Hydra Demo

Normal Mode Game Play

Interface prompt for inputting number of players.
It will throw an exception if the player number is not an integer that is at least 2.

```
z963li@ubuntu1804-008:~/cs246/1209/projects/hydra/hydra$ ./hydra
How many players?
1
Player number needs to be at least 2!
How many players?
0
Player number needs to be at least 2!
How many players?
-9
Player number needs to be at least 2!
How many players?
hello
Player number needs to be at least 2!
How many players?
```

First head takes the top card from the draw pile of player 1.
Then the interface prompts player 2 for any key input to start his/her turn.

```
How many players?
2
Heads:
1: 6S (1)

Players:
Player 1: 53 (53 draw, 0 discard)
Player 2: 54 (54 draw, 0 discard)

Player 2, it is your turn.
```

After player 2 responds by pressing any key, they enter the head number to place their card on. In this case, they must cut a head. Note that I improved the rules so that when the player needs to cut off a head, regardless of what number they put in the head will be cut off.

```
Player 2, it is your turn.

Heads:
1: 6S (1)

Players:
Player 1: 53 (53 draw, 0 discard)
Player 2: 54 (54 draw, 0 discard) + 1 in hand, 0 remaining, 0 in reserve

Player 2, you are holding a 10S. Your move?
1
Heads:
2: 2S (1)
3: 8D (1)

Players:
Player 1: 51 (51 draw, 0 discard)
Player 2: 55 (53 draw, 2 discard)

Player 1, it is your turn.
```

Now it is Player 1's turn. Player 2 has cut off Head1 and put out two new Heads using the two top cards from their draw pile.
Note that here I avoid undefined behavior by making sure that if the player enters an invalid value for head number, either by entering a number that is invalid or not a number, the prompt will show up again asking for input:

```
Player 1, it is your turn.

Heads:
2: 2S (1)
3: 8D (1)

Players:
Player 1: 51 (51 draw, 0 discard) + 1 in hand, 1 remaining, 0 in reserve
Player 2: 55 (53 draw, 2 discard)

Player 1, you are holding a 6D. Your move?
no
Heads:
2: 2S (1)
3: 8D (1)

Players:
Player 1: 51 (51 draw, 0 discard) + 1 in hand, 1 remaining, 0 in reserve
Player 2: 55 (53 draw, 2 discard)

Player 1, you are holding a 6D. Your move?
```

Here, if the player doesn't have to cut a head but enters an invalid value, then the prompt will show up again asking for the head number. However, if they have to cut off a head, then the game will automatically cut off the head for them even if they don't enter a valid head number(see the second picture below, which is not from the same game, but is an example of head cutting regardless of user input if need be). In the second pic the player has no valid

heads to place a card on, and they enter a 9, the game cuts off a head anyways since there is no valid head to place 8C on.

```
Heads:
2: 2S (1)
3: 8D (1)

Players:
Player 1: 51 (51 draw, 0 discard) + 1 in hand, 1 remaining, 0 in reserve
Player 2: 55 (53 draw, 2 discard)

Player 1, you are holding a 6D. Your move?
2
Heads:
2: 2S (1)
3: 8D (1)

Players:
Player 1: 51 (51 draw, 0 discard) + 1 in hand, 1 remaining, 0 in reserve
Player 2: 55 (53 draw, 2 discard)

Player 1, you are holding a 6D. Your move?
```

```
Heads:
2: 2D (2)
3: 6C (3)

Players:
Player 1: 49 (49 draw, 0 discard) + 1 in hand, 1 remaining, 0 in reserve
Player 2: 54 (52 draw, 2 discard)

Player 1, you are holding a 8C. Your move?
9
Heads:
3: 6C (3)
4: 2C (1)
5: KC (1)

Players:
Player 1: 51 (48 draw, 3 discard)
Player 2: 52 (50 draw, 2 discard)

Player 2, it is your turn.
```

Player 1 draws a 6D from their draw pile and places it on Head 3. It is valid because 8D was the top card on Head 3. Then the top card on Head 3 becomes 6D. Then they draws a 2D and place it on Head 3 again. It is also valid because 2 is less than 6.

```
Player 1, you are holding a 6D. Your move?
3
Heads:
2: 2S (1)
3: 6D (2)

Players:
Player 1: 50 (50 draw, 0 discard) + 1 in hand, 0 remaining, 0 in reserve
Player 2: 55 (53 draw, 2 discard)

Player 1, you are holding a 2D. Your move?
3
Heads:
2: 2S (1)
3: 2D (3)

Players:
Player 1: 49 (49 draw, 0 discard)
Player 2: 55 (53 draw, 2 discard)

Player 2, it is your turn.
```

Here Player 2 draws a 6C, but they decides to use the reserve since there is more than one Head now, and there 6 is bigger than any of the top cards of the current heads. So they use the reserve. The reserve is currently empty, so they place the current card 6C in reserve, and draw another card, which is 2C in this case.

```
Player 2, it is your turn.

Heads:
2: 2S (1)
3: 2D (3)

Players:
Player 1: 49 (49 draw, 0 discard)
Player 2: 55 (53 draw, 2 discard) + 1 in hand, 1 remaining, 0 in reserve

Player 2, you are holding a 6C. Your move?
0
Heads:
2: 2S (1)
3: 2D (3)

Players:
Player 1: 49 (49 draw, 0 discard)
Player 2: 54 (52 draw, 2 discard) + 1 in hand, 0 remaining, 1 in reserve

Player 2, you are holding a 2C. Your move?
```

Player 2 decides to place 2C on Head 3, which is valid because a card with the same value can be placed on top of a head. It will end their turns early if they have more remaining cards. But in this case they are not required to draw another card, so their turn ends at the same time.

```
Player 2, you are holding a 2C. Your move?
3
Heads:
2: 2S (1)
3: 2C (4)

Players:
Player 1: 49 (49 draw, 0 discard)
Player 2: 54 (52 draw, 2 discard)

Player 1, it is your turn.
```

Player 1 then cuts off a head. Now there are three heads. Player 2 then has their turn.

```
Heads:
2: 2S (1)
3: 2C (4)

Players:
Player 1: 49 (49 draw, 0 discard) + 1 in hand, 1 remaining, 0 in reserve
Player 2: 54 (52 draw, 2 discard)

Player 1, you are holding a 8C. Your move?
2
Heads:
3: 2C (4)
4: 6C (1)
5: KC (1)

Players:
Player 1: 50 (48 draw, 2 discard)
Player 2: 52 (50 draw, 2 discard)

Player 2, it is your turn.
```

Look! They have a Joker! Player 2 decides to end their turn early, so they enter a value of 6 for their joker, so even though they were required to draw two more cards since there are three heads, their turn ends after they place a 6J on a 6C, which is of the same value.

```
Heads:
3: 2C (4)
4: 6C (1)
5: KC (1)

Players:
Player 1: 50 (48 draw, 2 discard)
Player 2: 52 (50 draw, 2 discard) + 1 in hand, 2 remaining, 0 in reserve

Player 2, you are holding a Joker. Your move?
4
Joker value?
6
Heads:
3: 2C (4)
4: 6J (2)
5: KC (1)

Players:
Player 1: 50 (48 draw, 2 discard)
Player 2: 51 (49 draw, 2 discard)

Player 1, it is your turn.
```

The game goes on…

```
Player 1, you are holding a 4S. Your move?
4
Heads:
3: 2C (4)
4: 4S (3)
5: KC (1)

Players:
Player 1: 49 (47 draw, 2 discard) + 1 in hand, 1 remaining, 0 in reserve
Player 2: 51 (49 draw, 2 discard)

Player 1, you are holding a 7D. Your move?
5
Heads:
3: 2C (4)
4: 4S (3)
5: 7D (2)

Players:
Player 1: 48 (46 draw, 2 discard) + 1 in hand, 0 remaining, 0 in reserve
Player 2: 51 (49 draw, 2 discard)

Player 1, you are holding a 7H. Your move?
```

Player 1 decides that they want to keep the 7H for next round, so they use their reserve on the last draw. It means that 7H was placed in the reserve pile and then return to the top of their draw pile since their turn is ending.

```
Player 1, you are holding a 7H. Your move?
0
Heads:
3: 2C (4)
4: 4S (3)
5: 7D (2)

Players:
Player 1: 48 (46 draw, 2 discard)
Player 2: 51 (49 draw, 2 discard)

Player 2, it is your turn.
```

More interesting things happen here. Player 2 draws a 5C, and decides that 5C is a nice little small card that they can use later, so they entered 0 to place it in the reserve. However, they then draw a 10C, which would force them to cut off Head 3 if they don't swap this card with the one in the reserve. So Player 2 enters 0 again to swap the 10C in hand with the 5C that was placed in the reserve. Now they have 5C in hand again and 10C in the reserve.

```
Player 2, you are holding a 5C. Your move?
0
Heads:
3: 2C (4)
4: 4S (3)
5: 7D (2)

Players:
Player 1: 48 (46 draw, 2 discard)
Player 2: 50 (48 draw, 2 discard) + 1 in hand, 1 remaining, 1 in reserve

Player 2, you are holding a 10C. Your move?
0
Heads:
3: 2C (4)
4: 4S (3)
5: 7D (2)

Players:
Player 1: 48 (46 draw, 2 discard)
Player 2: 50 (48 draw, 2 discard) + 1 in hand, 1 remaining, 1 in reserve

Player 2, you are holding a 5C. Your move?
```

The game goes on...
2 hours later…….

Look! Player 1 gets an ace, which is universal! They can place this card on whatever head that is present regardless of their top card value. Here they decide to place it on Head 7, which has a top card of 6H, but it doesn't matter. Now they can place whatever card they want on Head 6, since an ace is "universal".

```
Player 1, it is your turn.

Heads:
6: 7H (1)
7: 6H (1)
8: 10C (1)
9: 2C (1)
10: 10H (1)
11: 2H (1)

Players:
Player 1: 47 (40 draw, 7 discard) + 1 in hand, 5 remaining, 0 in reserve
Player 2: 55 (44 draw, 11 discard)

Player 1, you are holding a AS. Your move?
7
```

A few moments later…
Player 1 decides to place a Jack on the ace on Head 7, which is totally OK! (unfortunately they drew a King in the next draw… so the ace was kind of wasted)

```
Heads:
6: 7H (1)
7: AS (2)
8: 10C (1)
9: 2C (1)
10: 2H (4)
11: 2H (1)

Players:
Player 1: 43 (36 draw, 7 discard) + 1 in hand, 1 remaining, 0 in reserve
Player 2: 55 (44 draw, 11 discard)

Player 1, you are holding a JD. Your move?
7
Heads:
6: 7H (1)
7: JD (3)
8: 10C (1)
9: 2C (1)
10: 2H (4)
11: 2H (1)
```

Player 1:“Fine, I will cut off Head 6 since it only has 1 card in it!”
Note how Head 6 was cut off and disappeared, and Head 12 and 13 are created. So there is in total one more head than before.

```
Heads:
6: 7H (1)
7: JD (3)
8: 10C (1)
9: 2C (1)
10: 2H (4)
11: 2H (1)

Players:
Player 1: 42 (35 draw, 7 discard) + 1 in hand, 0 remaining, 0 in reserve
Player 2: 55 (44 draw, 11 discard)

Player 1, you are holding a KS. Your move?
6
Heads:
7: JD (3)
8: 10C (1)
9: 2C (1)
10: 2H (4)
11: 2H (1)
12: KD (1)
13: QH (1)

Players:
Player 1: 43 (34 draw, 9 discard)
Player 2: 53 (42 draw, 11 discard)

Player 2, it is your turn.
```

A few moments later…
Here Player 2 draws their last card while still having a card in their reserve pile. After their turn ends, the card in the reserve is returned to the draw pile. Internally, their draw pile will have 36 - 1 = 35 cards after drawing the last card, but because their reserve card is returned to the top of their draw pile, now there is 35 + 1 = 36 cards when the next player's turn starts.

```
Players:
Player 1: 43 (34 draw, 9 discard)
Player 2: 47 (36 draw, 11 discard) + 1 in hand, 0 remaining, 1 in reserve

Player 2, you are holding a 5S. Your move?
12
Heads:
7: 3C (5)
8: 2D (3)
9: 2C (1)
10: 2H (4)
11: 2H (1)
12: 5S (2)
13: 5C (2)

Players:
Player 1: 43 (34 draw, 9 discard)
Player 2: 47 (36 draw, 11 discard)

Player 1, it is your turn.
```

…
Here, Player 2 decides to not risk it, so they place a 5H on Head 12, which has a 5H on top as well, to end their turn early. So even if they have 7 cards remaining, their turn ends.

```
Player 2, it is your turn.

Heads:
8: 2D (3)
9: 2C (1)
10: 2H (4)
11: 2H (1)
12: 5S (2)
13: 5C (2)
14: AC (1)
15: 2J (1)

Players:
Player 1: 48 (33 draw, 15 discard)
Player 2: 45 (34 draw, 11 discard) + 1 in hand, 7 remaining, 0 in reserve

Player 2, you are holding a 5H. Your move?
12
Heads:
8: 2D (3)
9: 2C (1)
10: 2H (4)
11: 2H (1)
12: 5H (3)
13: 5C (2)
14: AC (1)
15: 2J (1)

Players:
Player 1: 48 (33 draw, 15 discard)
Player 2: 44 (33 draw, 11 discard)

Player 1, it is your turn.
```

…..later…

Player 1 ran out of cards in their draw piles, but their discard pile is still not empty, so their discard pile is shuffled and all the cards in it are loaded to the draw pile. So now the draw pile has the 10 cards from the discard pile.

```
Players:
Player 1: 11 (1 draw, 10 discard) + 1 in hand, 4 remaining, 0 in reserve
Player 2: 57 (24 draw, 33 discard)

Player 1, you are holding a 6D. Your move?
13
Heads:
10: 7C (9)
11: 3D (8)
12: 5H (5)
13: 6D (9)
14: 6C (1)
15: 8H (1)
16: 4C (2)
17: KH (3)
18: KS (1)
19: 9D (2)

Players:
Player 1: 10 (10 draw, 0 discard) + 1 in hand, 3 remaining, 0 in reserve
Player 2: 57 (24 draw, 33 discard)

Player 1, you are holding a 7H. Your move?
```

Testing Mode

I can enter testing mode to manipulate card values by adding “-testing” as a command line argument to run the game in testing mode. In testing mode, the player decides all the card values whenever a card is drawed.
After asking me for the player number, it will also ask me the card value of the top card of the first head.

```
z963li@ubuntu1804-008:~/cs246/1209/projects/hydra/hydra$ ./hydra -testing
How many players?
2
Card value?
7
Suit?
D
Heads:
1: 7D (1)

Players:
Player 1: 53 (53 draw, 0 discard)
Player 2: 54 (54 draw, 0 discard)

Player 2, it is your turn.
```

Here, I made a 6H card, but I am violating the game rule by trying to place it in reserve when there is only one head. So the game is prompting again to ask me for the card value, since I am in testing mode.

```
Heads:
1: 7D (1)

Players:
Player 1: 53 (53 draw, 0 discard)
Player 2: 54 (54 draw, 0 discard) + 1 in hand, 0 remaining, 0 in reserve
Card value?
6
Suit?
H

Player 2, you are holding a 6H. Your move?
0
Heads:
1: 7D (1)

Players:
Player 1: 53 (53 draw, 0 discard)
Player 2: 54 (54 draw, 0 discard) + 1 in hand, 0 remaining, 0 in reserve
Card value?
6
Suit?
D

Player 2, you are holding a 6D. Your move?
1
Heads:
1: 6D (2)

Players:
Player 1: 53 (53 draw, 0 discard)
Player 2: 53 (53 draw, 0 discard)

Player 1, it is your turn.
```

I decide to make a Joker here by entering “Joker”. I gave it a value of ace. It would not ask for a suit value in the case of a Joker because the suit for Joker is “J”.

```
Heads:
1: 6D (2)

Players:
Player 1: 53 (53 draw, 0 discard) + 1 in hand, 0 remaining, 0 in reserve
Player 2: 53 (53 draw, 0 discard)
Card value?
Joker

Player 1, you are holding a Joker. Your move?
1
Joker value?
A
Heads:
1: AJ (3)

Players:
Player 1: 52 (52 draw, 0 discard)
Player 2: 53 (53 draw, 0 discard)
```

Bug

Yes. This program has a bug. When player 1 has no cards in both of their draw pile and discard pile the reserve card isn't returned to their draw pile. So it has a segmentation fault at the moment. So close to winning! I am still working on this :(

```
Player 1, you are holding a 3H. Your move?
19
Heads:
14: QD (8)
15: 4D (4)
16: AH (6)
17: 8S (6)
18: AC (7)
19: 3H (7)
20: 9H (1)
21: 5H (3)
22: 5S (4)
23: 8S (3)
24: 2H (2)
25: 10S (6)
26: 9C (1)
27: 10C (4)

Players:
Player 1: 0 (0 draw, 0 discard) + 1 in hand, 3 remaining, 1 in reserve
Player 2: 45 (34 draw, 11 discard)

Segmentation fault
```