

Auction Hold'em

We **strongly recommend** learning the rules of Texas Hold'em before learning Auction Hold'em. Two helpful resources are pkr.bot/poker-rules and pkr.bot/poker-video.

Overview

The poker variant for the 6.9630 Pokerbots Competition in IAP 2024 is “No-Limit Auction Hold'em,” a game based on the popular poker variant No-Limit Texas Hold'em. The main modification is that after the flop is dealt, both players simultaneously place a bid to receive a third hole card. The player with the higher bid wins the auction, and pays the lower bid amount to the pot (making this a second-price auction) and receives a third hole card from the top of the deck. In the case of a tie, both players pay the bid amount to the pot and both players receive a third hole card. Afterwards, play resumes as in regular Texas Hold'em, with a round of betting immediately following the auction. At showdown, both players can use any combination of their hole cards and the board cards to make the best hand of five.

Glossary

Hole cards	A player's two or three private cards
Board cards	Cards that are public and shared between the players
Pot	The accumulation of bets and other payments made by the players during a round to be claimed by the winner of the round
Stack	A player's individual resources they use for bets and other payments during a round
Pip	A player's contribution to the pot during a round of betting
Blinds	Small, forced bets at the beginning of the round to kick off the pot
Call	A minimum pot contribution to stay in the round in response to a bet or raise
Check	A “pass” or bet of 0
Fold	To quit the round and let the other player claim the pot
Flop	When the first three board cards are dealt
Turn	When the fourth board card is dealt
River	When the fifth and final board card is dealt
Bid	A player's bid amount for receiving a hole card. The player with the higher bid receives the card, but pays the amount of the lower bid.

Showdown

When the players' hole cards are revealed to determine the winner of the round who claims the pot

Game Logistics

A game of Auction Hold'em consists of a number of rounds played between two players. In every round, each player is allocated a stack before the cards are dealt. The change in a player's stack at the end of the round is used to update that player's bankroll, which starts at 0. The player with the highest cumulative bankroll after the last round is played wins the game.

Parameters

Rounds: 1000

Stack allocated per round: 400

Big blind: 2

Small blind: 1

Sequence of Play

A round of No-Limit Auction Hold'em has all the stages as standard Texas Hold'em but introduces a new Auction street.

1. Pay blinds
2. Deal hole cards
3. Round of betting
4. Deal flop
5. Auction for third hole card
6. Round of betting
7. Deal turn
8. Round of betting
9. Deal river
10. Round of betting
11. Showdown

Deal

The hole cards, flop, turn, river deals are the same as in standard Texas Hold'em.

Blinds

In each round, one player is designated as the dealer. The dealer alternates between successive rounds. To start the round, the dealer pays the small blind and their opponent pays the big blind. The blinds are a mandatory bet of 1 by the dealer followed by a mandatory raise to 2 by their opponent, which leaves the dealer to act next.

Betting

In the first round of betting (labeled 3 above), the dealer is the first player to act. In this first action, the dealer may fold (cost: 0), call (cost: 1), or raise (cost: 3+).

In all other rounds of betting, the dealer's opponent is the first player to act. In this action, the player may check (cost: 0) or bet (cost: 2+). The minimum legal bet is 1 big blind. The maximum legal bet is bounded by both players' remaining stack sizes; this ensures that neither player can make a bet that their opponent is unable to call.

When a player is faced with a bet or raise from their opponent, that player is allowed to raise. There is no limit on the number of consecutive raises that may occur in a round of betting.

The raise amount is defined as the amount by which the raising player's pip exceeds their opponent's pip. Equivalently, this is the opponent's cost of calling after the raise. It is common in Hold'em to place restrictions on the raise amount in order for a raise to be legal.

In Auction Hold'em, just like in Texas Hold'em, the minimum legal raise amount is the size of the previous bet if responding to a bet or the previous raise amount if responding to a raise. The maximum legal raise amount is bounded by both players' remaining stack sizes so that neither player can make a raise that their opponent is unable to call.

If the remaining stack sizes do not allow for a minimum legal raise amount, i.e. the maximum is below the minimum, then the only legal raise is the maximum legal raise amount. This occurs when a player makes an all-in raise.

The round of betting ends when a player calls, when a player folds, or when both players check in a row. In the first round of betting, if the dealer calls right away, then the round does not end and their opponent is given the opportunity to act: check (cost: 0) or raise (cost: 2+).

These are the standard Texas Hold'em betting rules; we encourage those unfamiliar with betting in Hold'em to revisit the resources pkr.bot/poker-rules and pkr.bot/poker-video for a refresher.

Auction

A second-price auction is held to award a player with a third hole card. After the flop is dealt, both players will post a bid without knowledge of the other player's bid. The player with the higher bid wins the auction, and puts the losing bid's amount into the pot. That player then receives a third hole card drawn from the deck. If both players post the same bid, both players put that bid amount into the pot and receive a third hole card.

Showdown

The winner of the round is determined by the standard Texas Hold'em hand rankings. Just as in regular Texas Hold'em, players may use any of the five board cards in addition to any of their two or three hole cards to make the best possible five-card hand. In the case of a tie, the pot is split.