

# Project 1

Title

**Card War Game**

Course

**CIS-5**

Section

**40570**

Due Date

**February 3, 2022**

Author

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## Introduction

**Title:**

Card War Game

**Number of players:**

2

**How to play:**

The game uses a standard 52-card deck of playing cards divided evenly and randomly between two players. Each player gets 26 random cards face down. Both player flip the top card at the same time, compare both cards and the player with the higher card wins both cards.

A war consist in a tie between the two player because both players flipped identical cards, each player lays three cards face-down, then each player flips one card face-up, compare the new face-up cards played and the player with the higher rank wins all the cards.

If the cards tie again then you have another war and repeat the process of the war and continue the process until there is a winner. If one player doesn't have more cards to lay face-down during the war, he or she will lose the war.

The first player to collect all the cards wins.

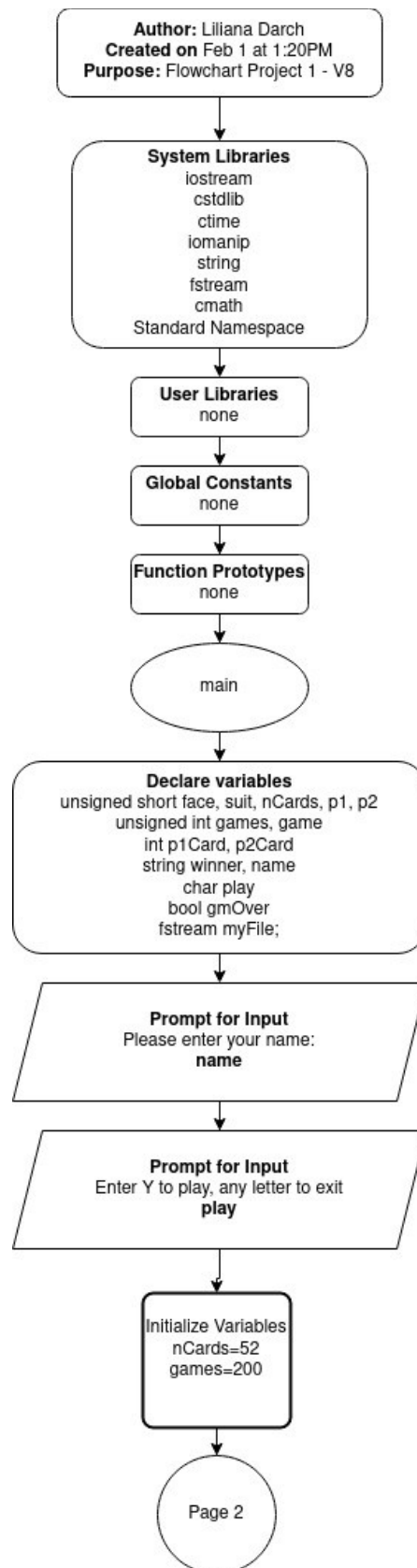
**Card denomination:**

A is the highest card = 13

2 is the lowest card = 1

Card	2	3	4	5	6	7	8	9	10	J	Q	K	A
Equal to	1	2	3	4	5	6	7	8	9	10	11	12	13

# Flowchart





## Pseudocode

DECLARE a variable face to hold the face of the cards  
DECLARE a variable suit to hold the suit of the cards  
DECLARE a variable nCards for number of cards of the deck  
DECLARE a variable p1 for player one  
DECLARE a variable p2 for player two  
DECLARE a variable games to count the rounds of one game  
DECLARE a variable game to count the score of each game in the file  
DECLARE a variable p1Cards to count the total of cards player one has each round  
DECLARE a variable p2Cards to count the total of cards player two has each round  
DECLARE a variable winner to hold the winner of the game  
DECLARE a variable name to hold the name of player one  
DECLARE a variable play to hold if player one would like to play again  
DECLARE a variable bool gmOver to hold if we have a winner  
DECLARE a variable myFile to write on the file

LOOP: While the player wants to keep playing

    GET: the users input

    LOOP: Do:

        IF the player1 card is higher than player2

            ADD one to player1

            SUBTRACT one to player2

        END IF

        IF the player2 card is higher than player1

            ADD one to player2

            SUBTRACT one to player1

        END IF

        IF player1 has the same card as player2

            IF the player1 card is higher than player2

                ADD four to player1

                SUBTRACT four to player2

            ELSE the player2 card is higher than player1

                ADD four to player2

                SUBTRACT four to player1

        END IF

    ELSE endl

        IF player1 has 52 cards or player2 has 52 cards

            gmOver is equal to true

        END IF

    WHILE gmOver is false

        IF player1 has 52 cards, assigned player 1 to winner OTHERWISE assigned "Computer"

END LOOP

## Spreadsheet – Cross Reference for Project 1

Chap ter	Section	Topic	Where Line #'s	Pts	Notes
2	2	cout	54		
	3	libraries	15 to 21	8	iostream, iomanip, cmath, cstdlib, fstream, string,
	4	variables/literals	40 to 49		No variables in global area, failed project!
	5	Identifiers			
	6	Integers	43	3	
	7	Characters	47	3	
	8	Strings	45	3	
	9	Floats No Doubles	Version 2 – 40	3	Using doubles will fail the project, floats OK!
	10	Bools	48	4	
	11	Sizeof ***** Variables 7 characters			
	12	or less			All variables <= 7 characters
		Scope ***** No			
	13	Global Variables			
	14	Arithmetic operators			
	15	Comments 20%+	54	5	Model as pseudo code
	16	Named Constants			All Local, only Conversions/Physics/Math in Glo
		Programming Style			
	17	***** Emulate			Emulate style in book/in class repository
3	1	cin	55		
	2	Math Expression			
		Mixing data types			
	3	*****			
		Overflow/Underflow			
	4	*****			
	5	Type Casting	37	4	
		Multiple assignment			
	6	*****			

	7	Formatting output	79	4	
	8	Strings	152	3	
	9	Math Library	86	4	All libraries included have to be used
	10	Hand tracing *****			
4	1	Relational Operators			
	2	if	77	4	Independent if
	4	If-else	139	4	
	5	Nesting	144	4	
	6	If-else-if	118	4	
	7	Flags *****			
	8	Logical operators	73	4	
	11	Validating user input	64	4	
	13	Conditional Operator	89	4	
	14	Switch	Version1 – 44	4	
5	1	Increment/Decrement	83, 84	4	
	2	While	64	4	
	5	Do-while	71	4	
	6	For loop	73	4	
	11	Files input/output both No breaks in loops	159	8	
	12	*****			Failed Project if included

\*\*\*\*\*

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Total 100

## Code

```
/*
 * File: main.cpp
 * Author: Liliana Darch
 * Created on January 31, 2022, 11:00 PM
 * Purpose: Project Card War Game Version 8
 */

//System Level Libraries
#include <iostream> //I/O Library
#include <cstdlib> //Random Function Library
#include <ctime> //Time Library
#include <iomanip> //Formatting Library
#include <string> //String library
#include <fstream> //File library
#include <cmath> //Math 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!
//Execution Begins Here
int main(int argc, char** argv) {
    //Set Random Number seed
    srand(static_cast<unsigned int>(time(0)));

    //Declare Variable Data Types and Constants
    unsigned short face, suit,
        nCards,
        p1, p2;
    unsigned int games, game;
    int p1Card, p2Card;
    string winner;
    string name;
    char play;
    bool gmOver;
    fstream myFile;

    //variables for the face and suit of the deck of cards
    //number of cards in a deck
    //Player one and player two
    //The amount of rounds available to play
    //The amount of cards that each player has every round
    //Holds the winner
    //Holds the name of player 1
    //Validates the user input keep playing
    //To check if we have a winner and a loser
    //File to hold the winner from each game
```



```

//Initialize Variables
cout<<"Please enter your name: "<<endl;           //Ask for the player's name
cin>>name;                                       //Read the player name
cout<<"Hi "<<name<<" are you ready to play against the computer?"<<endl;
cout<<"Enter Y to play, any letter to exit"<<endl;
cin>>play;                                     //Read the user input about playing again

nCards=52;                                     // The 52 cards in a deck
games=200;                                     // Play game no more than 200 rounds

while (play == 'Y' || play == 'y'){           //Checks if the user would like to play the game
    p1Card = 26;                               //Initialize player 1 with 26 cards
    p2Card = 26;                               //Initialize player 2 with 26 cards
    gmOver = false;                           //Check if there was a winner and a loser

//Start the game
do {

    for(int i = 0; i<games && !gmOver; i++){
        p1 = rand()%nCards%13;                 //Assign the random card to Player 1
        p2 = rand()%nCards%13;                 //Assign the random card to Player 2

        if (p1 > p2){                           //If player 1 has the highest card
            cout<<endl;
            cout<<"*** ROUND NUMBER "<<setw(3)<<i<<" ***"<<endl;    //Show the round number
            cout<<name<<" card is "<<p1<<endl;
            cout<<"Computer card is "<<p2<<endl;
            cout<<name<<" has the highest card "<<p1<<endl;
            p1Card++;                           //Adds 1 card to player 1
            p2Card--;                           //Subtract 1 card to player 2
            cout<<"-- The statistics --"<<endl;
            cout<<name<<" has "<<abs(p1Card)<<" cards"<<endl;
            cout<<"Computer has "<<abs(p2Card)<<" cards"<<endl;
        }
        if (p2 > p1){ // If player 1 has the highest card
            cout<<endl;
            cout<<"*** ROUND NUMBER "<<setw(3)<<i<<" ***"<<endl;    //Show the round number
            cout<<name<<" card is "<<p1<<endl;
            cout<<"Computer card is "<<p2<<endl;
            cout<<"Computer has the highest card "<<p2<<endl;
            p2Card++;                           //Adds 1 card to player 2
            p1Card--;                           //Subtract 1 card to player 2
            cout<<"-- The statistics --"<<endl;
            cout<<name<<" has "<<abs(p1Card)<<" cards"<<endl;
            cout<<"Computer has "<<abs(p2Card)<<" cards"<<endl;
        }
        if(p1 == p2) { //If we get a match, we have a war!!

```

```

cout<<endl;
cout<<"*** ROUND NUMBER "<<setw(3)<<i<<" ***"<<endl;    //Show the round number
cout<<name<<" card is "<<p1<<endl;
cout<<"Computer card is "<<p2<<endl;
cout<<"*** WE HAVE A WAR ***"<<endl;

```

```

the war    p1 = rand()%nCards%13;    //Assign a new the random card to Player 1 to play
the war    p2 = rand()%nCards%13;    //Assign a new the random card to Player 2 to play
cout<<endl;

```

```

cout<<"***Round number "<<i<<endl;    //Show the round number
if (p1 > p2){    // If player 1 has the highest card
    cout<<name<<" new card is "<<p1<<endl;
    cout<<"Computer new card is "<<p2<<endl;
    cout<<name<<" wins the war with the card number "<<p1<<endl;
    if ((p1Card <48) || (p2Card <48)) {    //control the amount of cards played
        p1Card = p1Card + 4;    //Add 4 card to player 1
        p2Card = p2Card - 4;    //Subtract 4 card to player 2
        cout<<"-- The statistics --"<<endl;
        cout<<name<<" has "<<abs(p1Card)<<" cards"<<endl;
        cout<<"Computer has "<<abs(p2Card)<<" cards"<<endl;
    }
}

```

```

} else{    //If player 2 has the highest card
    cout<<name<<" new card is "<<p1<<endl;
    cout<<"Computer new card is "<<p2<<endl;
    cout<<"Computer wins the war with the card number "<<p2<<endl;
    if ((p1Card <=48) || (p2Card <=48)){
        p2Card = p2Card + 4;    //Add 4 card to player 2
        p1Card = p1Card - 4;    //Subtract 4 card to player 1
        cout<<"-- The statistics --"<<endl;
        cout<<name<<" has "<<abs(p1Card)<<" cards"<<endl;
        cout<<"Computer has "<<abs(p2Card)<<" cards"<<endl;
    }
}
}

```

```

}else {
    cout<<endl;
}

```

```

if( p1Card >= 52 || p2Card >= 52 )    //Check if we have a winner every round
gmOver = true;    //Set the boolean to true so the game is over
}

```

```

} while (gmOver == false);    //Keep playing while bool is equal to false

```

```

    winner = p1Card >= 52 ? name:"Computer";
variable                                     //Assign the winner player to the winner

    cout<<endl<<"THE WINNER IS"<<endl;
    cout<<setw(10)<<winner<<endl;
    cout<<endl<<endl;                                     //Output the winner

    myFile.open("score.txt", ios::app);
    myFile<<"Game number "<<game<<"! The winner is: "<<winner<<"!"<<endl;    // Open a file
    game++;
    myFile.close();
    game++;
    myFile.close();                                     // counts how many games were played
    myFile.close();                                     //close the file

    cout<<"Do you want to play again?"<<endl;
    cout<<"Enter Y to play, any letter to exit"<<endl;
    cin>>play;
    }
}

//Exit stage right!
return 0;
}

```

## Summary

Project size: about 172 lines

The number of variables: 13

This project includes many concepts that we learned from the chapters 1 to 5 from the book Gaddis 9th Edition. Also, it has many possibilities to be extended for next project. For example, the use functions to clean the main, the use of arrays to hold de card suits and faces.

### Version 0:

Contains the minimun and maximun numbers available using the random variable.

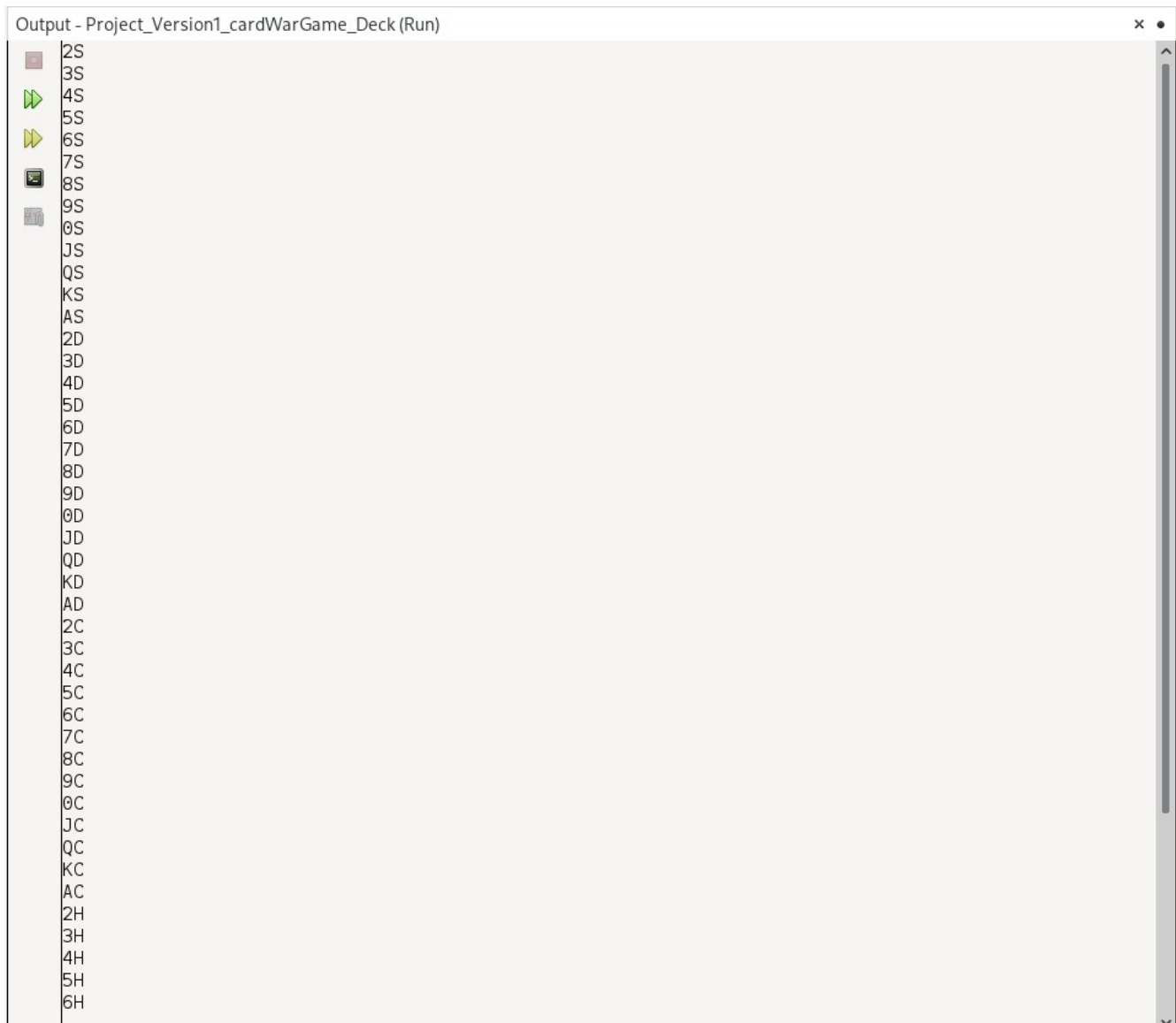


The screenshot shows a code editor's output window with the title 'Output'. It contains two tabs: 'Project\_Version0\_cardWarGame\_RandomVariable (Build, Run) ×' and 'Project\_Version0\_cardWarGame\_RandomVariable (Run) ×'. The active tab displays the following output:

```
Number of random function calls = 2100000000
The Minimum random number detected = 0
The Maximum random number detected = 2147483647
RUN FINISHED; exit value 0; real time: 26s; user: 0ms; system: 26s
```

**Version 1:**

Create a file with the deck of cards. The file contains the suit H for Hearts, D for Diamonds, C for Cloves and S for Spaces. It also contains the card's faces, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K and, A.

A screenshot of an IDE's output window titled "Output - Project\_Version1\_cardWarGame\_Deck (Run)". The window displays a list of 52 cards, organized by suit. The first 13 cards are Spades (S), the next 13 are Diamonds (D), the next 13 are Cloves (C), and the last 3 are Hearts (H). Each card is represented by a two-letter code (e.g., "2S", "AS", "2D", etc.). On the left side of the output area, there are small icons corresponding to each line: a red square for "2S", a green double arrow for "4S", a yellow double arrow for "6S", a black monitor icon for "8S", and a small grey icon for "10S". The rest of the lines have no icons. The window has a standard OS-style title bar with a close button (X) and a maximize button (a dot). A vertical scrollbar is on the right side.

```
Output - Project_Version1_cardWarGame_Deck (Run)
2S
3S
4S
5S
6S
7S
8S
9S
10S
JS
QS
KS
AS
2D
3D
4D
5D
6D
7D
8D
9D
10D
JD
QD
KD
AD
2C
3C
4C
5C
6C
7C
8C
9C
10C
JC
QC
KC
AC
2H
3H
4H
5H
6H
```

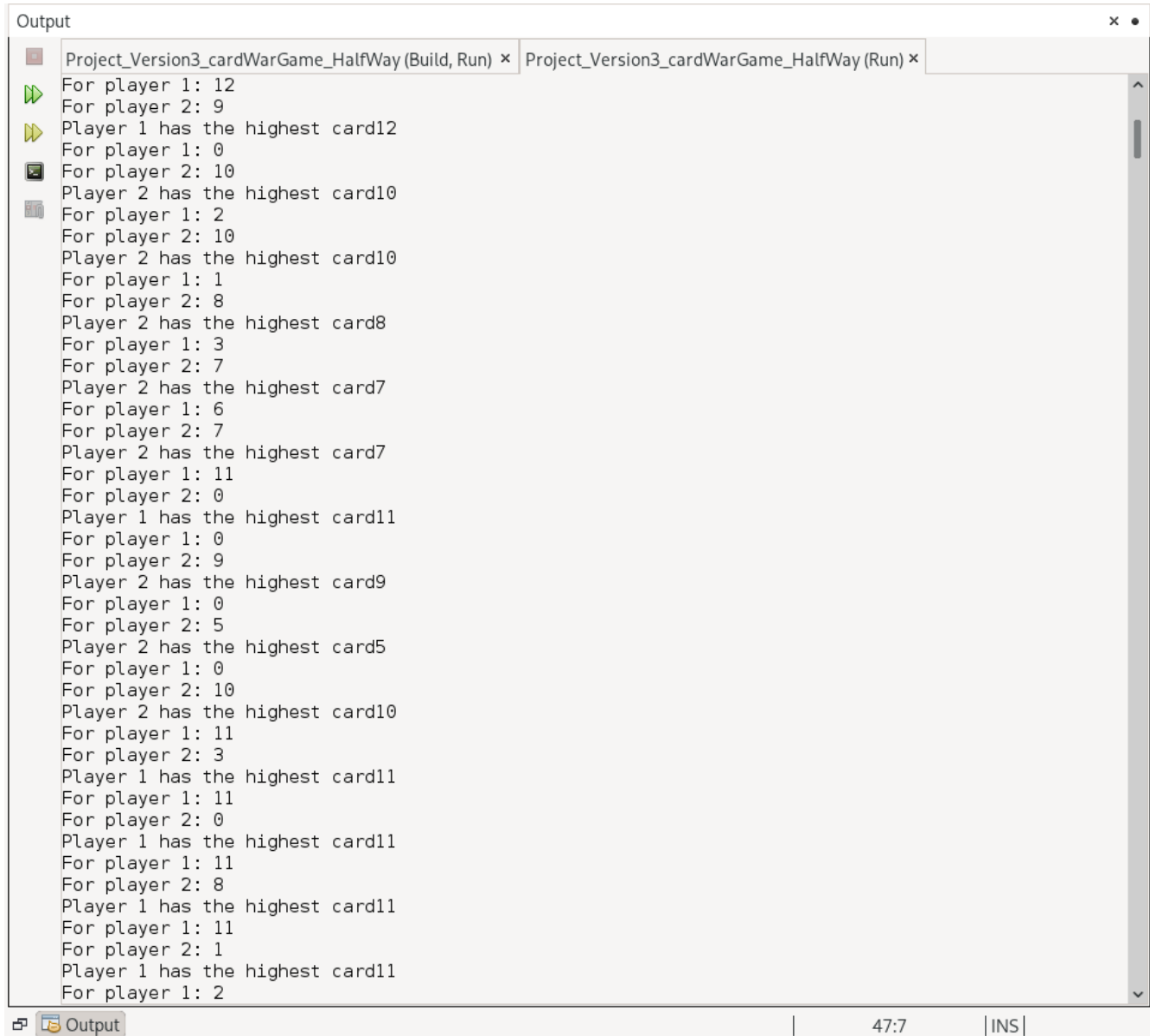
## Version 2:

I'm using the random variable to be able to get suits from 0 to 3 that represent the hearts, diamonds, cloves and spaces. And also, I try the random variable to get the random faces represented in numbers from 0 to 12.

```
Output - Project_Version2_cardWarGame_52cardsUsingRandom (Run)
Face: 5
Suit: 2
Face: 4
Face: 8
Face: 1
Face: 7
Face: 7
Face: 5
Face: 8
Face: 8
Face: 9
Face: 12
Face: 9
Face: 11
Face: 12
Suit: 0
Face: 0
Face: 1
Face: 11
Face: 10
Face: 6
Face: 0
Face: 12
Face: 4
Face: 10
Face: 1
Face: 5
Face: 12
Face: 5
Suit: 1
Face: 8
Face: 10
Face: 1
Face: 12
Face: 8
Face: 2
Face: 9
Face: 4
Face: 7
Face: 4
Face: 12
Face: 6
Face: 3
Suit: 3
```

### Version 3:

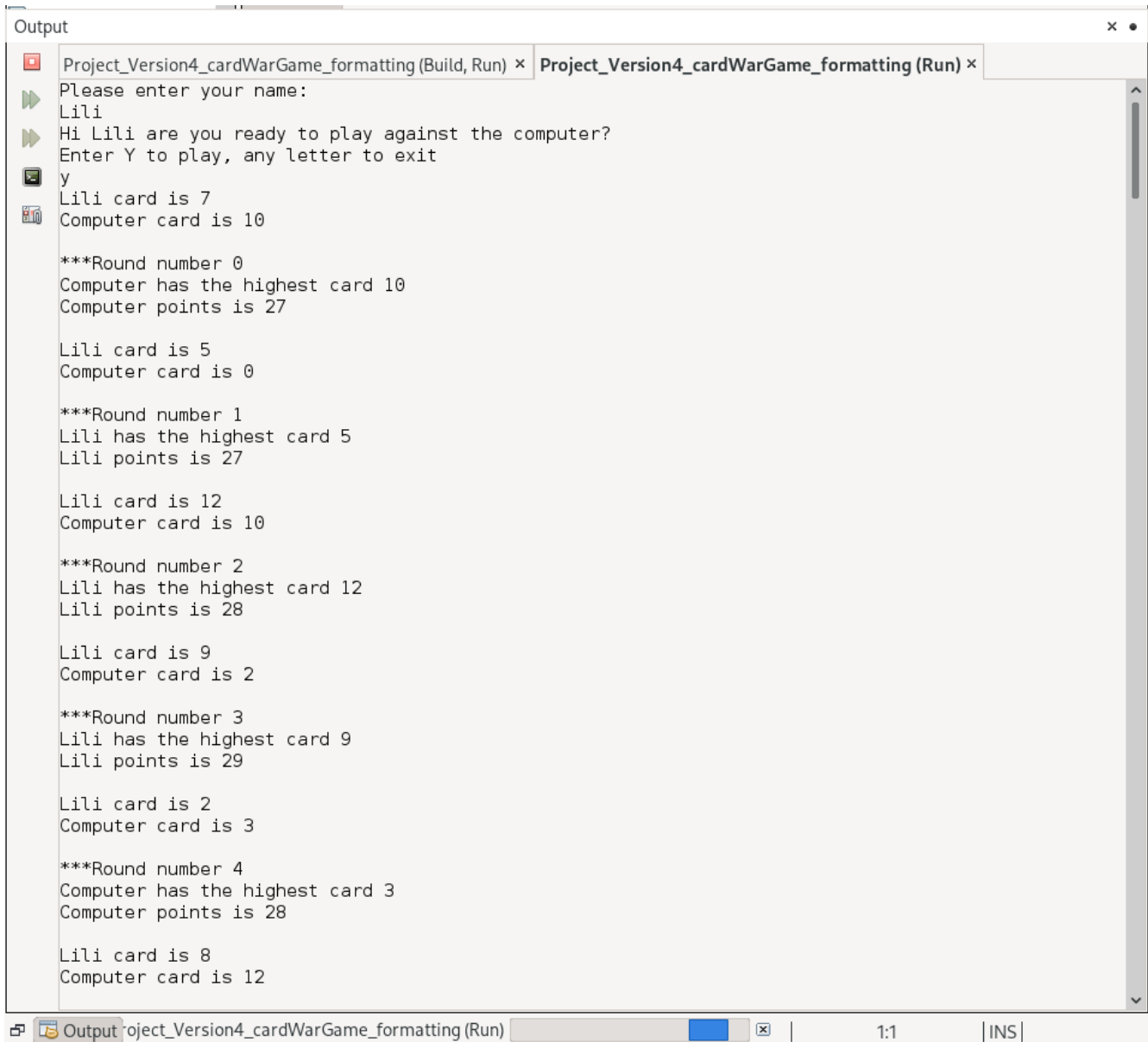
Checking which player has the higher card using if statments and conditional operator



```
Output
Project_Version3_cardWarGame_HalfWay (Build, Run) x Project_Version3_cardWarGame_HalfWay (Run) x
For player 1: 12
For player 2: 9
Player 1 has the highest card12
For player 1: 0
For player 2: 10
Player 2 has the highest card10
For player 1: 2
For player 2: 10
Player 2 has the highest card10
For player 1: 1
For player 2: 8
Player 2 has the highest card8
For player 1: 3
For player 2: 7
Player 2 has the highest card7
For player 1: 6
For player 2: 7
Player 2 has the highest card7
For player 1: 11
For player 2: 0
Player 1 has the highest card11
For player 1: 0
For player 2: 9
Player 2 has the highest card9
For player 1: 0
For player 2: 5
Player 2 has the highest card5
For player 1: 0
For player 2: 10
Player 2 has the highest card10
For player 1: 11
For player 2: 3
Player 1 has the highest card11
For player 1: 11
For player 2: 0
Player 1 has the highest card11
For player 1: 11
For player 2: 8
Player 1 has the highest card11
For player 1: 11
For player 2: 1
Player 1 has the highest card11
For player 1: 2
```

#### Version 4:

Use the string to hold the player's name. Incorporate a do while loop to play while the player press the key 'Y' or 'y'.



The screenshot shows an IDE's output window for a project named 'Project\_Version4\_cardWarGame\_formatting'. The window contains the following text:

```
Project_Version4_cardWarGame_formatting (Build, Run) x Project_Version4_cardWarGame_formatting (Run) x
Please enter your name:
Lili
Hi Lili are you ready to play against the computer?
Enter Y to play, any letter to exit
y
Lili card is 7
Computer card is 10

***Round number 0
Computer has the highest card 10
Computer points is 27

Lili card is 5
Computer card is 0

***Round number 1
Lili has the highest card 5
Lili points is 27

Lili card is 12
Computer card is 10

***Round number 2
Lili has the highest card 12
Lili points is 28

Lili card is 9
Computer card is 2

***Round number 3
Lili has the highest card 9
Lili points is 29

Lili card is 2
Computer card is 3

***Round number 4
Computer has the highest card 3
Computer points is 28

Lili card is 8
Computer card is 12
```

The IDE interface includes a status bar at the bottom with the text 'Output', 'Project\_Version4\_cardWarGame\_formatting (Run)', a zoom level of '1:1', and a cursor mode of 'INS'.



**Continue: Version 4** also check if the player 1 and player 2 have identical cards so they can play a WAR.

Output

```
Project_Version4_cardWarGame_formatting (Build, Run) x Project_Version4_cardWarGame_formatting (Run) x
***Round number 27
Lili has the highest card 9
Lili points is 51
Lili card is 5
Computer card is 5

***We have a war!!***
Lili new card is 9
Computer new card is 11

***Round number 28
Computer wins the war with the card number 11
Computer points is 42
Lili card is 2
Computer card is 7

***Round number 29
Computer has the highest card 7
Computer points is 43

Lili card is 0
Computer card is 2

***Round number 30
Computer has the highest card 2
Computer points is 44

Lili card is 10
Computer card is 7

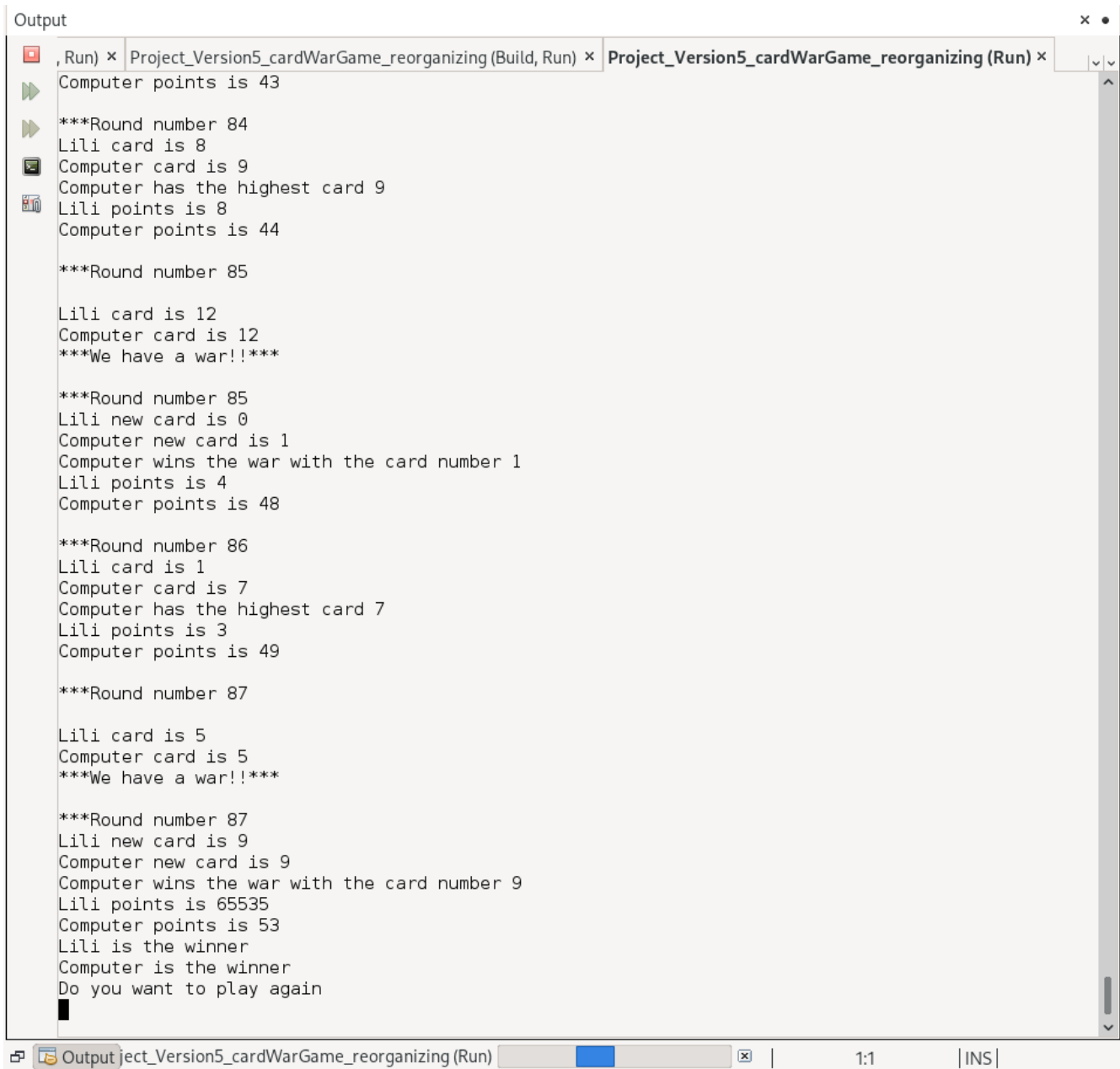
***Round number 31
Lili has the highest card 10
Lili points is 52

Lili card is 11
Computer card is 1

***Round number 32
Lili has the highest card 11
Lili points is 53
```

## Version 5:

I fixed some typos but I realized that I was having an error when printing the points for the winner because I was using an unsigned short if the player have -1 card the output will show as if the player had 65535 cards instead of a negative number.



```
Output
, Run) x Project_Version5_cardWarGame_reorganizing (Build, Run) x Project_Version5_cardWarGame_reorganizing (Run) x
Computer points is 43
***Round number 84
Lili card is 8
Computer card is 9
Computer has the highest card 9
Lili points is 8
Computer points is 44

***Round number 85

Lili card is 12
Computer card is 12
***We have a war!!***

***Round number 85
Lili new card is 0
Computer new card is 1
Computer wins the war with the card number 1
Lili points is 4
Computer points is 48

***Round number 86
Lili card is 1
Computer card is 7
Computer has the highest card 7
Lili points is 3
Computer points is 49

***Round number 87

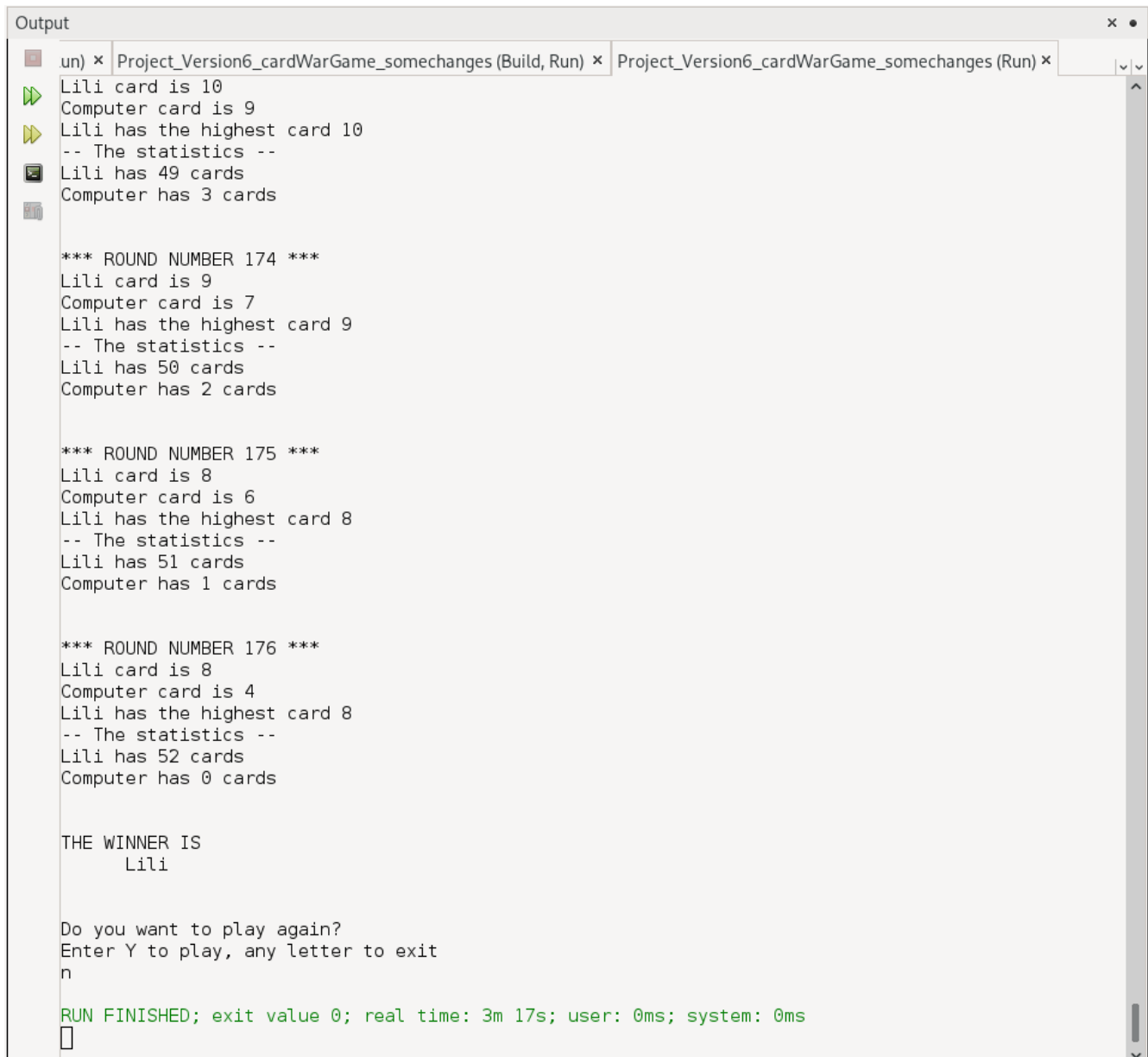
Lili card is 5
Computer card is 5
***We have a war!!***

***Round number 87
Lili new card is 9
Computer new card is 9
Computer wins the war with the card number 9
Lili points is 65535
Computer points is 53
Lili is the winner
Computer is the winner
Do you want to play again
█
```

## Version 6:

Adding a bool variable to fix the error of printing the winner pointing.

Also, spent some time working in the formatting the output to make the output console more readable.



```
un) × Project_Version6_cardWarGame_somechanges (Build, Run) × Project_Version6_cardWarGame_somechanges (Run) ×
Lili card is 10
Computer card is 9
Lili has the highest card 10
-- The statistics --
Lili has 49 cards
Computer has 3 cards

*** ROUND NUMBER 174 ***
Lili card is 9
Computer card is 7
Lili has the highest card 9
-- The statistics --
Lili has 50 cards
Computer has 2 cards

*** ROUND NUMBER 175 ***
Lili card is 8
Computer card is 6
Lili has the highest card 8
-- The statistics --
Lili has 51 cards
Computer has 1 cards

*** ROUND NUMBER 176 ***
Lili card is 8
Computer card is 4
Lili has the highest card 8
-- The statistics --
Lili has 52 cards
Computer has 0 cards

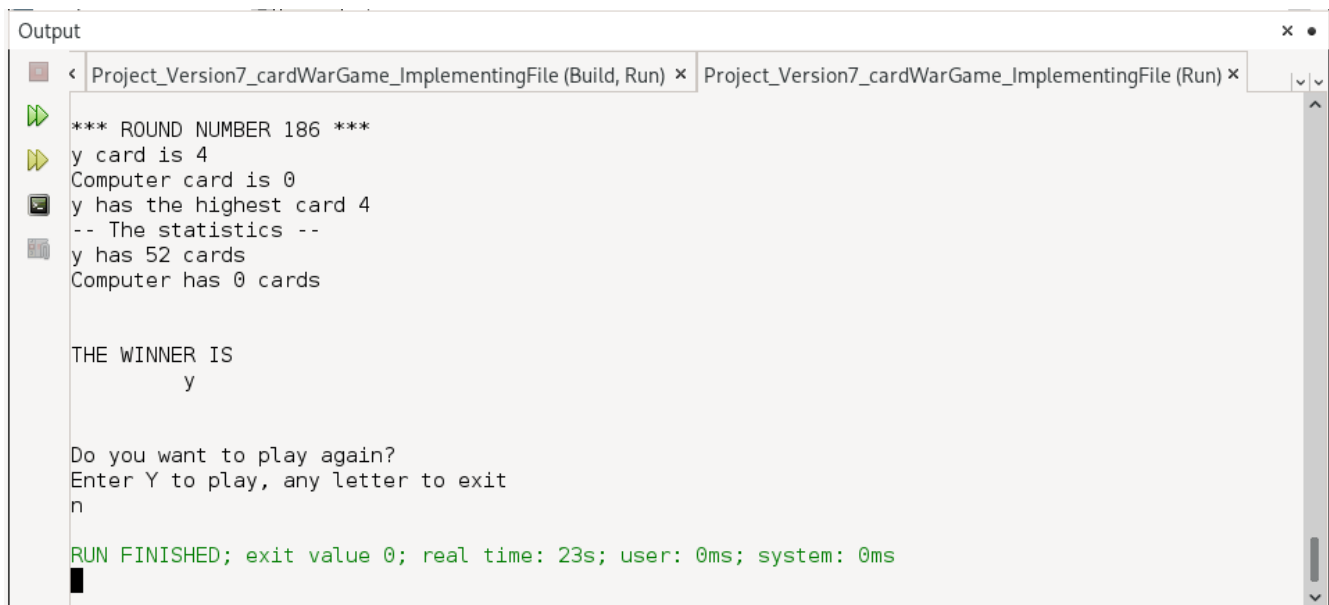
THE WINNER IS
    Lili

Do you want to play again?
Enter Y to play, any letter to exit
n

RUN FINISHED; exit value 0; real time: 3m 17s; user: 0ms; system: 0ms
□
```

## Version 7:

Created a file document to be able to store the winner for each game played.

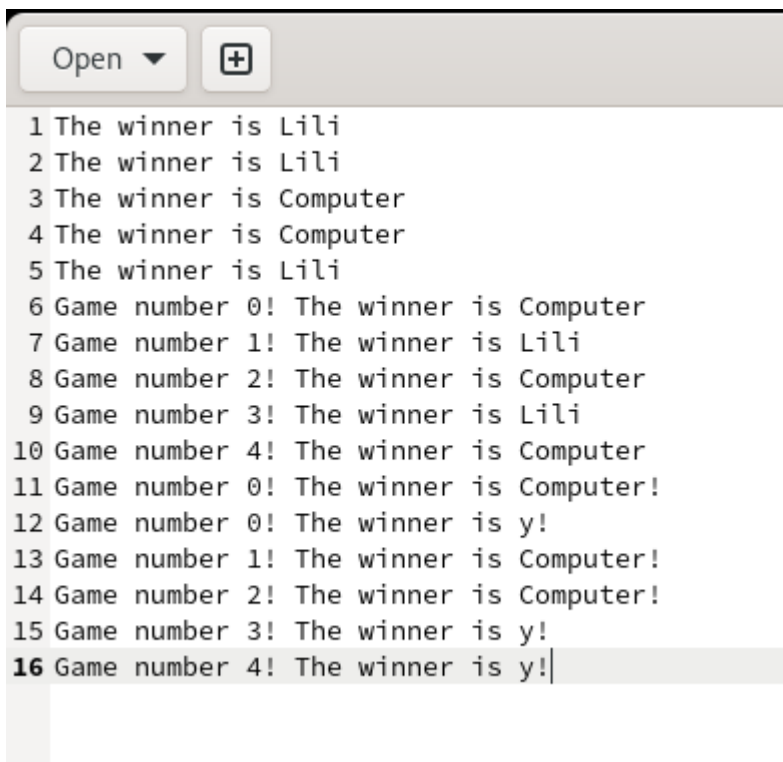


```
Output
Project_Version7_cardWarGame_ImplementingFile (Build, Run) x Project_Version7_cardWarGame_ImplementingFile (Run) x
*** ROUND NUMBER 186 ***
y card is 4
Computer card is 0
y has the highest card 4
-- The statistics --
y has 52 cards
Computer has 0 cards

THE WINNER IS
    y

Do you want to play again?
Enter Y to play, any letter to exit
n

RUN FINISHED; exit value 0; real time: 23s; user: 0ms; system: 0ms
```

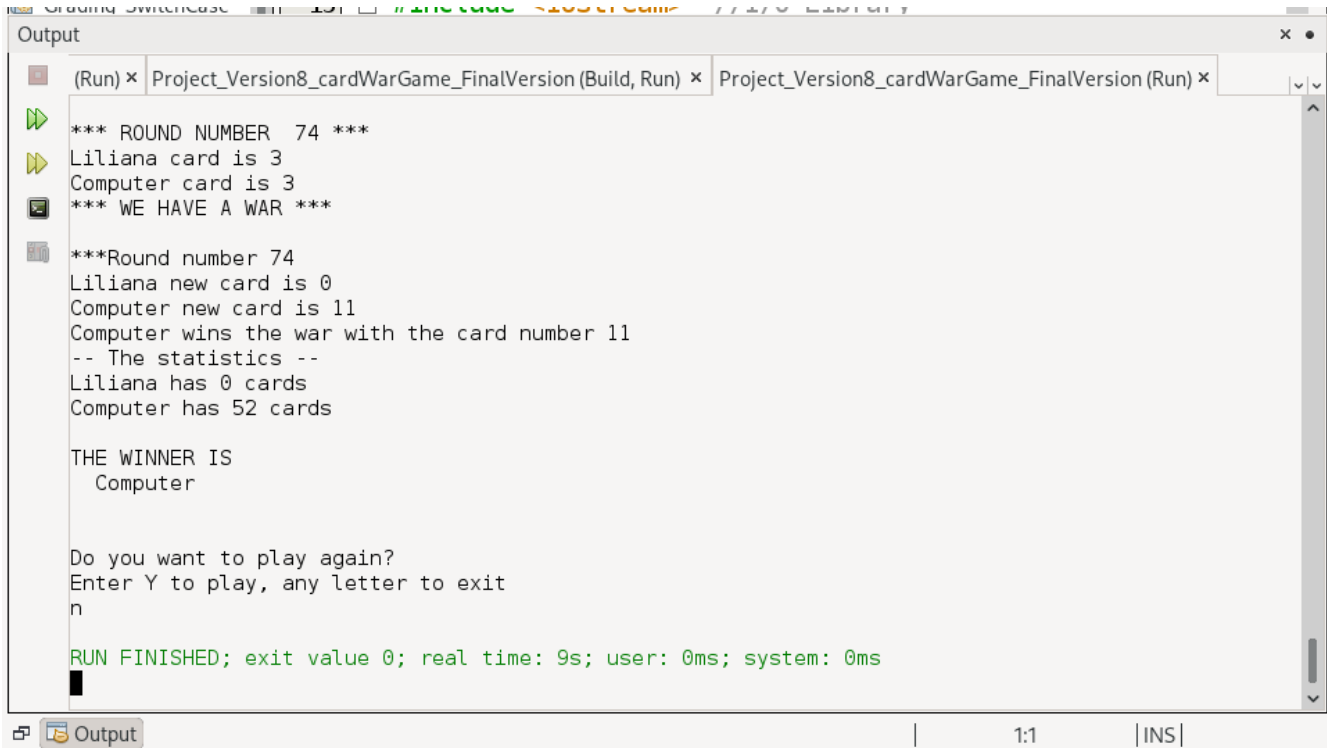


```
Open ▼ +
1 The winner is Lili
2 The winner is Lili
3 The winner is Computer
4 The winner is Computer
5 The winner is Lili
6 Game number 0! The winner is Computer
7 Game number 1! The winner is Lili
8 Game number 2! The winner is Computer
9 Game number 3! The winner is Lili
10 Game number 4! The winner is Computer
11 Game number 0! The winner is Computer!
12 Game number 0! The winner is y!
13 Game number 1! The winner is Computer!
14 Game number 2! The winner is Computer!
15 Game number 3! The winner is y!
16 Game number 4! The winner is y!
```

## Version 8:

Is the final version of my project 1.

Fixed some formatting output.



```
Output
(Run) x Project_Version8_cardWarGame_FinalVersion (Build, Run) x Project_Version8_cardWarGame_FinalVersion (Run) x
*** ROUND NUMBER 74 ***
Liliana card is 3
Computer card is 3
*** WE HAVE A WAR ***
***Round number 74
Liliana new card is 0
Computer new card is 11
Computer wins the war with the card number 11
-- The statistics --
Liliana has 0 cards
Computer has 52 cards

THE WINNER IS
  Computer

Do you want to play again?
Enter Y to play, any letter to exit
n

RUN FINISHED; exit value 0; real time: 9s; user: 0ms; system: 0ms
```