Pokerbots 2024

Lecture 1: Introduction to Pokerbots

Meet the team

Alexander Zhang
President

Dylan Dong
Vice President

Gaurab Das
Tech Lead

Meet the team

Jacob David
Head Instructor

Paco Gomez-Paz
Curriculum Lead

Meet the team

Sejal Rathi
Engine Developer

Sri Saraf
Server Developer

Jacob Jobraeel
Sponsorship Director

Sam Zhou
Treasurer

Sponsors

Resume Drop: pkr.bot/drop

Giveaways!

Giveaway Game: pkr.bot/age

- Guess the average age (in years) of the Pokerbots Team!

- You can be as precise as you want, but enter a decimal number (eg. 18.26)

- Winner is who guesses the closest (and earliest if there's a tie)

- Prize: Sony XM5 Headphones

Random Raffle: pkr.bot/random

Prize:
One year's worth of GTO Wizard Elite Subscription

Agenda

- Class overview + logistical details

- Intro to poker + variant rules

- Skeleton bot setup and connecting to the scrimmage server

- Testing your bot locally

- Overview of skeleton bot architecture

- Live Coding Lecture 1 reference bot

Class Overview + Logistical Details

Resources

- Github: pkr.bot/resources
    - Lecture slides/notes
    - Updated Syllabus (All logistical info is here)

- Piazza: pkr.bot/piazza
    - All updates will be posted here
    - Best place to ask questions

Class Structure

- Seven lectures
  - MWF 12:00-1:30pm EST (in 6-120 or pkr.bot/class for Zoom)

- Office hours
  - MWF 1:30-3pm EST (same locations as lecture).
  - TR 1:30-3pm EST (virtual at pkr.bot/oh)

- Scrimmage server (first three weeks)

- Weekly tournaments

- Final tournament and event (Feb 2rd)

Team Formation

- Teams are 1-4 people

- Piazza post @5

- Google Sheet: pkr.bot/teammates

- Poker Afternoon Study Breaks!

  - Tue 1/9 and Tue 1/23
  - 3-5pm EST
  - 2-131 & 2-132
  - Come try out the 2024 poker variant in action!
  - Great place to find teammates

- Team Specific Prizes

>$40K

Total Prize Amount

Prizes

- Grand prize: $7.5k

- 2nd - 5th place : $5k, $3.5k, $2k, $1k

- Bot Language Specific Prizes

- ~$2.5k/week Scrimmage Server Prizes

- All announced prizes can be viewed on the syllabus

- More prizes to be announced soon!

7 Lecture Titles

1. Introduction to Pokerbots

2. Poker Strategy

3. Game Theory

4. Engineering and Performance

5. Advanced Topics

6. Guest Lecture: Noam Brown

7. Guest Lecture: GTO Wizard

How to Receive Credit For This Course

Participate

Submit a bot to the scrimmage server every week

Improve

Each week you should beat your bot from the previous week

Report

Submit a 3-5 page strategy report at the end of the competition

Questions?

Intro to Poker + Variant Rules

Heads-up No-limit Hold'em Poker Rules

- Objective: earn as many chips as possible

- Players receive two secret cards *(hole cards)*

- Players bet into a pot in several rounds; the pot is given to the player with the best poker hand

- Structure of a betting round: first player can bet 0 (*check*) or any amount between "big blind" and the # of chips they have remaining. If they check, action passes to second player. If they bet, second player can *fold*, *call*, or *raise*

- Hand strength is determined as the best 5-card poker hand you can form out of 7 cards: 2 hole cards and 5 community cards

Poker Rules

- Two cards dealt to each player (*hole cards)*

- Betting round (first betting round begins with *blinds*)

- Flop (3 community cards revealed)

- Betting round

- Turn (+1 community cards revealed [4 total])

- Betting round

- River (+1 community cards revealed [5 total])

- Betting round

- Settlement (*showdown*)

Card Rankings

Poker Hand Strength

Hand Rankings

ROYAL FLUSH
A♠ K♠ Q♠ J♠ 10♠

STRAIGHT FLUSH
9♥ 8♥ 7♥ 6♥ 5♥

FOUR OF A KIND
7♠ 7♥ 7♦ 7♣ 6♦

FULL HOUSE
4♠ 4♥ 4♦ Q♠ Q♦

FLUSH
K♦ J♦ 9♦ 8♦ 5♦

STRAIGHT
7♣ 6♠ 5♣ 4♦ 3♦

THREE OF A KIND
Q♥ Q♦ Q♠ 4♠ 5♣

TWO PAIR
A♣ A♥ 5♠ 5♣ 9♥

ONE PAIR
10♥ 10♦ Q♣ 9♠ 5♦

2024 Variant Reveal

2024 Variant - Auction Hold'em

Immediately after the flop is dealt, an *auction* is held to receive a third hole card:

- Both players simultaneously place a *bid*.
- The player with the higher bid pays the lower bid amount to the pot (second-price auction) and receives an extra hole card drawn from the deck.
- If the bids tie, both players pay the bid amount to the pot and both players receive a third hole card.

Play continues as normal. At showdown, both players can use *any* combination of hole cards and community cards to make their best hand of five.

GOAL: Strategically place bids and navigate the game based on the auction outcome!

Auction Hold'em

- Two cards dealt to each player (*hole cards*)

- Betting round (first betting round begins with *blinds*)

- Flop (3 community cards revealed)

- Auction (at least one player receives a third hole card)

- Betting round

- Turn (+1 community cards revealed [4 total])

- Betting round

- River (+1 community cards revealed [5 total])

- Betting round

- Settlement (*showdown*)

Detailed rules for the variant will be posted on the class Github page after lecture

Skeleton Bot Setup: Connecting to the Scrimmage Server

Before You Code

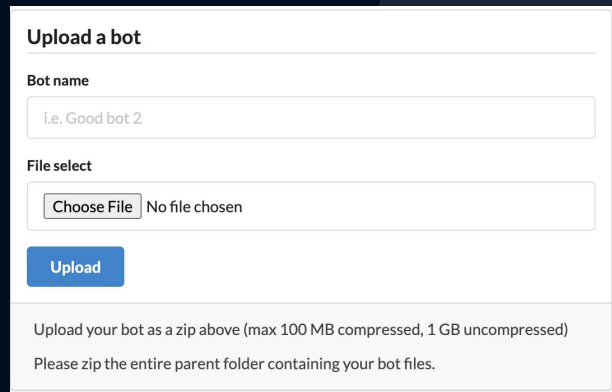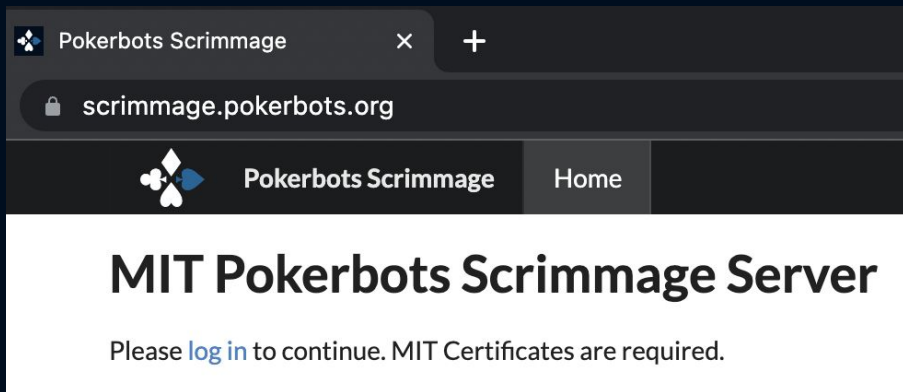See Piazza post @7 to set up your development environment for Pokerbots

Once finished, make a GitHub account to facilitate code management

Read up on using the command line and Git

Getting Set Up

Clone engine from mitpokerbots/engine-2024; create new repository for your code

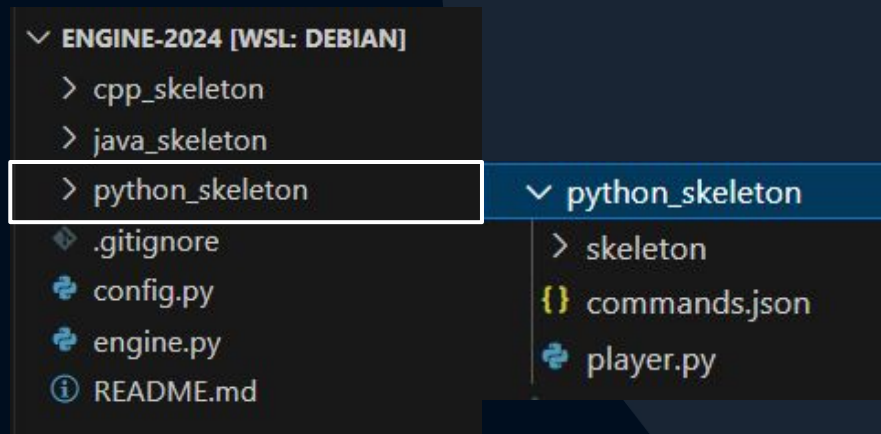Scrimmage server: download ZIP file and upload it directly.

Engine Structure

Engine Structure

- **3 Skeleton directories**
  - One for each language
  - Edit code in player.py, Player.java, main.cpp
  - Zip this for the scrimmage server
- **engine.py**
  - Core engine instructions
  - Run this to test a game
- **config.py**
  - Parameters for game

Overview of Skeleton Bot Architecture

Skeleton Bot Structure

- GameState, RoundState classes

- handle_new_round(), handle_round_over(), get_action()

- Skeleton Bot walkthrough

Coding reference-lecture-1-2024 bot

Example Bot

- We want to analyze our hole cards

- We want to raise the stakes if we win the auction

- Eventual goal: use a more advanced method to place a bid combined with more sophisticated betting logic

Live Coding Session

All code from today can be found at:

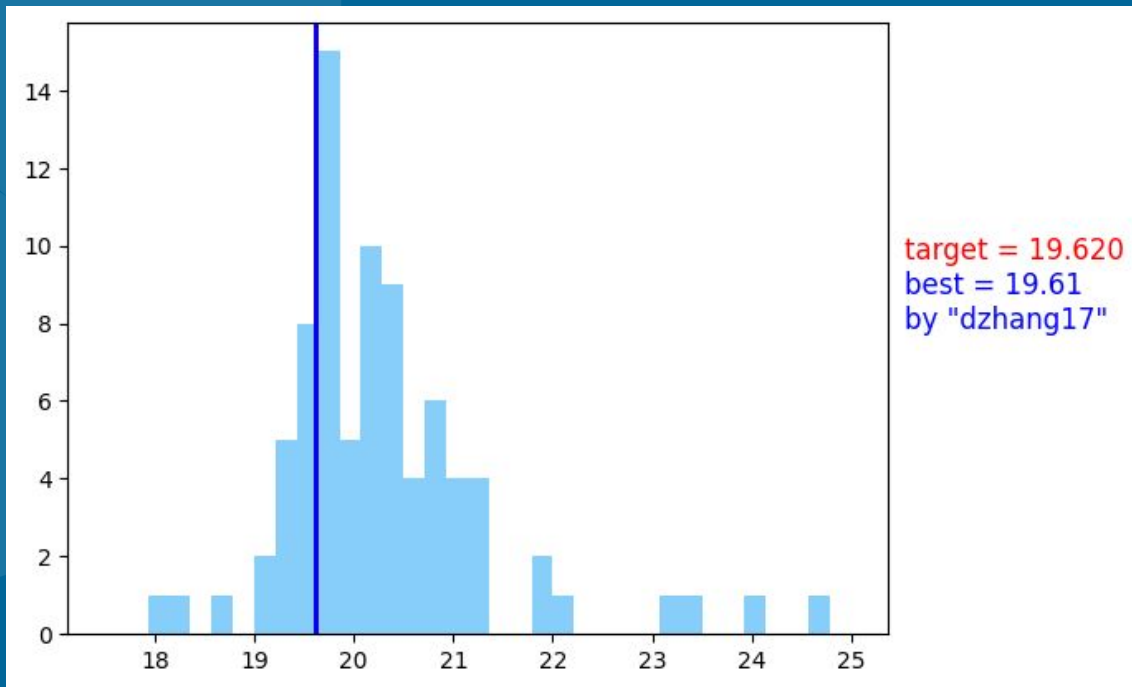github.com/mitpokerbots/reference-lecture-1-2024

Lunch 😋

- Graciously provided by GTO Wizard!
- To get lunch, just show proof that you submitted your resume at pkr.bot/drop

Giveaway Winners

We ran out of time today so we will be announcing the giveaway winners at the next lecture!

Average Age Game:

target = 19.620
best = 19.61
by "dzhang17"

Raffle Winner: kerb "huafang"

Thanks for watching!

Slides/notes will be posted on **pkr.bot/resources**

Make sure to check **pkr.bot/piazza** for updates

Lecture recording at **pkr.bot/lecture-1-recording**