Blotto Hold'em

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

Overview
The poker variant for 6.176 Pokerbots Competition in IAP 2021 is "No-Limit Blotto Hold'em," a new game based on the popular poker variant No-Limit Texas Hold'em (with a Blotto twist). The main modification is that players are dealt 6 cards and have to form three poker hands across three playing boards, instead of the normal 2 cards played on one board. Each board is resolved separately, with the 12 dealt cards drawn without replacement from a 52 card deck and the board cards drawn independently from the remaining 40 cards. At the start of each hand, the boards are inflated with 1, 2, and 3 big blinds, with players choosing which pair of hole cards to send to each of the three boards preflop.

Glossary

Hole cards	A player's private cards
Board cards	Cards associated with a particular board that are public and shared between the players
Pot	The accumulation of bets and other payments made by the players during a round on a board, to be claimed by the winner of the board
Stack	A player's individual resources they use for bets and other payments during a round
Pip	A player's contribution to a board's pot during a round of betting
Blinds	Small forced bets at the beginning of the round to kick off the pots
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 board 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
Showdown	When the players' hole cards are revealed to determine the winner of each board who claims its pot

Game Logistics

A game of Blotto 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: 500
Stack allocated per round: 200
Big blind: 2
Small blind: 1

Sequence of Play

A round of No-limit Blotto Hold'em has the same stages as in standard Texas Hold'em.

1. Players pay standard 1/2 blinds on each board
2. Boards 1, 2, and 3 are inflated by 1, 2, and 3 big blinds, respectively
3. Deal 12 hole cards
4. Each player assigns 2 cards to each board
5. Round of betting on each board
6. Deal flop on each board
7. Round of betting on each board
8. Deal turn on each board
9. Round of betting on each board
10. Deal river on each board
11. Round of betting on each board
12. Showdown on each board

Deal

The hole cards are dealt similarly to standard Texas Hold'em, except with 6 cards dealt to each player rather than 2. These are drawn without replacement from a 52 card deck - in other words, no repeats. Flop, turn, and river deals are the same as in standard Texas Hold'em, this time being drawn from separate copies of the remaining 40 card deck - in other words, the same cards can appear on different boards.

Card Allocation

After the 6 hole cards are dealt to each player, the players must then allocate a pair of hole cards to each of the three boards without replacement. This means that the player may not allocate an individual card to multiple boards. The player may allocate their 6 hole cards into the three pairs in any manner they please.

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 into each board's pot. 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. The blinds will be the same regardless of how much the pot is inflated by.

Betting

Below are the rules for betting in one round of Texas Hold'em. In Blotto Hold'em, the rules are the same, with the stipulation that the acting player has to act on all three boards at once. This means boards aren't resolved sequentially, but in parallel.

In the first round of betting (labeled 4 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 Blotto 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.

Note that players often will have different stack sizes; e.g. if player A makes a bet on Board 1 that player B folds to, player A's money is still in Board 1's pot, so player B will have a larger stack on boards 2 and 3.

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.

If a player is all-in on one board and the other player calls, all boards still live go to showdown, as the all-in player automatically becomes all-in on the remaining boards.

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 on one board, 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, just played simultaneously across three boards; 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.

Showdown

The winner of the round is determined by the standard Texas Hold'em hand rankings. Each board is resolved independently, with the players' bankrolls changing by the aggregate difference across the three boards.