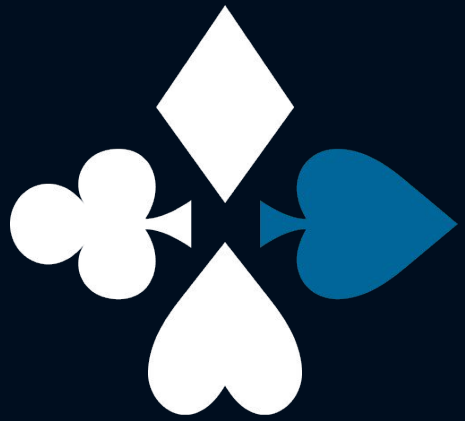
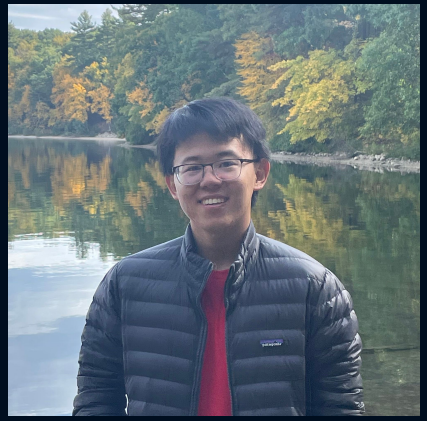


Pokerbots 2024

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

HRT

CITADEL
CITADEL | Securities

DRW

Jane Street

jump trading

TREX
QUANT

SEVEN
EIGHT
CAPITAL, LP

SIG
SUSQUEHANNA

HAPCAPITAL

CTC
CHICAGO TRADING COMPANY

2σ
TWO SIGMA

Resume Drop:
pkr.bot/drop

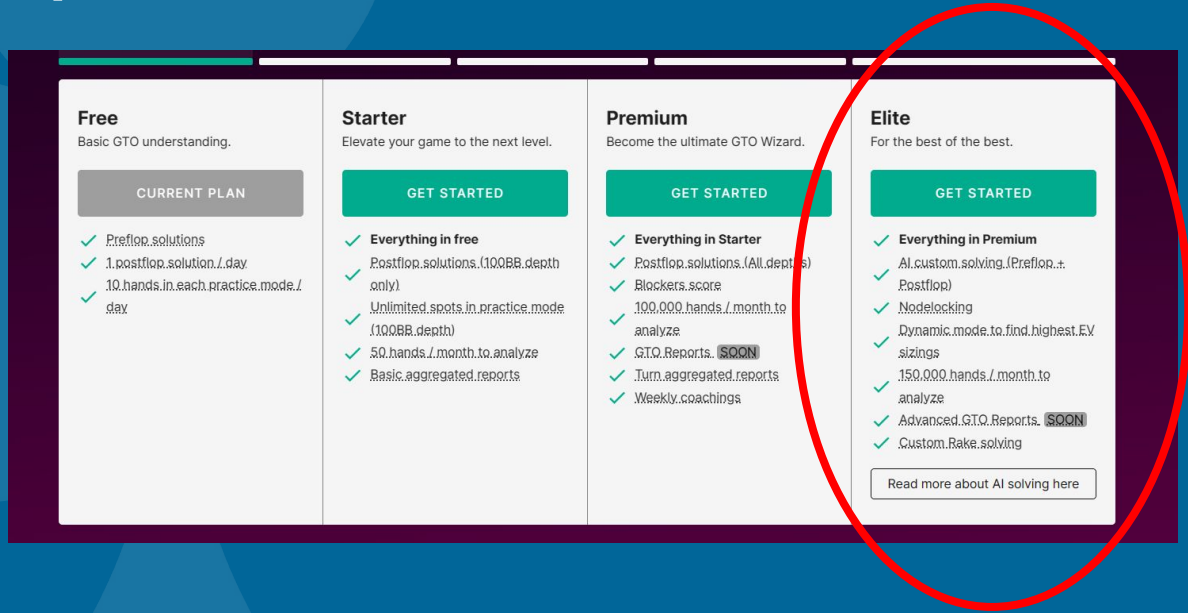
Giveaways!

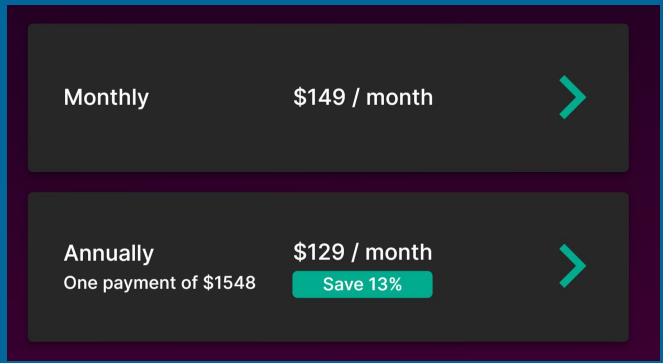
Giveaway Game: pkr.bot/age

- 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 GTOWizard 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: GTOWizard

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

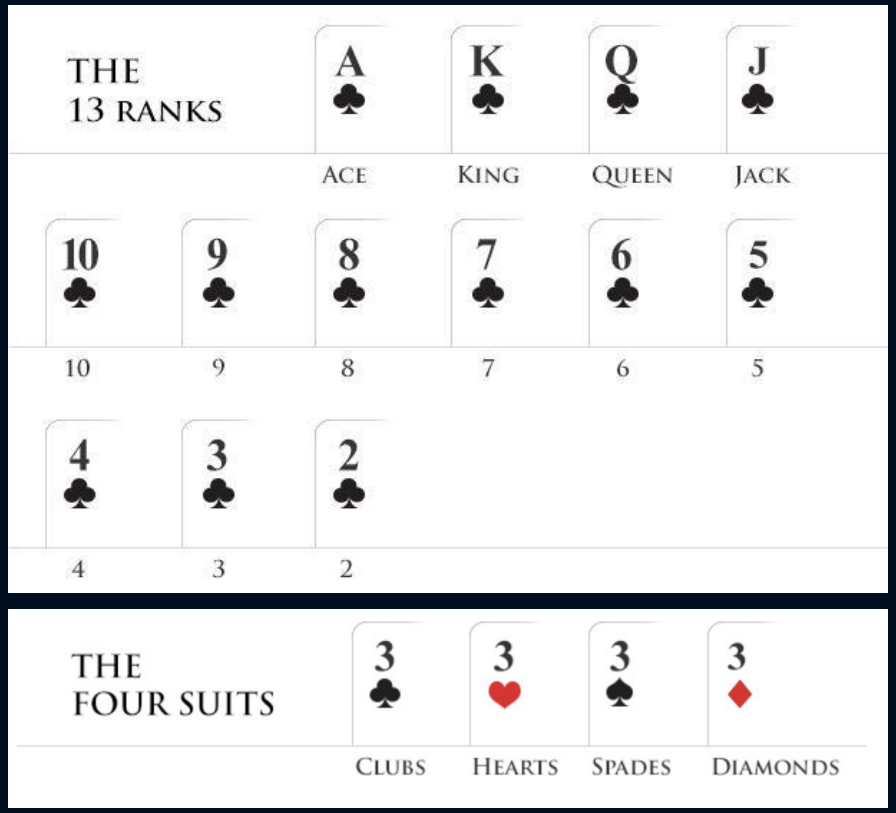
Heads-up No-limit Hold'em Poker Rules

- 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

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.

<u>GOAL:</u> 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

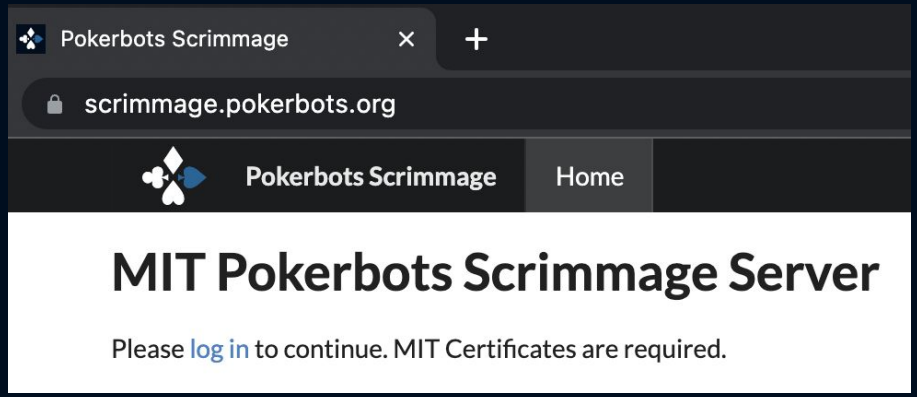
Once finished, make a GitHub account to facilitate code management

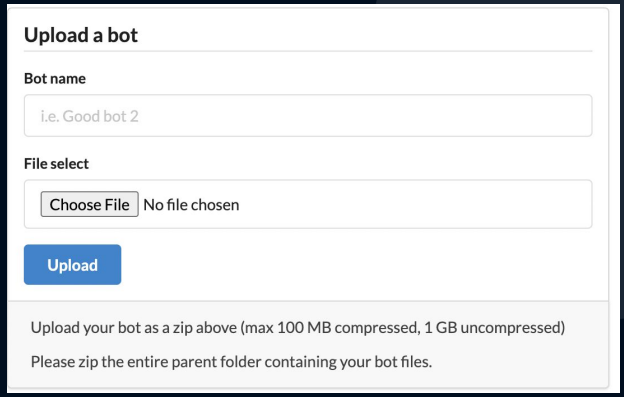
Read up on using the command line and Git

Getting Set Up

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

Scrimmage server: download ZIP file and upload it directly.

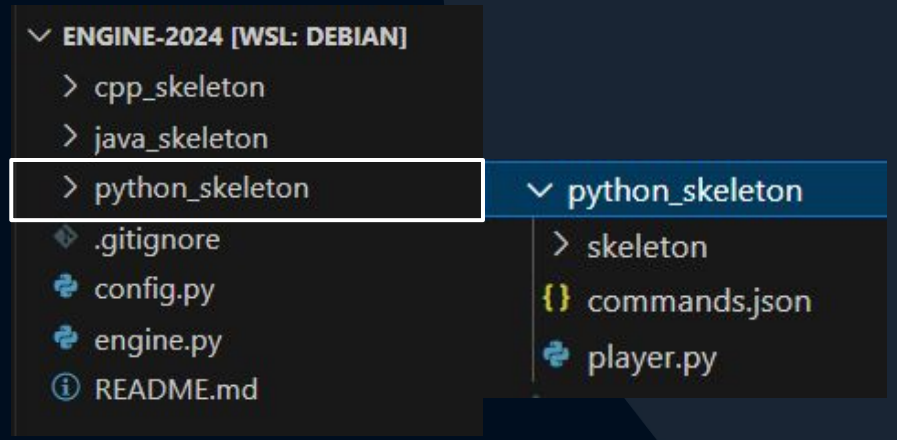




Engine Structure

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

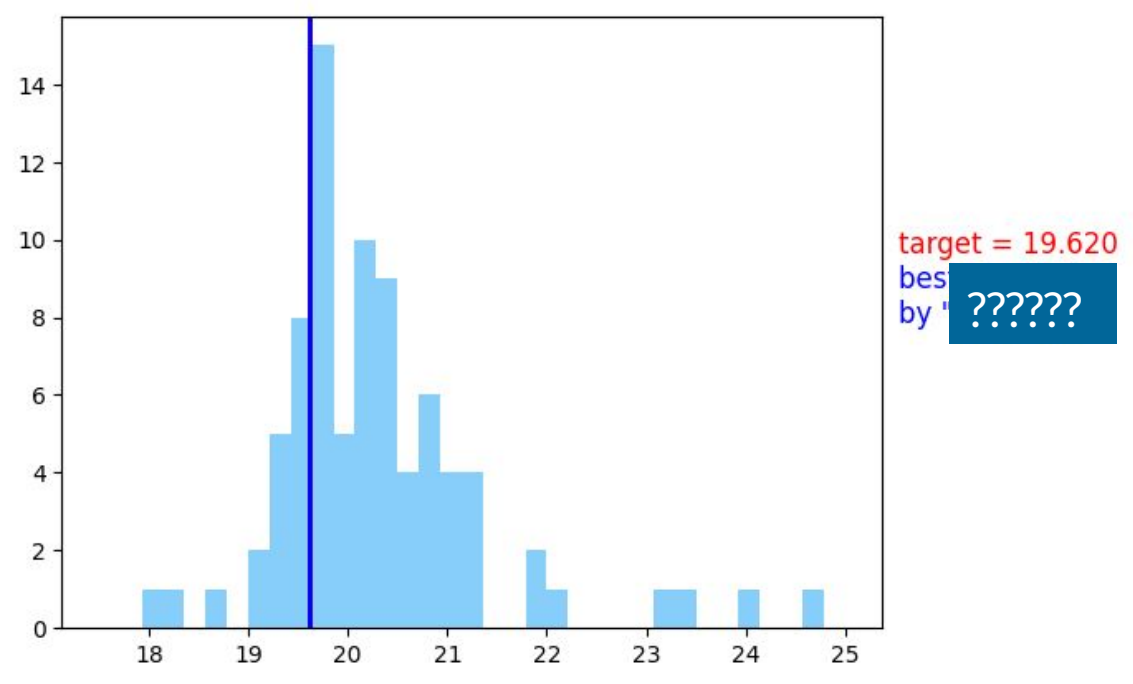
Lunch 😋

- Graciously provided by GTOWizard!
- 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:



Raffle Winner: kerb [????]

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**