would record the game result into the file, and sorting the pokers every round for both players and dealers received every round into the sequence from small to the big.

Flowchart


Author:Qingkai Zhang
Created on May 27, 2020, 12:10 PM
System Libraries
User Libraries <cstdlib>/<iomanip> <ctime>/<fstream>
Global Virables none
Function Prototypes coutMenu(); showResult(int); createDice(int[],int); searchA(int [],int); selectionSort(int[],int); swap(int&,int&);
Declare Variable for the game
game start title for the game flag=0
Round1 Distribute 2 pokers for everyone output them, hidden one for dealer
Dealer blackjack,flag=3 player blackjack ,flag=1 both blackjack,flag=2
Input == Hit flag == 0
Input == Hit flag == 0
Next round Distribute another poker for everyone
Input == Stand flag == 0
Player Bust flag=3
Function showResult
Switch Flag
Switch Flag
Y
flag==1
flag==2
flag==3
Win Output YOU WIN
Push Output The point is equal
Lose Output YOU LOSE
SelectionSort Save Game Record into File
Input Y repeat game
Else
Exit

Cross Reference from Project 1

You are to fill-in with where located in code

Chapter	Section	Topic	Where Line #"s	Pts	Notes
2	2	cout	62		
	3	libraries	14-18	5	iostream, iomanip, cmath, cstdlib, fstream, string, ctime
	4	variables/literals	35		No variables in global area, failed project!
	5	Identifiers			
	6	Integers	41	1	
	7	Characters	45	1	
	8	Strings	44	1	
	9	Floats No Doubles		1	Using doubles will fail the project, floats OK!
	10	Bools	35	1	
	11	Sizeof *****			
	12	Variables 7 characters or less	45		All variables <= 7 characters
	13	Scope ***** No Global Variables			
	14	Arithmetic operators			
	15	Comments 20%+	49	2	Model as pseudo code
	16	Named Constants	264		All Local, only Conversions/Physics/Math in Global area
	17	Programming Style ***** Emulate			Emulate style in book/in class repositiory
3	1	cin	101		
	2	Math Expression	72		

	3	Mixing data types ****			
	4	Overflow/Underflow ****			
	5	Type Casting	181	1	
	6	Multiple assignment *****			
	7	Formatting output	195	1	
	8	Strings	130	1	
	9	Math Library	234	1	All libraries included have to be used
	10	Hand tracing ******			
4	1	Relational Operators			
	2	if	242	1	Independent if
	4	If-else	255	1	
	5	Nesting	88	1	
	6	If-else-if	135	1	
	7	Flags *****	148		
	8	Logical operators	87	1	
	11	Validating user input	101	1	
	13	Conditional Operator	102	1	
	14	Switch	167	1	
5	1	Increment/Decrement	166	1	
	2	While	132	1	
	5	Do-while	98	1	
	6	For loop	189	1	
	11	Files input/output both	33	2	
	12	No breaks in loops ******			Failed Project if included

****** Not	required to	show	Total	30	

Cross Reference for Project 2

You are to fill-in with where located in code

Chapter	Section	Topic	Where Line #''s	Pts	Notes
6		Functions			
	3	Function Prototypes	25-30	4	Always use prototypes
	5	Pass by Value	26	4	
	8	return	243	4	A value from a function
	9	returning boolean	263	4	
	10	Global Variables		XXX	Do not use global variables -100 pts
	11	static variables	166	4	
	12	defaulted arguments	264	4	
	13	pass by reference	30	4	
	14	overloading	247	5	
	15	exit() function		4	
7		Arrays			
	1 to 6	Single Dimensioned Arrays	39	3	
	7	Parallel Arrays	39-40	2	
	8	Single Dimensioned as Function Arg	**28** uments	2	

	9	2 Dimensioned Arrays		2	Emulate style in book/in class repositiory
	12	STL Vectors		2	
		Passing Arrays to and from Function	S 29	5	
		Passing Vectors to and from Functio	Ns	5	
8		Searching and Sorting Arrays			
	3	Bubble Sort		4	
	3	Selection Sort	247	4	
	1	Linear or Binary Search	236	4	
****** Not r	equired to	show	Total	70	Other 30 points from Proj 1 first sheet tab

Constructs & Concepts Utilized

iostream Library

Name	Frequency	Description	Location
cout	28	Output Data	Throughout
cin	2	Input Data	Throughout

cstdlib Library

Name	Frequency	Description	Location

srand()	1	Random # seed	Line 36
rand()	1	Generates rand #	Line 233

iomanip Library

Name	Frequency	Description	Location
setw()	3	Format final game stats	Line 190 196 261

string Library

Name	Frequency	Description	Location
string	1	Declare var.	Line 44

fstream Library

Name	Frequency	Description	Location
out.open()	1	Open file	Line 33
out.close()	1	Close file	Line 204
outputFile	19	WriteData	Through file

Data Types:

Data Types	Frequency	Location
int	52	Through File
char	1	Line 45
string	1	Line 44
ofstream	1	Line 32

Conditional Statements:

Conditional Statement	Frequency	Starting Location
if	13	Through the File
if/else	8	Through the File
if/else if	6	Through the File
switch	2	Line 167 221

Loops:

Loops	Frequency	Starting Location
for	11	Through the File
while	2	Line 37,132
do-while	1	Line 163

Linear Search:

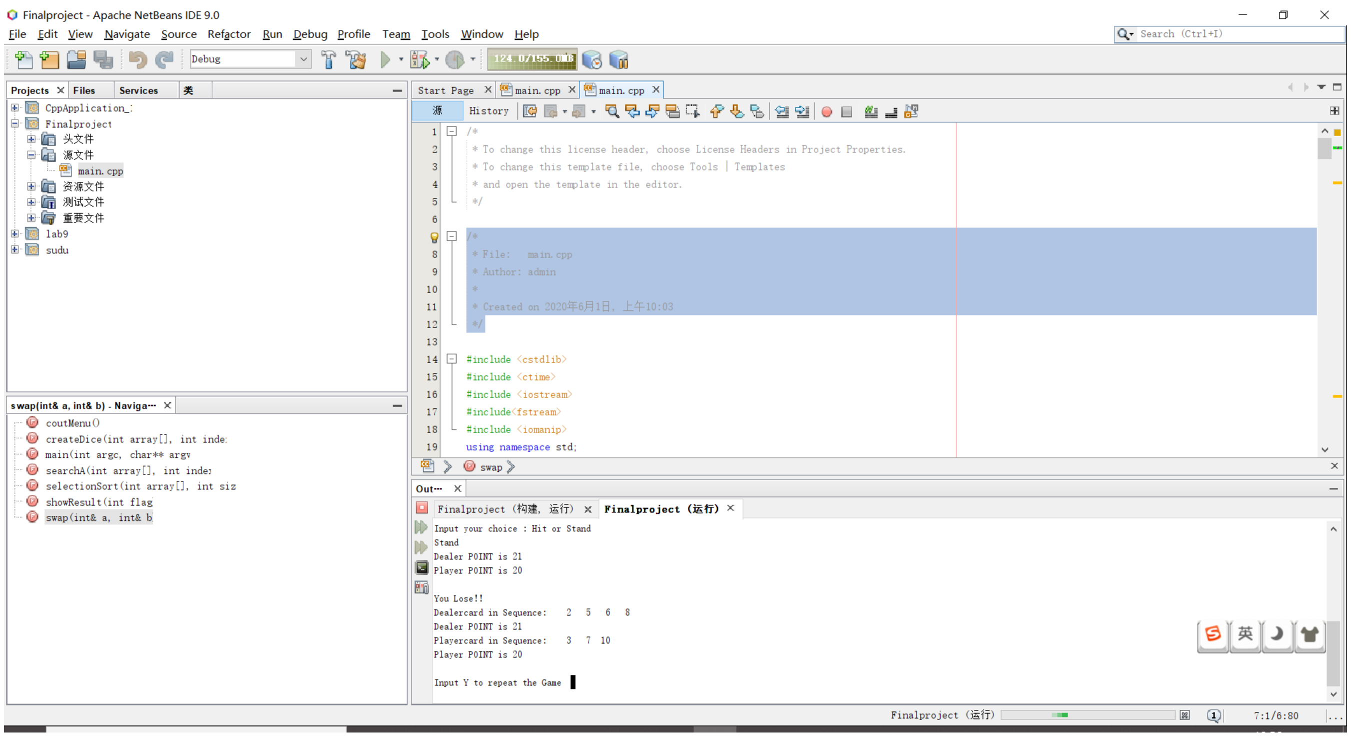
Function	Frequency	Location
searchA	1	Line 236

Sorting:

Function	Frequency	Location
selectionSort	1	Line 247

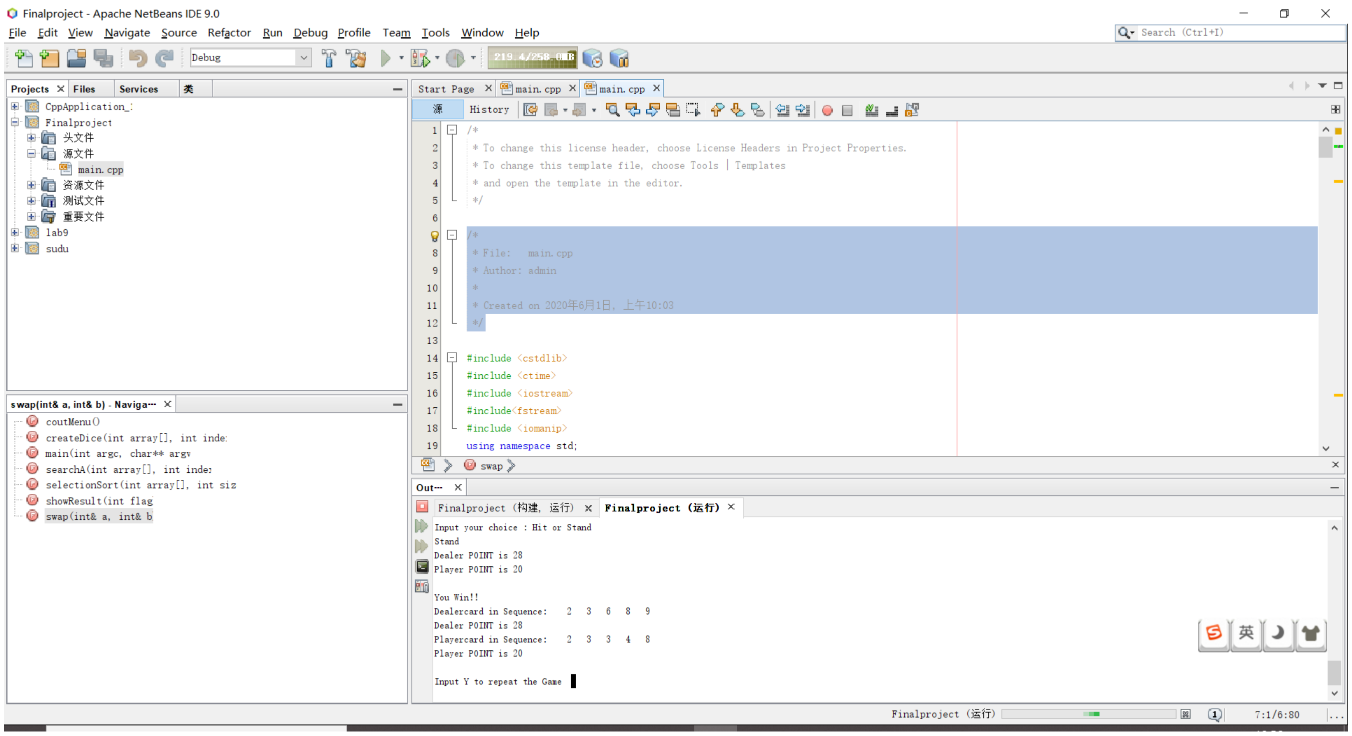
Proof of a Working Product

Here are some results of my final projects.



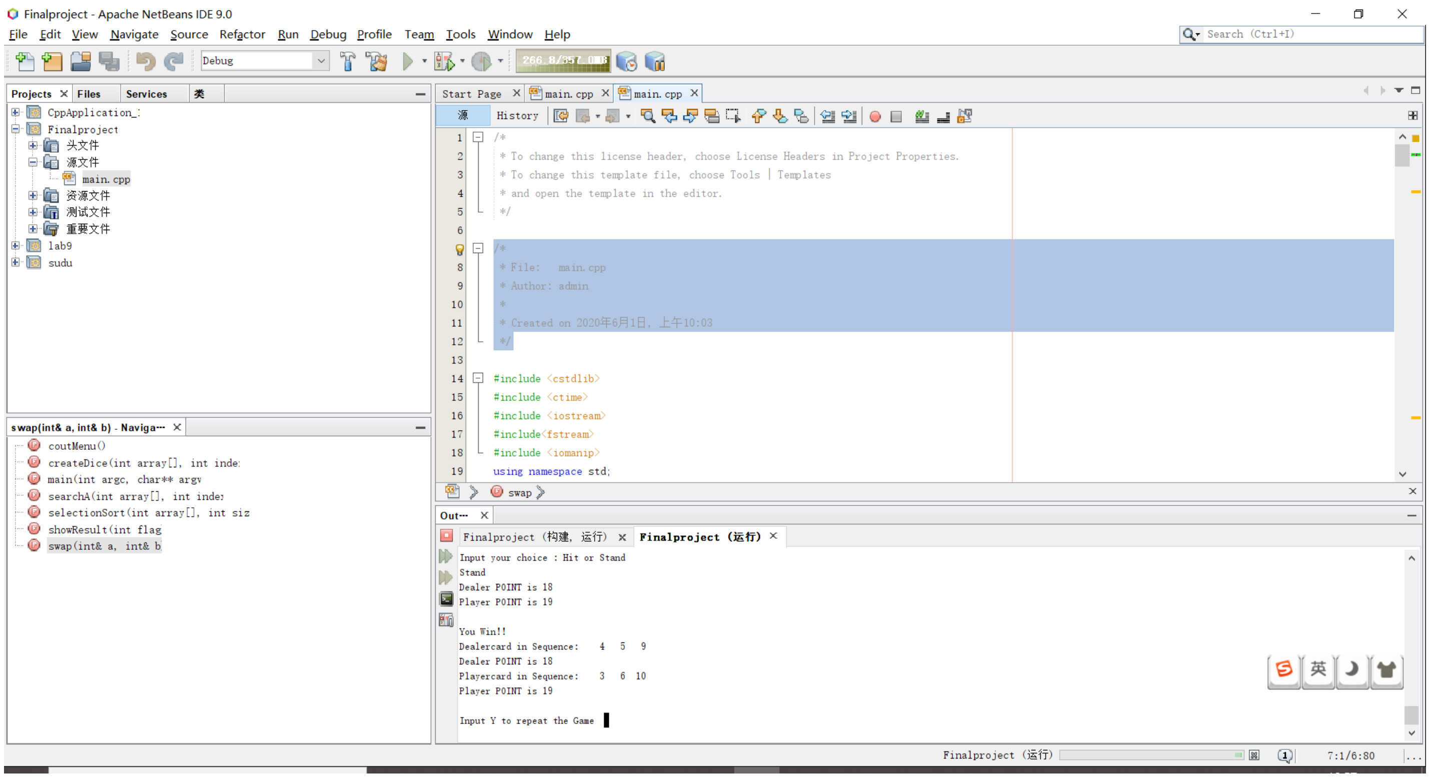
```
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

/*
 * File:   main.cpp
 * Author: admin
 *
 * Created on 2020年6月1日, 上午10:03
 */

#include <cstdlib>
#include <ctime>
#include <iostream>
#include<fstream>
#include <iomanip>
using namespace std;
```

```
Input your choice : Hit or Stand
Stand
Dealer POINT is 21
Player POINT is 20

You Lose!!
Dealercard in Sequence:   2   5   6   8
Dealer POINT is 21
Playercard in Sequence:   3   7  10
Player POINT is 20

Input Y to repeat the Game
```



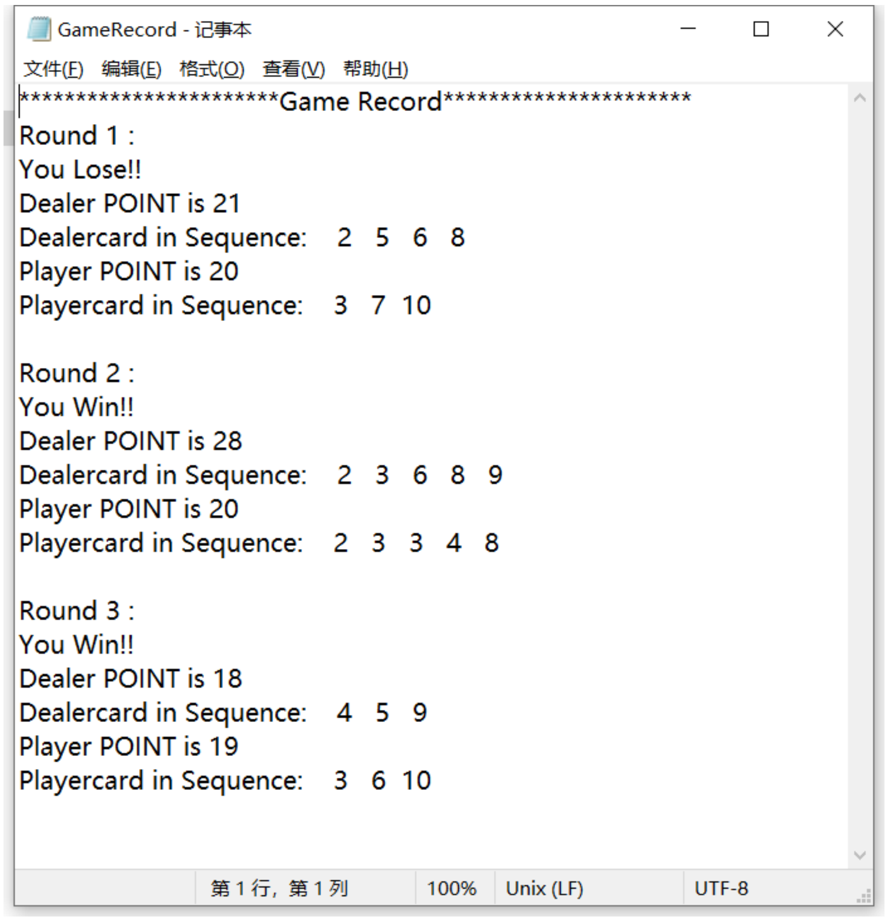
```
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

/*
 * File:   main.cpp
 * Author: admin
 *
 * Created on 2020年6月1日, 上午10:03
 */

#include <cstdlib>
#include <ctime>
#include <iostream>
#include<fstream>
#include <iomanip>
using namespace std;
```

```
Input your choice : Hit or Stand
Stand
Dealer POINT is 28
Player POINT is 20

You Win!!
Dealercard in Sequence:   2   3   6   8   9
Dealer POINT is 28
Playercard in Sequence:   2   3   3   4   8
Player POINT is 20

Input Y to repeat the Game
```


Finalproject - Apache NetBeans IDE 9.0
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Search (Ctrl+I)
Debug
Projects Files Services 类
CppApplication_1
Finalproject
头文件
源文件
main.cpp
资源文件
测试文件
重要文件
lab9
sudu
swap(int& a, int& b) - Naviga…
coutMenu()
createDice(int array[], int inde
main(int argc, char** argv
searchA(int array[], int inde
selectionSort(int array[], int siz
showResult(int flag
swap(int& a, int& b
Start Page main.cpp main.cpp
源 History
swap
Out…
Finalproject (构建, 运行) Finalproject (运行)
Finalproject (运行)
7:1/6:80

```
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

/*
 * File:   main.cpp
 * Author: admin
 *
 * Created on 2020年6月1日, 上午10:03
 */

#include <cstdlib>
#include <ctime>
#include <iostream>
#include<fstream>
#include <iomanip>
using namespace std;
```

```
Input your choice : Hit or Stand
Stand
Dealer POINT is 18
Player POINT is 19

You Win!!
Dealercard in Sequence:    4   5   9
Dealer POINT is 18
Playercard in Sequence:    3   6  10
Player POINT is 19

Input Y to repeat the Game
```



```
**********************Game Record**********************
Round 1 :
You Lose!!
Dealer POINT is 21
Dealercard in Sequence:   2   5   6   8
Player POINT is 20
Playercard in Sequence:   3   7  10

Round 2 :
You Win!!
Dealer POINT is 28
Dealercard in Sequence:   2   3   6   8   9
Player POINT is 20
Playercard in Sequence:   2   3   3   4   8

Round 3 :
You Win!!
Dealer POINT is 18
Dealercard in Sequence:   4   5   9
Player POINT is 19
Playercard in Sequence:   3   6  10
```

References

1. codeE homework& Lab

2. “Starting Out with C++: From Control Structures through Objects” Gaddis, Tony. 9th Edition. (Textbook)

Program

```
 /*
  * File:   main.cpp
 * Author: Qingkai
 *
 * Created on 2020年6月1日, 上午10:03
 */
#include <cstdlib>
```

```
#include <ctime>

#include <iostream>

#include<fstream>

#include <iomanip>

using namespace std;


/*

 *

 */

//Fuction Prototypes

void coutMenu();

void showResult(int);

void createDice(int[],int);

bool searchA(int [],int);

void selectionSort(int[],int);

void swap(int&,int&);

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

    ofstream outputFile;

    outputFile.open("GameRecord.txt");

    outputFile << "**********************Game Record*********************"<<endl;

    bool status = true;

    int x = 1;

    while(status){

    srand(unsigned(time(0)));

    int Dealercard[10];

    int Playercard[10];

    int sumD=0;

    int sumP=0;

    int point;

    string input;

    char input1;


    int flag = 0;


    //games status, true for continue, false for finish
```

```
status=true;



    //set status to true for default
    status=true;
    //first turn
   createDice(Dealercard,1);
   createDice(Dealercard,2);
   createDice(Playercard,1);
   createDice(Playercard,2);
    //rolling the dice by getting random number
    //round 1
    cout<<"Dealer card1 is Dealercard1"<<endl;
    cout<<"Dealer card2 is : "<<Dealercard[2]<<endl<<endl;
    if(Dealercard[1]==1||Dealercard[2]==1)
        sumD=Dealercard[1]+Dealercard[2]+10;
    else
        sumD=Dealercard[1]+Dealercard[2];

    cout<<"Player card1 is "<<Playercard[1]<<endl;
    cout<<"Player card2 is "<<Playercard[2]<<endl;
    if(Playercard[1]==1||Playercard[2]==1)
        sumP= Playercard[1]+ Playercard[2]+10;
    else
        sumP = Playercard[1]+ Playercard[2];
    cout<<"Player POINT is "<<sumP<<endl<<endl;

    if(Dealercard[1]==10&&Dealercard[2]==1){
        if(Playercard[1]==1&&Playercard[2]==10)
            flag=2;//push
        else if(Playercard[2]==1&&Playercard[1]==10)
            flag=2;//push
        else
            flag=3;//lose Dealer BlackJack
    }
```

```
 if((Playercard[2]==1&&Playercard[1]==10)||(Playercard[1]==1&&Playercard[2]==10)){
    if(Dealercard[1]==1&&Dealercard[2]==10)
        flag=2;//push
    else if(Dealercard[2]==1&&Dealercard[1]==10)
        flag=2;//push
    else
        flag=1;//Win player BlackJack
 }

int i =3;
int j;
do
{
cout<<"Input your choice : Hit or Stand"<<endl;
cin>>input;
if(input=="Hit"){

    createDice(Dealercard,i);
    createDice(Playercard,i);

    if(sumD<11 && Dealercard[i]==1)
        sumD+=Dealercard[i]+10;
    else{
        sumD+=Dealercard[i];
    }
    if( searchA(Dealercard,i-1) && sumD >21)
        sumD-=10;

    if(sumP<11 && Playercard[i]==1)
        sumP+=Playercard[i]+10;
    else
        sumP+=Playercard[i];
```

```
     if( searchA(Playercard,i-1) && sumP >21)
        sumP-=10;

    cout<<"Dealer card"<<i<<" is : "<<Dealercard[i]<<endl<<endl;
    cout<<"Player card"<<i<<" is "<<Playercard[i]<<endl;
    cout<<"Player POINT is "<<sumP<<endl<<endl;
    i++;
    if(sumP>21 )
        flag = 3; //lose
    }
if(input=="Stand"){
     j = i;
    while(sumD<=17){//Dealer would keep Hit until the point is over 17

         createDice(Dealercard,j);
          if(sumD<11 && (searchA(Dealercard,j)))
            sumD+=Dealercard[j]+10;
          else
            sumD+=Dealercard[j];
         j++;
            if(sumD>21)
                flag=1;
    }

    cout<<"Dealer POINT is "<<sumD<<endl;
    cout<<"Player POINT is "<<sumP<<endl<<endl;
    if(sumD<=21 && sumP<=21){
    if(sumD > sumP){
       flag = 3;//lose
        }
    else if(sumD == sumP){
       flag = 2;//push
        }
    else if(sumD < sumP){
       flag = 1;//Win
```

```
                }
            }
        else if(sumP>21)
            flag = 3;//lose
        else if(sumD>21 && sumP<=21)
            flag = 1;//win
        }

    }while(flag==0);

    outputFile << "Round "<<x<<" :"<<endl;
    x++;
    switch(flag){
        case 1:
               outputFile <<"You Win!!"<<endl;
                break;
        case 2:
                outputFile <<"The Point is Equal!!"<<endl;
                break;
        case 3:
                outputFile <<"You Lose!!"<<endl;
                break;
    }

    showResult(flag);
    cout << "Dealercard in Sequence: ";
    selectionSort(Dealercard,j-1);
    cout<<"Dealer POINT is "<<sumD<<endl;
    cout << "Playercard in Sequence: ";
    selectionSort(Playercard,i-1);
    cout<<"Player POINT is "<<sumP<<endl<<endl;


outputFile<<"Dealer POINT is "<<sumD<<endl;
outputFile << "Dealercard in Sequence: ";
     for(int y =1; y <=j-1; y++)
```

```
            outputFile << setw(4) << Dealercard[y];
            outputFile << endl;
    outputFile<<"Player POINT is "<<sumP<<endl;
    outputFile << "Playercard in Sequence: ";
        for(int y =1; y <=i-1; y++)
            outputFile << setw(4) << Playercard[y];
            outputFile << endl<<endl;

    cout<<"Input Y to repeat the Game";
    cin>>input1;
    cout<<endl;
    if(input1!='Y')
        status = false;
    }
    outputFile.close();
    return 0;
}
void coutMenu(){
     for(int i=0;i<15;i++)
    {
        cout<<"*";
    }
    cout<<" Game Start ";
    for(int i=0;i<15;i++)
    {
        cout<<"*";
    }
    cout<<endl<<endl;
}
void showResult(int flag){

    switch(flag){
            case 1: cout<<"You Win!!"<<endl;
                   // outputFile <<"You Win!!"<<endl;
                    break;
            case 2: cout<<"The Point is Equal!!"<<endl;
                   // outputFile <<"The Point is Equal!!"<<endl;
                    break;
            case 3: cout<<"You Lose!!"<<endl;
                   // outputFile <<"You Lose!!"<<endl;
                    break;
        }
}
void createDice(int array[],int index){
    array[index] =(rand()%(10))+1;
}
bool searchA(int array[],int index){
    bool status = false;
    for(int i = 0;i<index;i++){
        if(array[i]==1)
            status = true;
    }
       if(status)
           return true;
       else
           return false;
}
void selectionSort(int array[],int size){
    int minIndex,minValue;
    for(int start = 1; start <(size); start++){
        minIndex = start;
        minValue = array[start];
        for(int index = start+1;index<=size;index++){
            if(array[index]<minValue){
                minValue = array[index];
                minIndex = index;
            }
        }
        swap(array[minIndex],array[start]);
    }
    for(int i =1; i <=size; i++)
        cout << setw(4) << array[i];
     cout << endl;
}
void swap(int &a, int &b){
    int temp =a;
    a = b;
    b= temp;
}
```