

# PROJECT

# 2

CIS 5  
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## **Introduction**

Blackjack, also known as 21, is one of the most well recognized card games played around the world. This iconic card game is known for its simple rules, while still remaining exciting to play. Blackjack is a favorite for playing with family, friends, and even in casinos. Blackjack is about trying to beat the dealer without going over 21, allowing there to be a balance between chance and strategy. Within my friends, this game is a favorite which inspired me to do this as my project. This project allowed me to explore core programming concepts, while keeping the game fun and interactive.

To access my project through GitHub, please visit: <https://github.com/hellokittylea/Project2>

## **How Blackjack works**

The goal of Blackjack is to beat the dealer by getting a hand value as close to 21 as possible without going over.

### **Rules of the Game**

#### **1. Card Values**

- Number cards (2–10) are worth their face value.
- Face cards (Jack, Queen, King) are each worth 10.
- Aces are worth either 1 or 11, depending on what benefits the hand.

#### **2. Gameplay**

- Each player starts with two cards.
- The dealer also draws two cards, with one face-up and the other hidden.
- Players can choose to “hit” (draw another card) or “stand” (keep their hand).
- Players can continue hitting until they either stand or “bust” (go over 21).
- After all players finish, the dealer reveals the hidden card and draws until their hand is 17 or higher.
- Whoever is closer to 21 without busting wins.

## **My Approach**

When I started this project, I already had a simple one-player version of Blackjack from my previous project (Project 1). For Project 2, I had to expand the game while demonstrating concepts from Chapters 6–8 of *Starting Out with C++: From Control Structures through Objects*. What I have done differently is adding multiple players, a betting system, and a chance to quit before the game ends. Project 2 has allowed me to focus on the programming concepts while keeping the game playable. This project taught me how to translate real-world logic into working C++ code. Blackjack turned out to be a great way to practice what I have learned.

## **Handling the Ace Value**

One major challenge in coding Blackjack is the Ace, which can be either 1 or 11. Instead of making the program decide, I gave players the option to choose the value when they draw an Ace so the game is more interactive and closer to how real Blackjack works.

## **Similarities to the Real Card Game**

My program is very similar to the real Blackjack rules:

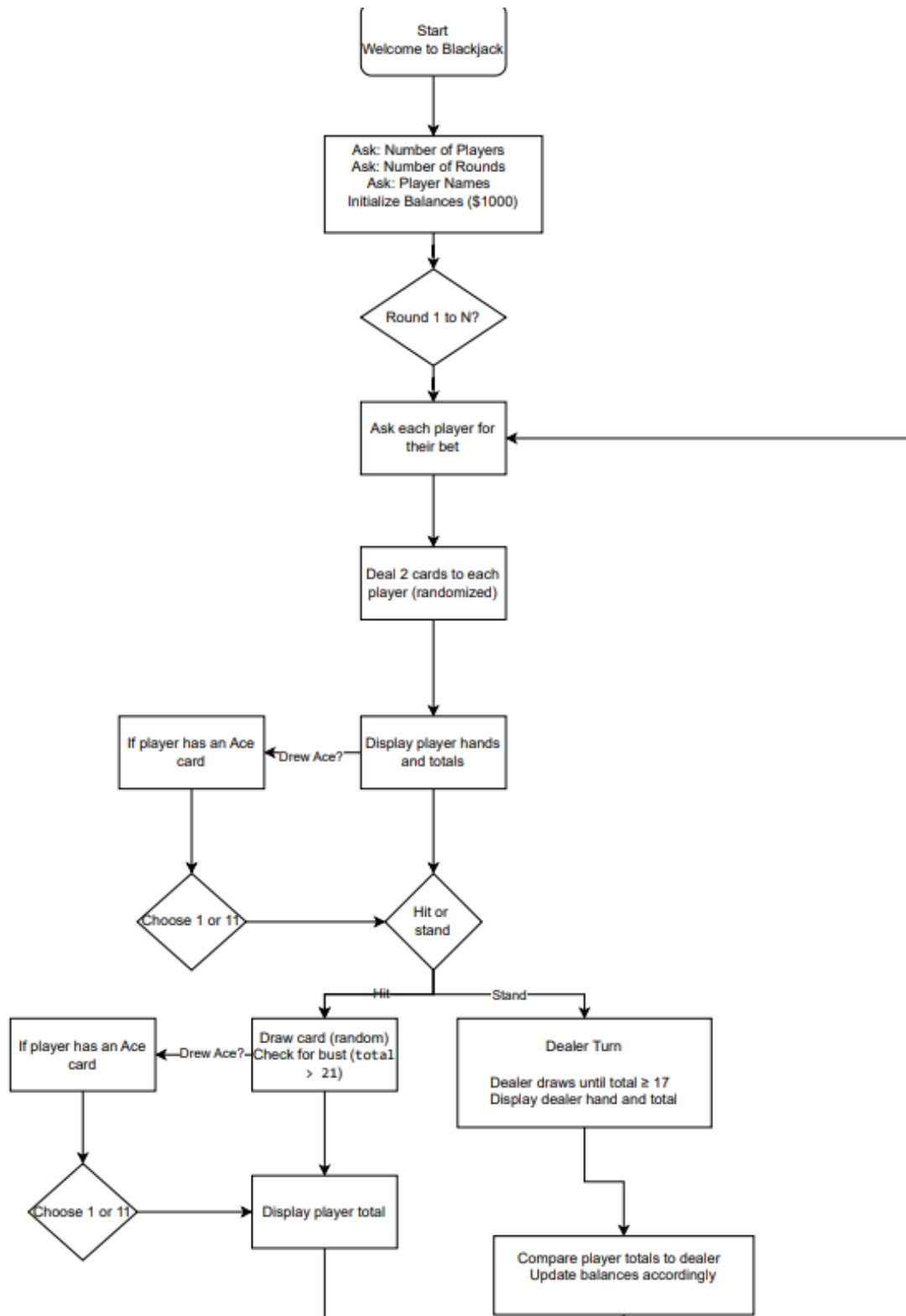
- Players and the dealer start with two cards.
- Face cards are worth 10, and the player chooses the Ace's value.
- The dealer must draw until reaching 17 or higher and must stop at that point.
- Going over 21 is an automatic loss (bust).
- The player cannot see the dealer's hidden card until their own turn is over.
- Multiple players can play in a round (multiplayer mode).
- Face card names (like "King of Hearts") are displayed for realism.

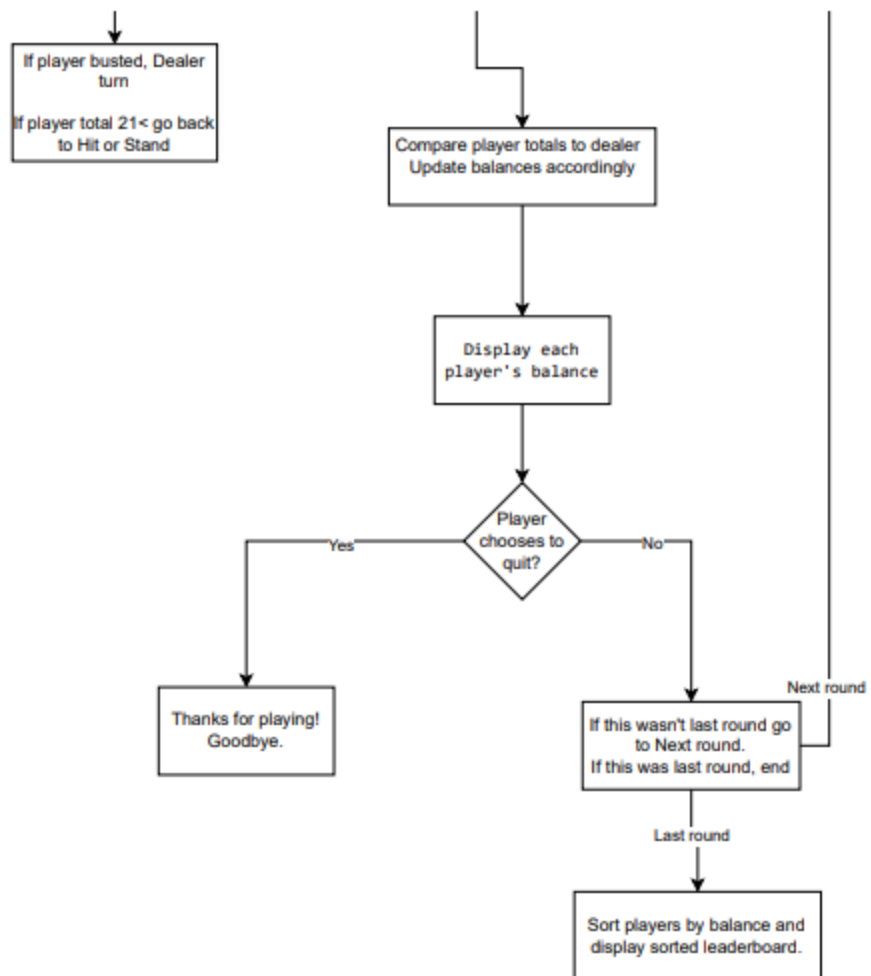
## **Differences from the Real Card Game**

While I stayed with the main rules of Blackjack, I made a few changes:

- Cards can repeat across hands due to how values are randomly generated (no real shuffled deck).
- For multiplayer, I allowed each player to go one at a time rather than simultaneously.
- Allowing a quit option is player wants to quit or they run out of money

## Flowchart





## **Checklist**

Chapter	Topic	Where is the line
6		
	function prototypes	14-30
	Pass by value	41,195, 296,303,311
	return	195, 204, 311
	returning Boolean	276
	static variables	52
	defaulted arguments	221, 18
	pass by reference	213
	Overloading	254, 242, 255
	exit()function	355

Chapter	Topic	Where is the line
7		
	Parallel Arrays	45, 49, 132-133, 136-137, 143-144
	Single Dimensioned as Function Arguments	318
	2 Dimensioned Arrays	59-60
	STL Vectors	213, 318, 333, 221, 254
	Passing arrays to and from functions	228
	Passing vectors to and from Functions	318

Chapter	Topic	Where is the line
8		
	bubble sort	333
	linear or binary search.	345



## Screenshots

I will be providing screenshots as evidence that my project works

Run	Output
>	<pre>Welcome to Blackjack! Enter number of players: 2 Enter number of rounds to play: 3 Enter name for player 1: Lee Enter name for player 2: Mia  === Round 1 === Lee, you have \$1000. Enter your bet: 100 Mia, you have \$1000. Enter your bet: 100 King and 6 dealt to player 1 9 and 6 dealt to player 2 Dealer shows: Jack Lee's hand: King 6 Total: 16 Lee, Hit or Stand? (h/s): s Lee stands with 16 Mia's hand: 9 6 Total: 15 Mia, Hit or Stand? (h/s): h Mia drew a Jack. New total: 25 Mia busted! Dealer drew a 5. Dealer drew a 8. Dealer busted! Dealer total: 23 Lee wins and gains 100 Mia loses their bet of 100</pre>

## Output

```
▲ Balances after round 1:
Lee: $1100
Mia: $900
Type 'q' to quit, any other key to continue:

=== Round 2 ===
Lee, you have $1100. Enter your bet: 100
Mia, you have $900. Enter your bet: 100
4 and 3 dealt to player 1
Jack and 3 dealt to player 2
Dealer shows: 7
Lee's hand: 4 3 Total: 7
Lee, Hit or Stand? (h/s): h
Lee drew a Queen. New total: 17
Lee, Hit or Stand? (h/s): s
Lee stands with 17
Mia's hand: Jack 3 Total: 13
Mia, Hit or Stand? (h/s): h
Mia drew a 2. New total: 15
Mia, Hit or Stand? (h/s): s
Mia stands with 15
Dealer drew a Queen.
Dealer stands with 17
Dealer total: 17
Lee pushes (tie), bet returned.
▼ Mia loses their bet of 100
```

## Output

```
▲ Balances after round 2:
Lee: $1100
Mia: $800
Type 'q' to quit, any other key to continue:

=== Round 3 ===
Lee, you have $1100. Enter your bet: 100
Mia, you have $800. Enter your bet: 100
Ace and 2 dealt to player 1
Jack and Ace dealt to player 2
Dealer shows: Queen
Lee, you have an Ace. Choose 1 or 11: 11
Lee's hand: Ace 2 Total: 13
Lee, Hit or Stand? (h/s): h
Lee drew a 5. New total: 18
Lee, Hit or Stand? (h/s): s
Lee stands with 18
Mia, you have an Ace. Choose 1 or 11: 11
Mia's hand: Jack Ace Total: 21
Mia, Hit or Stand? (h/s): s
Mia stands with 21
Dealer drew a 9.
Dealer stands with 19
Dealer total: 19
Lee loses their bet of 100
▼ Mia wins and gains 100
```

## Output

```
▲ Lee's hand: Ace 2  Total: 13
Lee, Hit or Stand? (h/s): h
Lee drew a 5. New total: 18
Lee, Hit or Stand? (h/s): s
Lee stands with 18
Mia, you have an Ace. Choose 1 or 11: 11
Mia's hand: Jack Ace  Total: 21
Mia, Hit or Stand? (h/s): s
Mia stands with 21
Dealer drew a 9.
Dealer stands with 19
Dealer total: 19
Lee loses their bet of 100
Mia wins and gains 100

Balances after round 3:
Lee: $1000
Mia: $900
Type 'q' to quit, any other key to continue:

Final rankings:
1. Lee - $1000
2. Mia - $900
```

Run	Output
	<pre>▲ Welcome to Blackjack! Enter number of players: 2 Enter number of rounds to play: 2 Enter name for player 1: Lee Enter name for player 2: Mia  === Round 1 === Lee, you have \$1000. Enter your bet: 1000 Mia, you have \$1000. Enter your bet: 1000 2 and 4 dealt to player 1 10 and 4 dealt to player 2 Dealer shows: 2 Lee's hand: 2 4 Total: 6 Lee, Hit or Stand? (h/s): h Lee drew a 9. New total: 15 Lee, Hit or Stand? (h/s): s Lee stands with 15 Mia's hand: 10 4 Total: 14 Mia, Hit or Stand? (h/s): s Mia stands with 14 Dealer drew a King. Dealer drew a 3. Dealer drew a King. Dealer busted! Dealer total: 25 ▼ Lee wins and gains 1000</pre>

```
▲ 10 and 4 dealt to player 2
Dealer shows: 2
Lee's hand: 2 4 Total: 6
Lee, Hit or Stand? (h/s): h
Lee drew a 9. New total: 15
Lee, Hit or Stand? (h/s): s
Lee stands with 15
Mia's hand: 10 4 Total: 14
Mia, Hit or Stand? (h/s): s
Mia stands with 14
Dealer drew a King.
Dealer drew a 3.
Dealer drew a King.
Dealer busted!
Dealer total: 25
Lee wins and gains 1000
Mia wins and gains 1000

Balances after round 1:
Lee: $2000
Mia: $2000
Type 'q' to quit, any other key to continue: q
Thanks for playing! Goodbye.
```