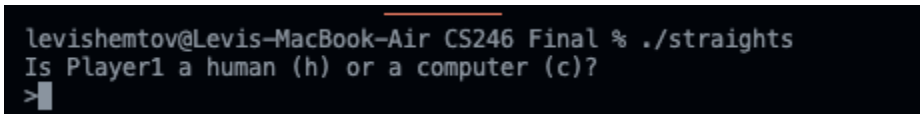
Levi Shem-Tov

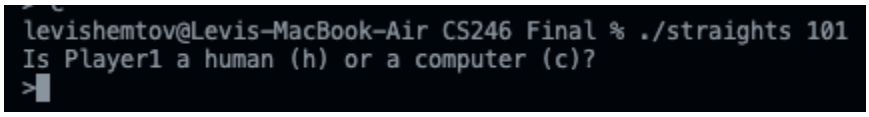
Demo

This document will guide you through the features of this project. To compile the code, simply run the command presented below in the terminal:

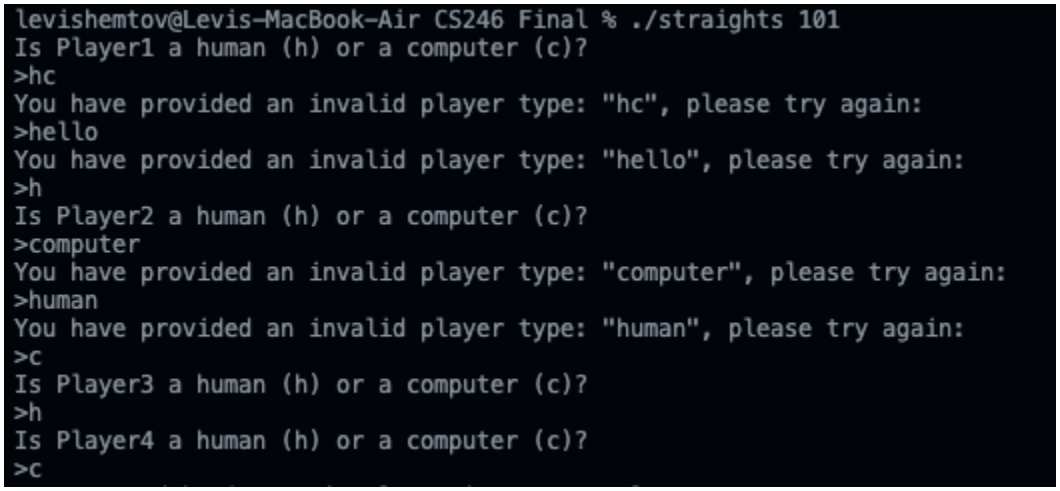
The executable “straights” has now been created in the directory. To run the program without a given seed (randomly generated seed used), enter the command shown below:



Conversely, if you wish to provide your own seed, enter it as a command line argument, as shown below:



The program now asks us if each Player (1-4) is a human or a computer. To set a given player to human, type ‘h’ and to set a player to computer, type ‘c’. If invalid input is given, the program will ask you to reenter the player type.



To begin, we will have all players be human:

```
levishemtov@Levis-MacBook-Air CS246 Final % ./straights 101
Is Player1 a human (h) or a computer (c)?
>h
Is Player2 a human (h) or a computer (c)?
>h
Is Player3 a human (h) or a computer (c)?
>h
Is Player4 a human (h) or a computer (c)?
>h
```

Player1 was dealt the 7 of spades, and so they begin the game. If a different seed is used, it is likely a different player will be dealt 7S, and thus, they would begin the game instead of Player1

```
A new round begins. It's Player1's turn to play.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades:
Your hand: 4S QS 2H 7S QH 4C JC 3D 6C 7H KC 2C 9C
Legal plays: 7S
>
```

:

It should be noted that normally the 7H would be a legal play. However, on the first play of the game, the 7S is the only legal play. If Player1 attempts a non-legal move or provides invalid input, the program will respond in the follow ways:

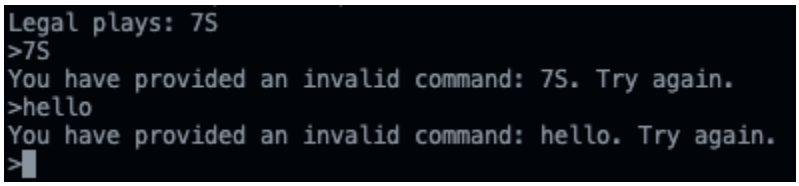
If a card that is not a legal play is attempted to be played, whether it be the player's hand or not, the program prints out the following:

```
Your hand: 4S QS 2H 7S QH 4C JC 3D 6C 7H KC 2C 9C
Legal plays: 7S
>play 7H
This is not a legal play.
>play KC
This is not a legal play.
>play AC
This is not a legal play.
>
```

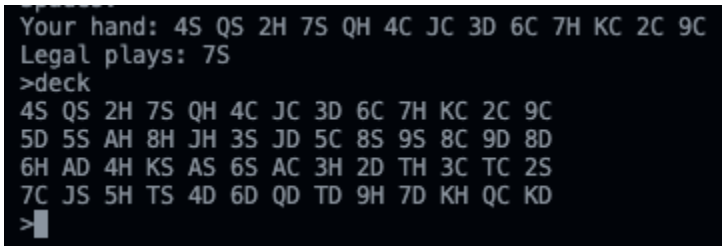
If the player attempts to discard when they have one or more legal plays, the following will be printed out:

```
>discard 7S
You have a legal play. You may not discard.
>discard QH
You have a legal play. You may not discard.
>discard JS
You have a legal play. You may not discard.
>discard hello
You have a legal play. You may not discard.
>discard mycard
You have a legal play. You may not discard.
>
```

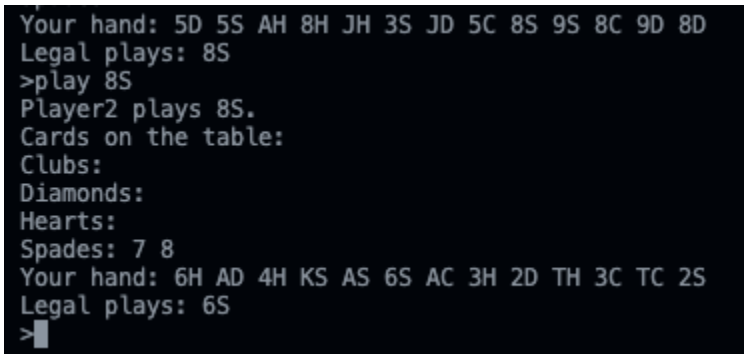
If an invalid command is provided, such that it is not one of “play”, “discard”, “deck”, “quit”, and “ragequit”, the program print out the following:



As well, if a player wishes to see the cards dealt to each player, they need only type “deck” and it will show the 13 cards each player was dealt to begin the round, beginning with Player1, with each new line being the next player, so line 1 is Player1, line 2 is Player2 and so on.



As can be seen above, the top row lines up with Player1’s dealt hand. Player1 begins the game by playing the 7 of spades, and the turn now goes to Player2. As can be seen below, the 7 of spades has been recorded as being played on the table. The only legal play for Player2 is the 8 of spades. Once played, the table is displayed as follows:



It is now Player3’s turn to play. To demonstrate “ragequit”, we will rage quit for Player3 below. We can expect to see a computer take over and play Player3’s turn. As the 6 of spades is the

only legal play, the cards on the table should be 6S, 7S, and 8S, as seen below.

```
Your hand: 6H AD 4H KS AS 6S AC 3H 2D TH 3C TC 2S
Legal plays: 6S
>ragequit
Player3 ragequits. A computer will now take over.
>Player3 plays 6S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 6 7 8
Your hand: 7C JS 5H TS 4D 6D QD TD 9H 7D KH QC KD
Legal plays: 7C 7D
>
```

I've played out the game, playing a legal play on each player's turn (not Player3 as they "ragequit"ed) until I reached a scenario where a player must discard. In this case, it is Player1.

```
Player4 plays 6D.
Cards on the table:
Clubs:
Diamonds: 6 7
Hearts: 6 7
Spades: 6 7 8 9
Your hand: 4S QS 2H QH 4C JC 3D 6C KC 2C 9C
Legal plays:
>
```

If Player1 attempts an invalid turn or provides invalid input, the program will respond in the following ways:

If the player attempts to play a card, the program will not allow this.

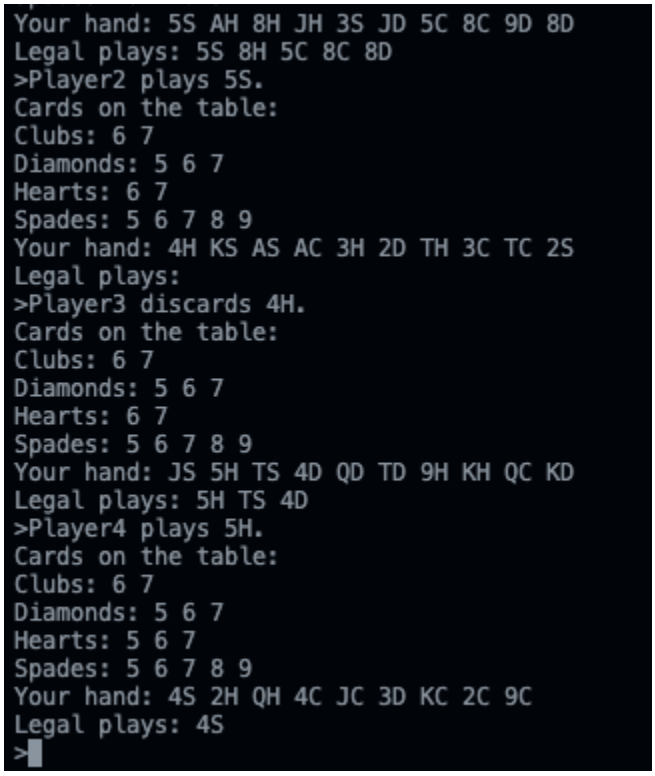
```
Your hand: 5H 4D QD TD KH QC KD
Legal plays:
>play 4D
This is not a legal play.
>play 5H
This is not a legal play.
>
```

If the player attempts to discard a card they do not have or one that does not exist, the program will not allow this:

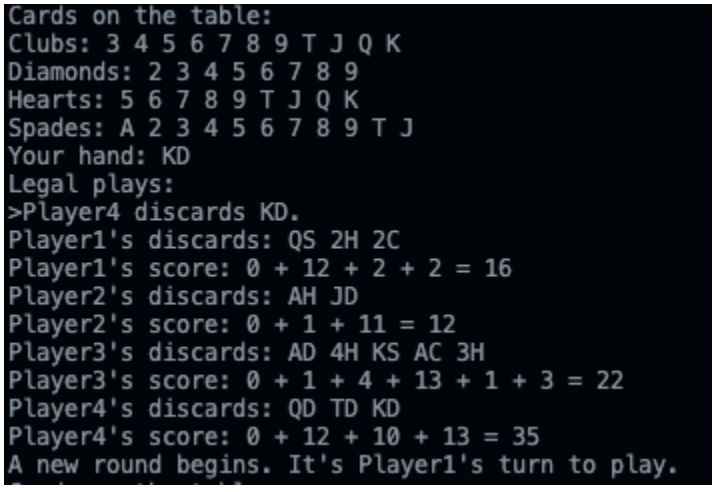
```
Your hand: 4S QS 2H QH 4C JC 3D 6C KC 2C 9C
Legal plays:
>discard QD
This is not a legal play
>discard QA
This is not a legal play
>
```

Player2 and Player4 have both rage quitted to more quickly demonstrate the other features of the game. We can see that the computers act as they are supposed to. When one or more legal plays exist, a computer will play the first card listed, as can be seen by Player2 and Player4. As

well, when no legal plays exist, a computer should discard the first card listed in their hand, which Player3 does.

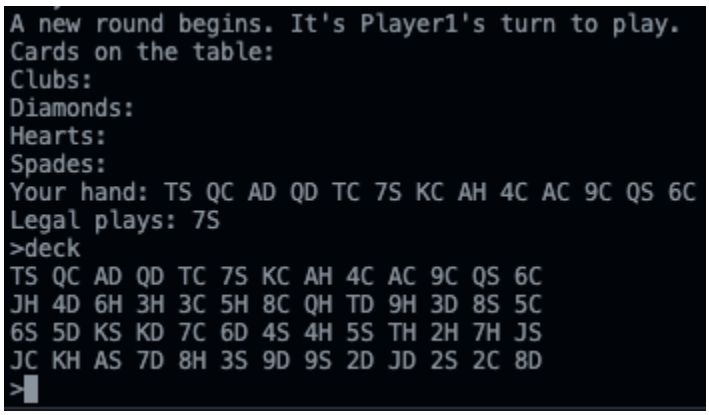


The round continues until all cards have been played out. As Player1 started the round and all players have the same number of cards, Player4 will play the final card before the round ends. When the round ends, the program states each player's discarded and then their associated discard sum. The first number in the summation represents the previous rounds' discard sum. For the first round, as there are no previous rounds, the first number is 0.

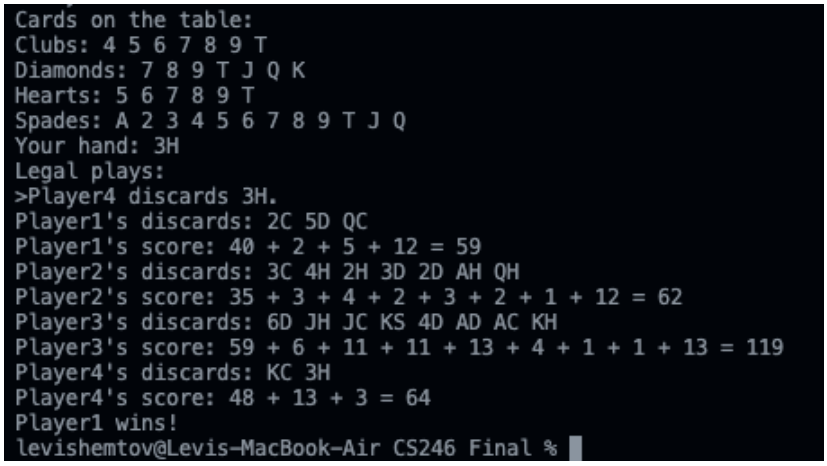


After the scores are printed, because no discard sum is greater than 80, a new round begins. Player1 is again dealt the 7S and so they start the new round. Using the "deck" command, we

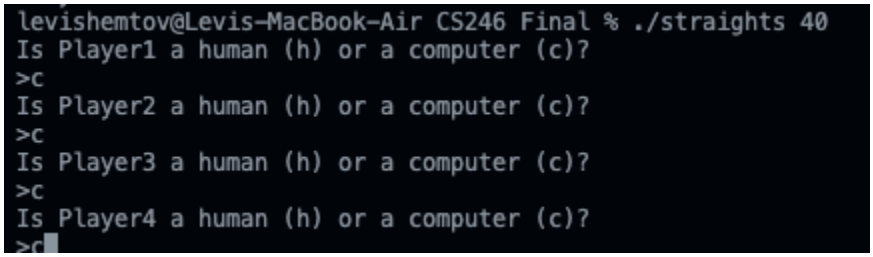
can see the deck has been shuffled from the previous round (compared to the initial “deck” command output).



The game continues similarly to last round, so we will “ragequit” Player1, and as all players are now computers, the game will complete itself instantaneously. Looking at the screenshot below, we see that Player3 started the round with a score of 59. Now, at the end of the final round, Player3 has a score of 119. As this is greater than the 80 score threshold, the game ends. The program then finds the player(s) with the lowest score and states that player is the winner.



To show a game where multiple players win (tie for lowest score), I will be running the program using only computers, with a seed of 40.



We can see that at the end of this game, both Player1 and Player4 have the same discard sum of 29 when Player3 goes over the 80 score threshold. Thus, both players win and the program prints as such.

```
Cards on the table:
Clubs: 7 8 9 T
Diamonds: 2 3 4 5 6 7 8 9 T J Q K
Hearts: 3 4 5 6 7 8 9 T J
Spades: A 2 3 4 5 6 7 8 9 T J
Your hand: KH
Legal plays:
>Player3 discards KH.
Player1's discards: 6C AH 2C KS
Player1's score: 7 + 6 + 1 + 2 + 13 = 29
Player2's discards:
Player2's score: 49 = 49
Player3's discards: QC 2H JC QH AD KC 5C 3C KH
Player3's score: 22 + 12 + 2 + 11 + 12 + 1 + 13 + 5 + 3 + 13 = 94
Player4's discards: QS AC 4C
Player4's score: 12 + 12 + 1 + 4 = 29
Player1 wins!
Player4 wins!
levishemtov@Levis-MacBook-Air CS246 Final %
```

Finally, to demonstrate the functionality of the quit function, a new game has been created and the four players are humans. Now, when the "quit" command is used on anyone's turn, the game immediately terminates.

```
levishemtov@Levis-MacBook-Air CS246 Final % ./straights 101
Is Player1 a human (h) or a computer (c)?
>h
Is Player2 a human (h) or a computer (c)?
>h
Is Player3 a human (h) or a computer (c)?
>h
Is Player4 a human (h) or a computer (c)?
>h
A new round begins. It's Player1's turn to play.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades:
Your hand: 4S QS 2H 7S QH 4C JC 3D 6C 7H KC 2C 9C
Legal plays: 7S
>quit
levishemtov@Levis-MacBook-Air CS246 Final %
```

As well, the "quit" command works when initializing the players:

```
Is Player1 a human (h) or a computer (c)?
>h
Is Player2 a human (h) or a computer (c)?
>c
Is Player3 a human (h) or a computer (c)?
>h
Is Player4 a human (h) or a computer (c)?
>quit
levishemtov@Levis-MacBook-Air CS246 Final %
```

Valgrind screenshot with no memory leaks:

```
Legal plays:
>Player3 discards KH.
Player1's discards: KD
Player1's score: 52 + 13 = 65
Player2's discards: 2D QD
Player2's score: 44 + 2 + 12 = 58
Player3's discards: 4H 3D AH QH KH
Player3's score: 75 + 4 + 3 + 1 + 12 + 13 = 108
Player4's discards: JH JD 2H AD 3H
Player4's score: 79 + 11 + 11 + 2 + 1 + 3 = 107
Player2 wins!
==131==
==131== HEAP SUMMARY:
==131==     in use at exit: 0 bytes in 0 blocks
==131==   total heap usage: 30,387 allocs, 30,387 frees, 1,108,284
bytes allocated
==131==
==131== All heap blocks were freed -- no leaks are possible
==131==
==131== For counts of detected and suppressed errors, rerun with: -
v
==131== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 f
 0)
```