

Bounty Hold'em

We **strongly recommend** learning the rules of Texas Hold'em before learning Bounty 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 2025 is "No-Limit Bounty Hold'em," a game based on the popular poker variant No-Limit Texas Hold'em. The main modification is that every 25 rounds, both players are assigned a rank (hidden from their opponent) called their bounty, and if they win when the (up to 7) cards among their hole cards and the current board include a card matching the rank of their bounty, their winnings follow the following formula:

$$[\text{winnings with bounty}] = 1.5 * [\text{normal winnings}] + 10$$

Here, the normal winnings refers to **the amount of chips bet by the opponent at the end of all action** - not the total pot size.

It is important to note that at every round of play, the players' stack sizes are reset to 400.

Glossary

Hole cards	A player's two 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 so far 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
Bounty	A rank (e.g. '5' or 'A') given to a player which increases winnings when contained in hole cards or on the board
Showdown	When the players' hole cards are revealed to determine the winner of the round who claims the pot

Game Logistics

A game of Bounty 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 Bounty Hold'em has all the stages as standard Texas Hold'em.

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

Deal

The hole cards, flop, turn, and 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 Bounty 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.

Bounty

Both players' bounties are generated uniformly at random (they may be the same) and are changed every 25 rounds. Everytime a player wins, whether or not a showdown is reached, their bounty will come into play. We say that a player hits their bounty when either one of their hole cards or one of the cards on the board (which may be empty) has their bounty rank. If a winning player hits their bounty, their winnings follow the following formula:

$$[\text{winnings with bounty}] = 1.5 * [\text{normal winnings}] + 10$$

Note that this will also take away more chips from their opponent, keeping each round zero-sum.

Also, in the case of a split pot, if both or none of the players hit their bounty, nothing happens. However, if exactly one player hits their bounty, they will win $1/4$ of the chips that their opponent put into the pot plus an additional 10. The reasoning for this is as follows: assume both players currently have x chips in the pot (for a total pot size of $2x$). Then, this can be calculated as two boards with a pot size of x on each. The player without the bounty hit wins $x/2$, while the player with the bounty hit wins $3/2 * x/2 + 10 = 3x/4 + 10$. The relative winnings of the player with the bounty hit are thus $x/4 + 10$.

If at any point a player's winnings become non-integer, they are rounded up if the winning player is out of position (not the dealer) and rounded down otherwise.

We offer a few examples of the bounty calculations for clarity:

- Player A and Player B go to showdown, both of them having bet 50 chips into the pot. Player A wins and hits their bounty. The normal winnings are 50 - thus the winnings with bounty are $1.5 * 50 + 10 = 85$.
- There are currently 60 chips in the pot after all action on the flop, and the turn card has just been dealt out. Player A bets 10 chips, and player B raises to 30. Player A then folds. Player B's normal winnings would be 40 chips ($60/2 + 10$). Player B's winnings with bounty are thus $1.5 * 40 + 10 = 70$.
- Player A is dealer/small blind (1) and Player B is big blind (2). Player A folds upon their action. If Player B hit their bounty within their hole cards, then they would win 12 chips. Their normal winnings would be 1. The winnings with bounty are thus $1.5 * 1 + 10 = 11.5$ - this gets rounded to 12 because Player B is out of position.
- Player A and Player B go to showdown, each of them having bet 40 chips for a total pot size of 80. They chop, but Player A's bounty hit. Player A would win $40/4 + 10 = 20$ chips.

Showdown

The winner of the round is determined by the standard Texas Hold'em hand scorings. Just as in regular Texas Hold'em, players may use any of the board cards in addition to their own hole cards to make their best possible five-card hand. If the winning player hits their bounty (their bounty rank card is in any of the community cards or winning player's hole cards), their winnings increase as described in the Bounty section. In the case of a tie, players' bankrolls do not change, unless exactly one of the players hits their bounty (details described in Bounty section).