

CS 246 Fall 2020 Final Project - Starights
Demo

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1 Command Line Arguments

1.1 Start Game with Random Seed

The following command:

```
./straights <0>
```

will start the game with random seed (current time). We run the program with a space and followed by an integer “0” to specify an random seed.

1.2 Start Game with Given Seed

The following command:

```
./straights <i>
```

will start the game with given seed `i`.

Note: our program must get a specification of seed as the first argument.

1.3 Load a Saved Game through a Command File

The following command:

```
./straights <i> [file-name]
```

will load a saved game with input file `file-name`.

Note: this argument is optional.

2 Unit Tests for each Command (and printed message on screen)

The following tests are using seed 246.

```

[17:44:20|j658chen@ubuntu1804-010]:[~/cs246/1209/projects/straights/src]> ./straights 246
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 Player4's turn to play.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades:
Your hand: 6S 4S 8S 5C KD KS JH QH AH 8D 7D 9H 7S
Legal plays: 7S
>

```

Figure 1: Four Human

```

[18:13:41|j658chen@ubuntu1804-010]:[~/cs246/1209/projects/straights/src]> ./straights 246
Is Player1 a human (h) or a computer (c)?
>c
Is Player2 a human (h) or a computer (c)?
>c
Is Player3 a human (h) or a computer (c)?
>c
Is Player4 a human (h) or a computer (c)?
>c
A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Player1 plays 7H.
Player2 plays 8H.
Player3 discards QC.
Player4 plays 6S.
Player1 discards 3D.
Player2 plays 6H.
Player3 plays 5S.
Player4 plays 4S.

```

Figure 2: Four Computer

```
[18:20:05|j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/src]> ./straights 246
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)?
>c
Is Player4 a human (h) or a computer (c)?
>c
A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
Legal plays: 7H
>|
```

Figure 3: 2H2C

2.1 Set Up the Game

2.2 play

2.2.1 Play a Card in hand

```
[18:25:52|j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]> ./straights 246
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)?
>c
Is Player4 a human (h) or a computer (c)?
>c
A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
Legal plays: 7H
>play 7H
Player1 plays 7H.
Cards on the table:
Clubs:
Diamonds:
Hearts: 7
Spades: 7
Your hand: 8H 5D 6H 3C KH 9C 2D JD 2C 6D KC 7C 8C
Legal plays: 8H 6H 7C
>
```

2.2.2 Play a Card not in hand

```
[18:27:29|j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]> ./straights 246
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)?
>c
Is Player4 a human (h) or a computer (c)?
>c
A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
Legal plays: 7H
>play 2D
This is not a legal play.
>
```

2.2.3 Play a Card in hand but not valid

```
[18:28:57|j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]> ./straights 246
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)?
>c
Is Player4 a human (h) or a computer (c)?
>c
A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
Legal plays: 7H
>play 3D
This is not a legal play.
>
```

2.3 discard

2.3.1 Discard a Card in hand

With input file 2H2C_discard_inhand.in:

```
>Player1 plays 5H.  
Cards on the table:  
Clubs:  
Diamonds:  
Hearts: 5 6 7  
Spades: 6 7  
Your hand: 8H 5D 3C KH 9C 2D JD 2C 6D KC 7C 8C  
Legal plays: 8H 7C  
>Player2 plays 8H.  
Player3 plays 5S.  
Player4 plays 4S.  
Cards on the table:  
Clubs:  
Diamonds:  
Hearts: 5 6 7 8  
Spades: 4 5 6 7  
Your hand: 3D 4D 6C 3H TC AD TS 4C TH AS AC  
Legal plays:  
>Player1 discards 3D.  
Cards on the table:  
Clubs:  
Diamonds:  
Hearts: 5 6 7 8  
Spades: 4 5 6 7  
Your hand: 5D 3C KH 9C 2D JD 2C 6D KC 7C 8C  
Legal plays: 7C  
>>
```

2.3.2 Discard a Card not in hand

With input file 2H2C_discard_notinhand.in:

```

Legal plays: 8H
>Player1 plays 5H.
Cards on the table:
Clubs:
Diamonds:
Hearts: 5 6 7
Spades: 6 7
Your hand: 8H 5D 3C KH 9C 2D JD 2C 6D KC 7C 8C
Legal plays: 8H 7C
>Player2 plays 8H.
Player3 plays 5S.
Player4 plays 4S.
Cards on the table:
Clubs:
Diamonds:
Hearts: 5 6 7 8
Spades: 4 5 6 7
Your hand: 3D 4D 6C 3H TC AD TS 4C TH AS AC
Legal plays:
>You cannot discard the card 2D, since it's not in your hand.
>>

```

2.3.3 Discard a Card in hand but not valid

In this case, we have a playable card in hand, but decided to discard a card in hand.
 With input file 2H2C_discard_invalid.in:

```

[18:46:46]j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]> ./straights 246
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)?
>c
Is Player4 a human (h) or a computer (c)?
>c
A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
Legal plays: 7H
>discard 3D
You have a legal play. You may not discard.
>

```


2.4 deck

2.4.1 At game start

Input deck at the start:

```
[18:52:16|j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]> ./straights 246
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)?
>c
Is Player4 a human (h) or a computer (c)?
>c
A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
Legal plays: 7H
>deck
 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
 8H 5D 6H 3C KH 9C 2D JD 2C 6D KC 7C 8C
 QC TD 2S 5S JC QS 3S 9S JS QD 4H 9D 2H
 6S 4S 8S 5C KD KS JH QH AH 8D 7D 9H 7S
>
```

2.4.2 during the game

With input file 2H2C_deck_ingame.in:

```

Diamonds:
Hearts: 5 6 7
Spades: 6 7
Your hand: 8H 5D 3C KH 9C 2D JD 2C 6D KC 7C 8C
Legal plays: 8H 7C
>Player2 plays 8H.
Player3 plays 5S.
Player4 plays 4S.
Cards on the table:
Clubs:
Diamonds:
Hearts: 5 6 7 8
Spades: 4 5 6 7
Your hand: 3D 4D 6C 3H TC AD TS 4C TH AS AC
Legal plays:
>You cannot discard the card 2D, since it's not in your hand.
> 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
   8H 5D 6H 3C KH 9C 2D JD 2C 6D KC 7C 8C
   QC TD 2S 5S JC QS 3S 9S JS QD 4H 9D 2H
   6S 4S 8S 5C KD KS JH QH AH 8D 7D 9H 7S
>>

```

2.5 quit

2.5.1 At game start

quit the game at the beginning with input file 2H2C_quit_at_start.in:

```

[19:07:52]j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]> ./straights 246 2H2C_quit_at_start.in
Is Player1 a human (h) or a computer (c)?
>Is Player2 a human (h) or a computer (c)?
>Is Player3 a human (h) or a computer (c)?
>Is Player4 a human (h) or a computer (c)?
>A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
Legal plays: 7H
>[19:09:53]j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]>

```

2.5.2 During the game

With input file 2H2C_quit_in_game.in and using valgrind:

```
>Player2 plays 8H.
Player3 plays 5S.
Player4 plays 4S.
Cards on the table:
Clubs:
Diamonds:
Hearts: 5 6 7 8
Spades: 4 5 6 7
Your hand: 3D 4D 6C 3H TC AD TS 4C TH AS AC
Legal plays:
>You cannot discard the card 2D, since it's not in your hand.
> 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
   8H 5D 6H 3C KH 9C 2D JD 2C 6D KC 7C 8C
   QC TD 2S 5S JC QS 3S 9S JS QD 4H 9D 2H
   6S 4S 8S 5C KD KS JH QH AH 8D 7D 9H 7S
>==216047==
==216047== HEAP SUMMARY:
==216047==      in use at exit: 0 bytes in 0 blocks
==216047==    total heap usage: 151 allocs, 151 frees, 91,717 bytes allocated
==216047==
==216047== All heap blocks were freed -- no leaks are possible
==216047==
==216047== For counts of detected and suppressed errors, rerun with: -v
==216047== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
[19:12:00]j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]>
```

2.6 ragequit

2.6.1 One player ragequit and letting one human play can play

With input file 2H2C_ragequit_one_player.in:

```
Cards on the table:
Clubs:
Diamonds:
Hearts: 7
Spades: 7
Your hand: 8H 5D 6H 3C KH 9C 2D JD 2C 6D KC 7C 8C
Legal plays: 8H 6H 7C
>Player 2 ragequits. A computer will now take over.
Player2 plays 8H.
Player3 discards QC.
Player4 plays 6S.
Cards on the table:
Clubs:
Diamonds:
Hearts: 7 8
Spades: 6 7
Your hand: 3D 4D 6C 3H TC AD TS 4C 5H TH AS AC
Legal plays:
>Player1 discards 3D.
Player2 plays 6H.
Player3 plays 5S.
Player4 plays 4S.
Cards on the table:
Clubs:
Diamonds:
Hearts: 6 7 8
Spades: 4 5 6 7
```

3 Integration tests

3.1 Play a game with all commands

With input file 2H2C_play_a_game.in:

```
[19:49:43]j658chen@ubuntu1804-008:[~/cs246/1209/projects/straights/test]> ./straights 246 2H2C_play_a_game.in
Is Player1 a human (h) or a computer (c)?
>Is Player2 a human (h) or a computer (c)?
>Is Player3 a human (h) or a computer (c)?
>Is Player4 a human (h) or a computer (c)?
>A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
Legal plays: 7H
> 3D 4D 6C 7H 3H TC AD TS 4C 5H TH AS AC
  8H 5D 6H 3C KH 9C 2D JD 2C 6D KC 7C 8C
  QC TD 2S 5S JC QS 3S 9S JS QD 4H 9D 2H
  6S 4S 8S 5C KD KS JH QH AH 8D 7D 9H 7S
>Player1 plays 7H.
Cards on the table:
Clubs:
Diamonds:
Hearts: 7
Spades: 7
```

```

Player3's score: 0 + 12 = 12
Player4's discards: KD KS JH QH AH
Player4's score: 0 + 50 = 50
A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 7
Your hand: 6H 3C TC 3S 2S 5H 8H 8D 7H JC QD 6S 3D
Legal plays: 7H 6S
> 6H 3C TC 3S 2S 5H 8H 8D 7H JC QD 6S 3D
   9S KH QS 6C 2H 4C 5D KC 4D 9C AC AD TS
   AS 6D 4S KD TH 9H 8S AH 7D 7C 5S 2C TD
   KS 5C QH 3H 8C 7S 4H 9D QC JD 2D JS JH
>Player1 plays 6S.
Player2 discards 9S.
Player3 plays 8S.
Player4 discards KS.
Cards on the table:
Clubs:
Diamonds:
Hearts:
Spades: 6 7 8
Your hand: 6H 3C TC 3S 2S 5H 8H 8D 7H JC QD 3D
Legal plays: 7H

```

```

Player4 discards JS.
Cards on the table:
Clubs: 6 7 8 9 T J
Diamonds: A 2 3 4 5 6 7 8 9 T J
Hearts: A 2 3 4 5 6 7 8 9 T J
Spades: A 2 3 4 5 6 7 8
Your hand: QD
Legal plays: QD
>Player1 plays QD.
Player2 discards TS.
Player3 discards 2C.
Player1's discards: 3C
Player1's score: 4 + 3 = 7
Player2's discards: 9S KH QS 4C KC AC TS
Player2's score: 28 + 62 = 90
Player3's discards: KD 2C
Player3's score: 12 + 15 = 27
Player4's discards: KS 5C QH QC JS
Player4's score: 50 + 53 = 103
Player1 wins!
[19:47:05|j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]>

```

Note during the game, there are two rounds. The program successfully reshuffled the deck and let the play who owns 7S to go first.

3.2 A game with two winners

With input file 4C_two_winners.in , seed to be 7:

```

[19:31:15|j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]> ./straights 7 4C_two_winners.in
Is Player1 a human (h) or a computer (c)?
>Is Player2 a human (h) or a computer (c)?
>Is Player3 a human (h) or a computer (c)?
>Is Player4 a human (h) or a computer (c)?
>A new round begins. It's Player4's turn to play.
Player4 plays 7S.
Player1's discards: JC
Player1's score: 60 + 11 = 71
Player2's discards: 8C QD KC 2C QH TH TC KH
Player2's score: 73 + 80 = 153
Player3's discards: AC 9C QC
Player3's score: 49 + 22 = 71
Player4's discards: AH JH KD
Player4's score: 59 + 25 = 84
Player1, Player3 wins!
[19:34:33|j658chen@ubuntu1804-008]:[~/cs246/1209/projects/straights/test]>

```

Note that Player1 and Player3 both has the lowest score 71.

4 Conclusion

As shown above, we successfully handle the following requirements:

- 5 required basic commands work properly in our examples
- Deck is reshuffled for each game and round
- Player get their hand as the order in the Deck
- Player with 7S always goes first
- When a move {play|discard} is invalid, program shows error msg and prompt for re-entering a command
- Player with lowest score wins, when any of the players accumulated 80 scores
- Mutiple players with lowest score wins were shown
- Exit the game when someone declare a win
- The vector of cards for each suit was shown in **order** on the tableau
- No memory leak
- **no delete used in source code; using smart pointers instead**