Project 1

Blackjack

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Introduction:

I have created a program that runs a simple version of the card game Blackjack from scratch. This version of Blackjack is the card aspect only. I have not yet implemented a chip system for betting, nor have I included the ability to split when a pair is drawn. Blackjack is my favorite card game, and it seemed fitting to make, given the requirements for the project, and my prerequisite knowledge of the game's rules. The entire program was created from the ground up, and no reference code was used throughout the entirety of the project.

The player is dealt two cards and one of the dealer cards is shown. The player is then given the choice to "hit" or "stay". If the player chooses to hit, then the player is given another card. If the player's card total (each card is given a number value, and is added up to find the total) hits or exceeds 21, they automatically stay. The dealer then reveals their second card. After the dealer reveals their second card, if their total is less than or equal to sixteen, they draw until their total exceeds sixteen. The card total of the dealer and the player are compared, and whichever total is closer to 21 wins, given that the total does not exceed 21 (if the player or dealer exceeds a total of 21, they lose the game). If the difference from 21 is the same or if both the dealer and player exceed 21 or "bust" then the game results in a draw. If the player chooses to stay, then their total remains, and the dealer continues the same as previously described.

Summary:

Total Lines: 1,165

Lines of Comments: 112

Number of Classes: 5

Number of Variables: 32

This project iteration took me about a week to complete, building off of my own Blackjack game from the past. Roughly 15 hours were put into the project including the documentation. The most challenging aspect of the project was implementing all of the required containers and algorithms into the program. I could not figure out how to include some containers/algorithms in a way beneficial to the game. Although I functionally understand how they work, implementing them into my project was difficult, and I ultimately had to come up with places to put them, despite the fact that the game is functional without them.

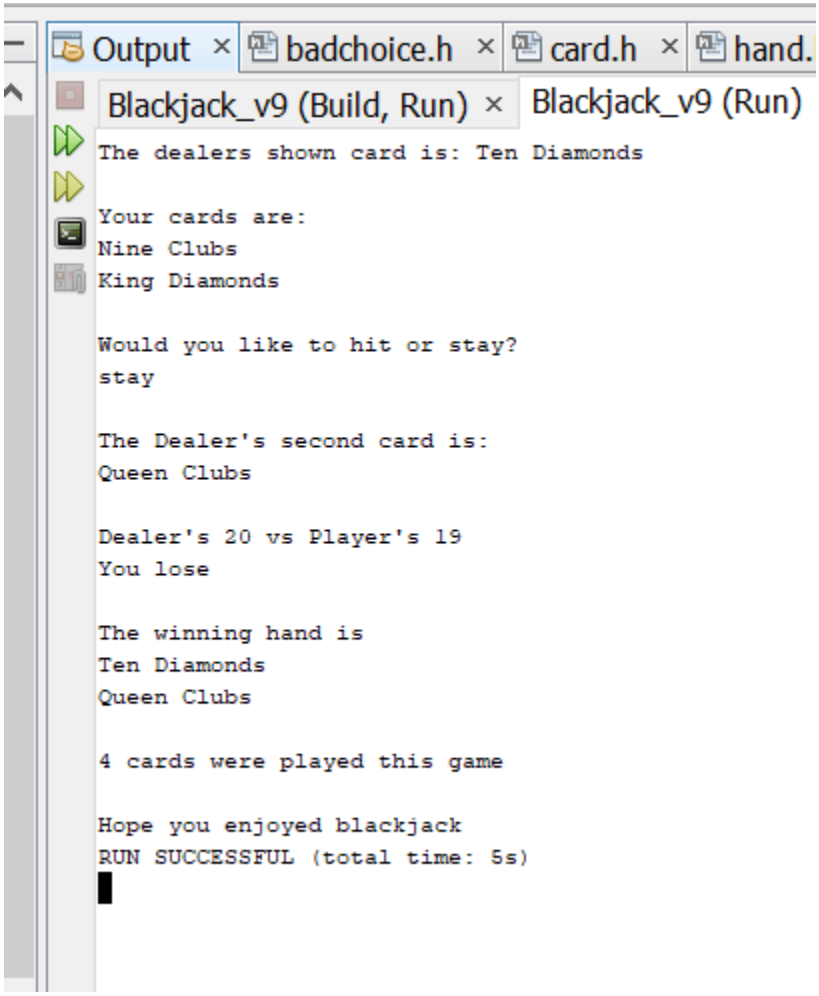
Github Link:

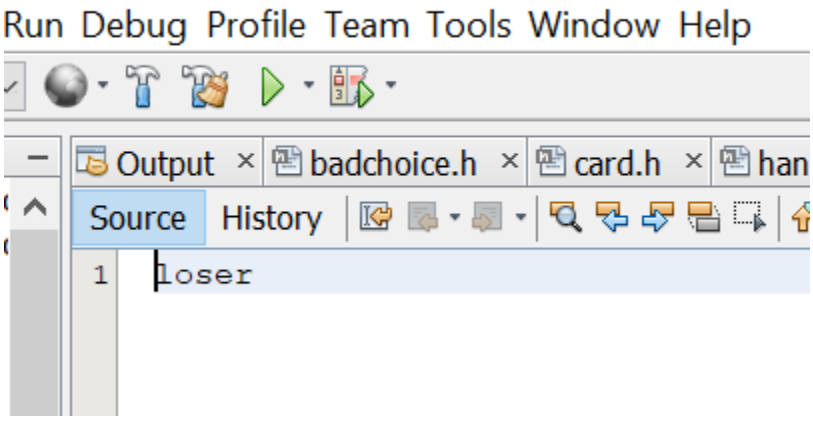
https://github.com/cv2808089/Villanueva_Christian_CIS_17/tree/master/CSC%2017C/Projects/Project%201

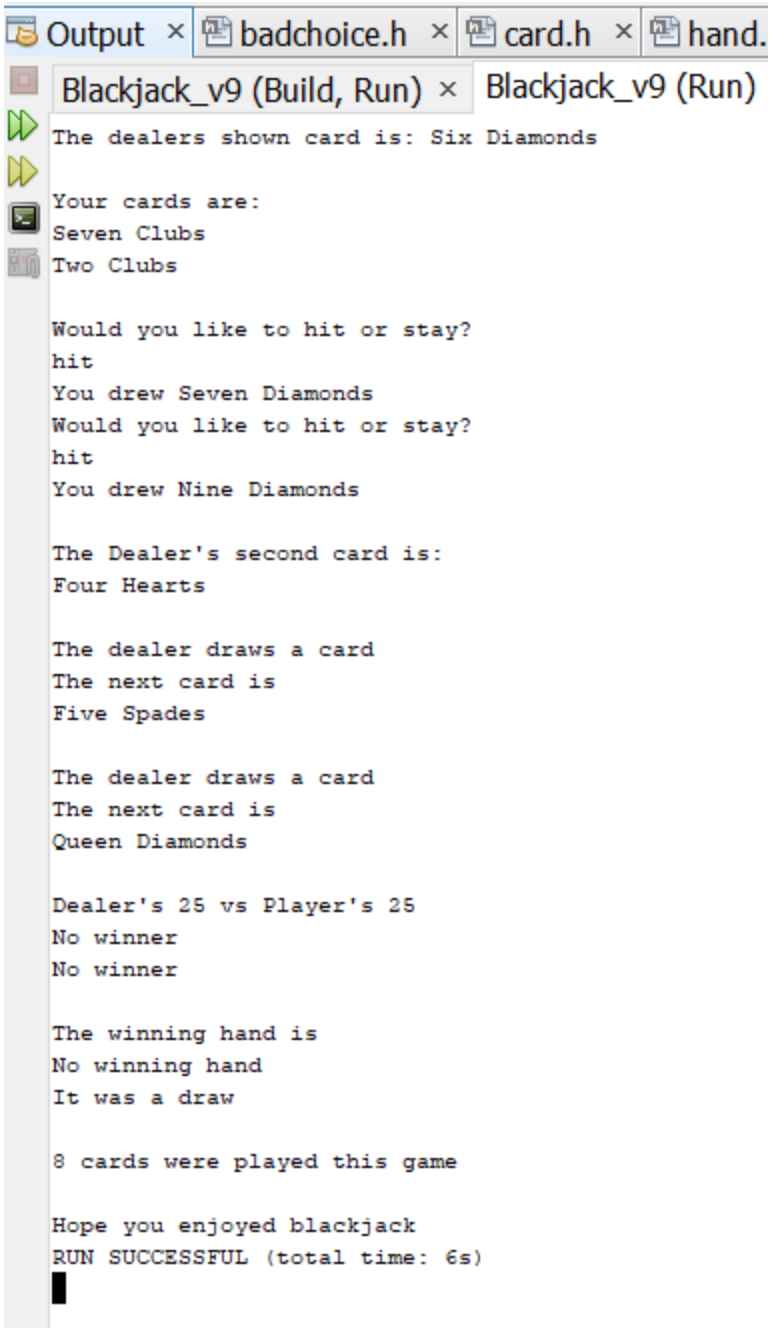
Description:

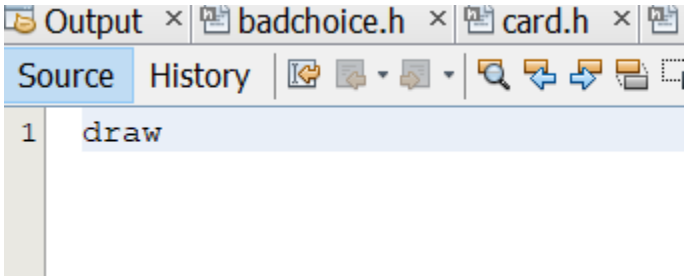
The game initially started as just a program that drew cards and output them. The card values and the ability to total them were then added, as well as the conditions for winning the game. Next came checks to ensure that repeat cards did not show up. After this came the rest of the concepts from the class up until this point such as pointers and binary files. After this came the splitting of the project into multiple source files, followed by conversion into classes. After converting into classes, I added exceptions, static variables and utilized a part of the STL. The next version added the copy constructor, and other minor tweaks. Following this was the addition of lists to the project. The next version added stacks, maps, and queues, which ultimately made the game more efficient, removing the need to check for repeat cards every time someone drew a card. The final version implemented sets, and a sorting algorithm to find the min and max values played;

Sample output:





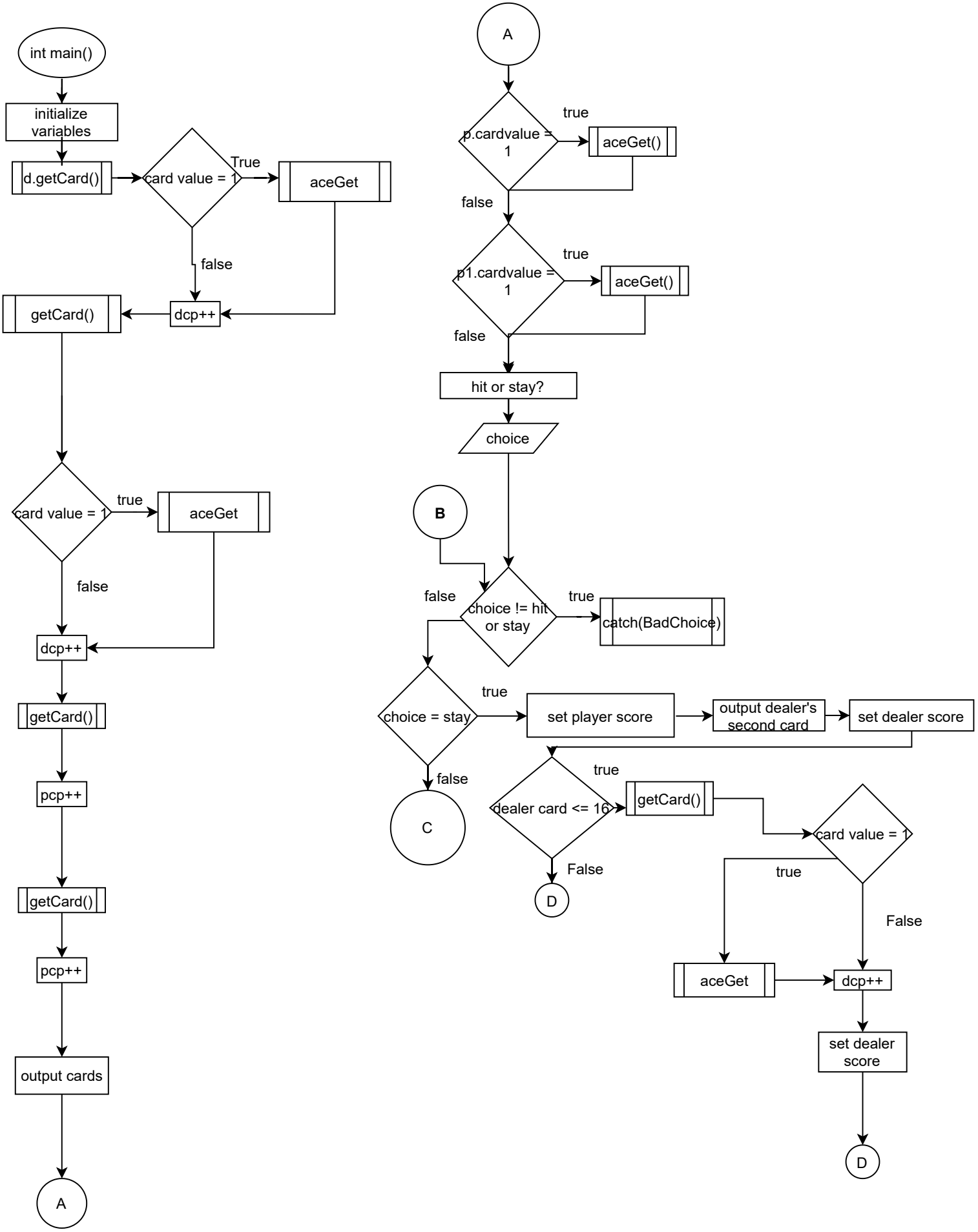

Output
badchoice.h
card.h
hand.
Blackjack_v9 (Build, Run)
Blackjack_v9 (Run)
The dealers shown card is: Six Diamonds
Your cards are:
Seven Clubs
Two Clubs
Would you like to hit or stay?
hit
You drew Seven Diamonds
Would you like to hit or stay?
hit
You drew Nine Diamonds
The Dealer's second card is:
Four Hearts
The dealer draws a card
The next card is
Five Spades
The dealer draws a card
The next card is
Queen Diamonds
Dealer's 25 vs Player's 25
No winner
No winner
The winning hand is
No winning hand
It was a draw
8 cards were played this game
Hope you enjoyed blackjack
RUN SUCCESSFUL (total time: 6s)

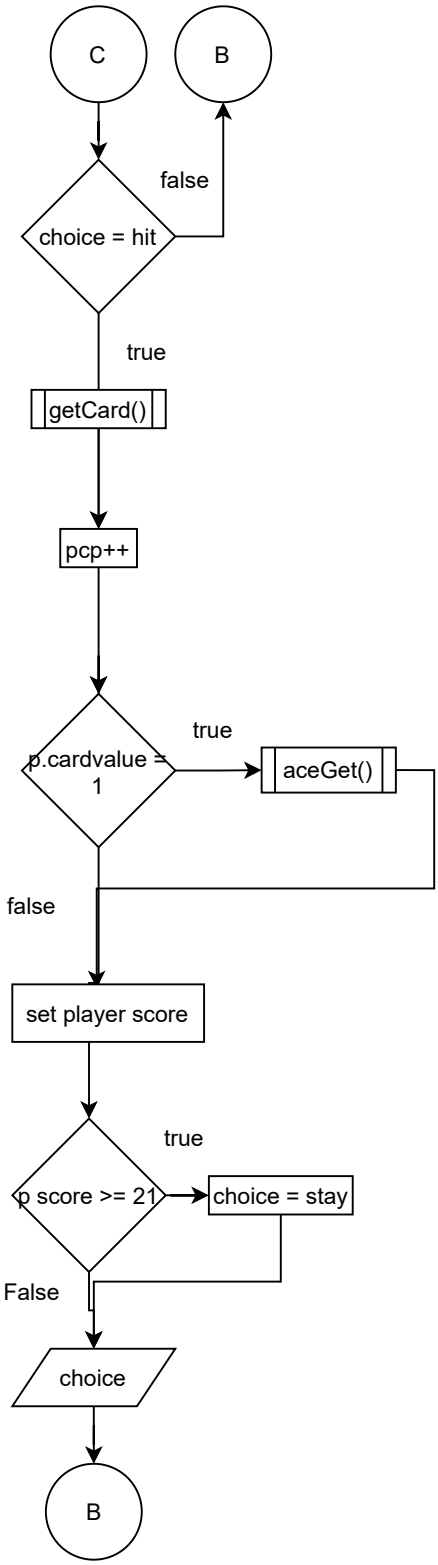

Output
badchoice.h
card.h
Source
History
1
draw

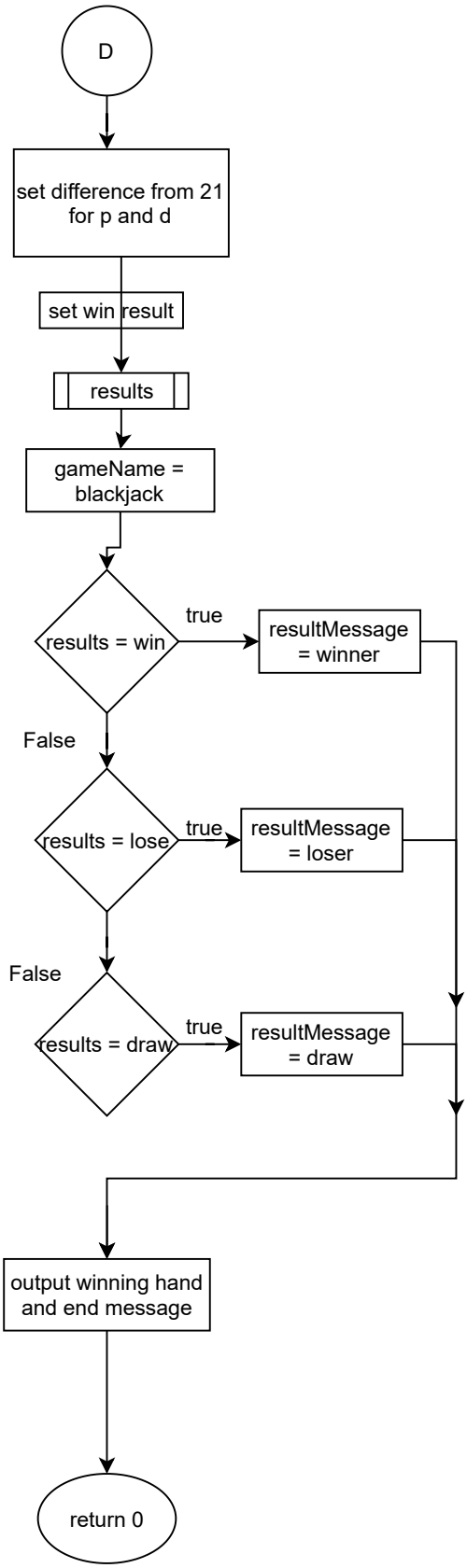
Containers	File	Line
List	hand.h	16
Map	main.cpp	359
Stack	blackjack_imp	346
Queue	main.cpp	415
Set	blackjack_imp	357
Iterators		
Input	hand.h	71
Output	hand.h	57
Bidirectional	main.cpp	398
Random Access	main.cpp	364
Algortihms		
Count	main.cpp	449
Random_shuffle	blackjack_imp	347
Sort	blackjack_imp	398

Variable Type	Name	Line	NOTE: LINE IS IN MAIN UNLESS OTHER FILE IS STATED
int	cardValue	card.h, 12	
	cip	hand.h, 12	
	score	hand.h, 14	
	df21	hand.h, 18	
	aceResult	player.h, 9	
	chk	43	
	dcp	51	
	pcp	53	
	aceChoice	55	
	ac	player.cpp, 8	
string	cardName	card.h, 11	
	suit	card.h, 13	
	choice	49	
enum	gameResult	21	
gameResult	winc	20	<- in blackjack_implementation.cpp
bool	res	hand.cpp: 16, 29, 42	
Card	hold	77	<- in blackjack_implementation.cpp
	hold	hand.cpp, 7	
Hand	Dealer	47	
player	p1	45	
list<Card>	cards	hand.h, 16	
	played	393	<- in blackjack_implementation.cpp
vector<Card>	deck	76	<- in blackjack_implementation.cpp
	gameName	367	
stack<Card>	deck2	346	<- in blackjack_implementation.cpp
	deck	59	
map<int, char>	resultMessage	364	
queue<Card>	winningHand	420, 431	
set<int>	played	357	<- in blackjack_implementation.cpp
iterator	it	hand.h: 27, 34, 42, 49, 57, 64, 71, 81, 92	
	i	364	

Note: I use abbreviations for variable names




C
B
false
choice = hit
true
getCard()
pcp++
p.cardvalue = 1
true
aceGet()
false
set player score
p score >= 21
true
choice = stay
False
choice
B


D
set difference from 21 for p and d
set win result
results
gameName = blackjack
results = win
true
resultMessage = winner
False
results = lose
true
resultMessage = loser
False
results = draw
true
resultMessage = draw
output winning hand and end message
return 0

Version 11 Pseudocode

Main
{
Set random number seed
Define classes and variables

Draw dealer cards
If an ace is drawn, make its value 11 if it doesn't bust the dealer
Increment number of cards in play

Draw player cards
Increment number of cards in play

Output dealer's first card and player's two cards
If the player draws a(n) ace(s) gets their choice for the aces value(only allows 1 or 11)
Gets the player's choice to hit or stay with input validation

If stay is chosen,
    Calculates player and dealer card total
    Reveals dealer's second card
    If dealer's card total is <= 16,
        draws cards, iterates cards in play
        repeats until a total of >16 is achieved
        If dealer draws ace, sets it to 11 if it doesn't bust the dealer
        Calculates dealer card total
        Output dealer's cards

If hit is chosen, loops until stay is chosen
    Calculates player and dealer card total
    Draw card and iterate cards in play

    Display card drawn
    If ace is drawn, get choice for ace value(only allows 1 or 11)
    Add card value to player card total

    If player card total >= 21, set choice to stay
    If player card total < 21, get choice to hit or stay(with input validation)

    Reveals dealer's second card
    If dealer's card total is <= 16,
        draws cards, iterates cards in play, and checks
        repeats until a total of >16 is achieved
        If dealer draws ace, sets it to 11 if it doesn't bust the dealer
        Calculates dealer card total
        Output dealer's cards

Find difference of dealer and player total from 21
Find and output game results based on difference

Output the game results

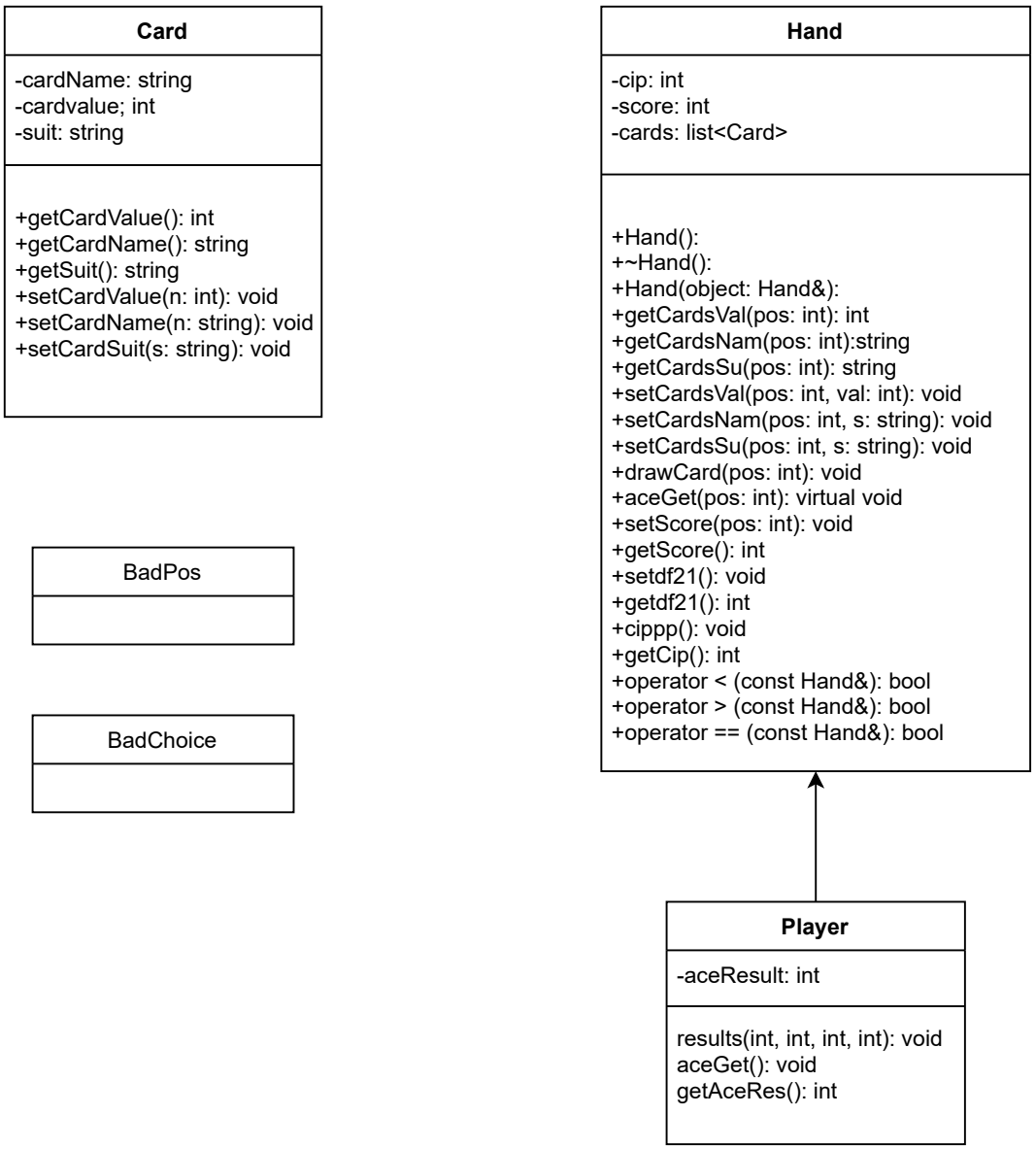
Define map and vector to hold result message and game name
If win result is win, message is winner
If win result is lose, message is loser
If win result is draw, message is draw

Write the result message to a binary file

Outputs queue of winning hand
Output the number of cards used in the game
Outputs the highest and lowest values played
Output exit message

Free up the used memory and exit the program

}


Card
-cardName: string
-cardvalue; int
-suit: string
+getCardValue(): int
+getCardName(): string
+getSuit(): string
+setCardValue(n: int): void
+setCardName(n: string): void
+setCardSuit(s: string): void
Hand
-cip: int
-score: int
-cards: list<Card>
+Hand():
+~Hand():
+Hand(object: Hand&):
+getCardsVal(pos: int): int
+getCardsNam(pos: int):string
+getCardsSu(pos: int): string
+setCardsVal(pos: int, val: int): void
+setCardsNam(pos: int, s: string): void
+setCardsSu(pos: int, s: string): void
+drawCard(pos: int): void
+aceGet(pos: int): virtual void
+setScore(pos: int): void
+getScore(): int
+setdf21(): void
+getdf21(): int
+cippp(): void
+getCip(): int
+operator < (const Hand&): bool
+operator > (const Hand&): bool
+operator == (const Hand&): bool
BadPos
BadChoice
Player
-aceResult: int
results(int, int, int, int): void
aceGet(): void
getAceRes(): int