

We consider a simplistic version of BlackJack.

Our version of the Blackjack supports an automated (i.e., non human) dealer plus 1 to 3 other potential players.

Beyond the dealer, some of these players may be AI players as explained below.

We do NOT address betting and use only 1 deck (i.e., 52 cards shuffled at the beginning of each game).

An overview of the game is available at: <https://en.wikipedia.org/wiki/Blackjack>

Your webapp must support playing several games one after the other, NOT concurrently.

That is, we do not worry about someone being simultaneously in multiple games with (the same or different groups of) other players.

Each game consists of several *rounds*.

In the first round, each player first gets two cards, one hidden, one *visible* to other players.

Then in each round, each player has 2 options:

- 1) **Stay**: the player takes no additional card and just waits for the game to be resolved (i.e., a winner declared).
- 2) **Hit**: the player gets one more card. If this card causes the hand's value to go over 21, the player **must** immediately declare 'bust'

Additionally, in the first round each player except the dealer may split:

- 3) **split**: If the first two cards of a hand have the same *rank* (*not just the same value*), the player can split them into two hands by making both visible. In this case, each of these hands immediately gets a new hidden card and then play for a normal round resumes for this player who is now playing with two separate hands instead of just one! This means this player has to hit or stay for each of these two hands from this point on for the rest of that game.

The players play in a specific order (namely the order in which they join the game), with the dealer playing last.

The dealer is an automated player. That is, the dealer's behavior is fixed: if his hand's value is less than 17, he must hit. If the dealer's hand value is exactly 17, but the hand does not have an ace, the dealer must stay. Finally, if the dealer's hand value is 17 and the hand contains an ace (which is called soft 17), the dealer must hit. The dealer stays if his hand's value is 18 or above.

Winning:

- a 7-card Charlie (i.e., a hand of 7 cards whose value does not exceed 21) must be declared immediately and wins over all other hands
- a busted hand must be declared immediately and always loses
- among hands that have not busted nor are 7-card Charlies:
 - o a hand with the highest value (up to 21) wins over hands of lesser value.
 - o If two or more hands have the highest value obtained in this game, the winner/s is/are the hand with the fewest cards.

Note: hands that reach 21 do NOT have to be declared immediately.

Finally, beyond the behavior of the dealer, you must support zero or more players being AI players that obey the following strategy in each round:

- if you have your two initial cards to be of the same rank, then split
- if your current value is 21, then stay
- else: if at least one other player has stayed with two cards with the visible card being an ace or a card of value 10, then hit
- else: if your value is between 18 and 20
 - o then if any other player has his visible cards add up to *strictly more* than your hand's value minus 10, then hit
 - o else stay
- else: hit

Just to be sure about terminology: tens, jacks, queens and kings have a *value* of 10 but are of different *rank*.

In our version, the *suit* of a card does not matter.

The results of running this test suite must be directed to a text log file named ResultBJ.txt.