

## **Project Proposal**

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**Nov. 18, 2021**

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### **Project Description:**

Python Poker is a game of Texas Hold 'em written in Python. It's just a classic game of Texas Hold 'em starting with a table of 8 players. There is the opportunity to play multiplayer, but to start with, there will be 7 bots at the table who decide on how to play based on an equation or multiple equations based on the situation.

### **Competitive Analysis:**

From my research online, I saw a good amount of implementations of this idea. One in particular had a very useful algorithm for calculating the value of hands for determining who wins the hand. I based mine off of it so at least one element of the backend of my project will be similar to it. However, what's different is that there's no graphics and purely is played in the console. Mine is different in that there is an interface and graphics to make it easier for the player(s) to play the game.

Another one was a previous TP. The only thing I was able to see was the demo on YouTube, but I got a good idea of how it worked. I believe a good amount of the complexity was that there was a way to show all the players' hands and see the correlating probability of winning for each hand. This was useful for seeing about the level of project and graphics I need to achieve by TP3. Mine will be similar, but I could see places where I can improve on various graphical elements and gameplay elements as well.

### **Structural Plan:**

This project is heavily OOP based. There are three different files, excluding the graphics package, Deck.py, Player.py, and \_\_init\_\_.py. The Deck file contains the PlayingCard class and the Deck class. A Deck has 52 Playing Card objects and the class also contains the methods needed for calculating hand strength. The Player file contains the Player class and the Bot class. The Bot class is a child of the Player class. The only difference between the two is that betting and playing is different. Otherwise they are the same. The \_\_init\_\_ file contains all the necessary elements for playing the game. The different modes for screens are contained there. The different functions necessary for the game to run in general are there. The PokerGame class is also in the \_\_init\_\_ file. This object holds all of the data for the current game being played.

### **Algorithmic Plan:**

The most difficult part of this project will be determining an algorithm for the bots to decide how they will play their hands. I plan on implementing a set of equations that are given certain information about the current hand, like the most recent bet, the combination of the cards

in hand and cards on the board (if any), and the difficulty of the bot. This set of information will be able to have the bot compute an arbitrary score which will be used to determine whether to bet, check, or fold. These equations will be probability heavy in calculating pot odds, equity, etc. Generally, they calculate the odds of winning and tell the bot what to do after that. In the future, I plan on implementing further steps to have some bots play more aggressively than others, probably with a predetermined “looseness” quantifier.

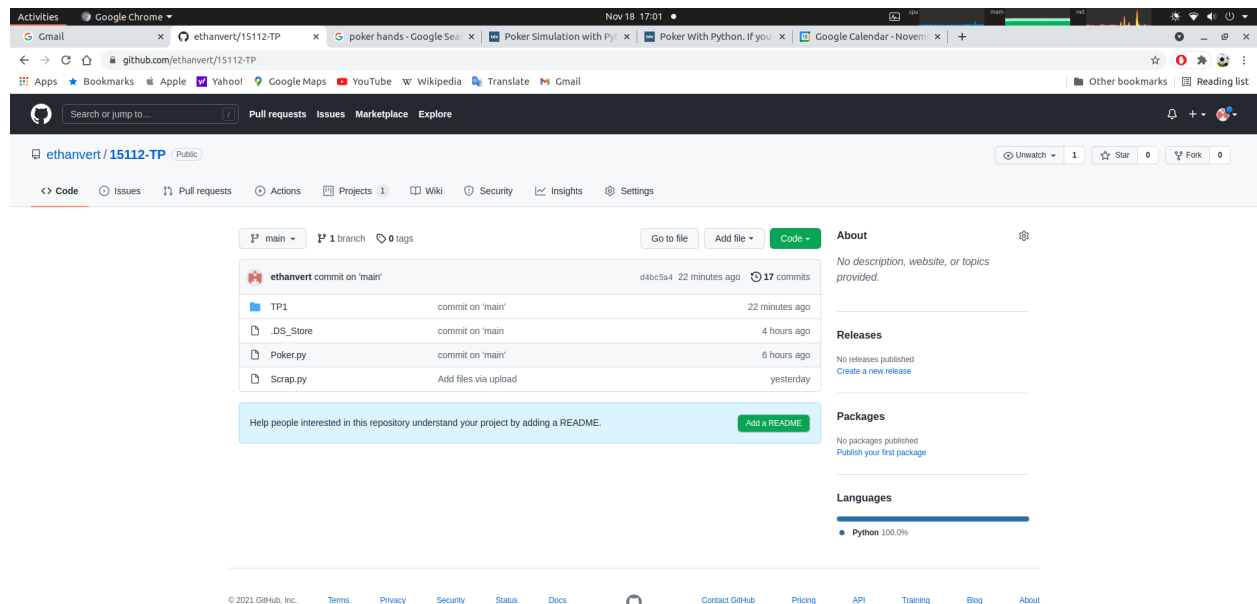
## Timeline Plan:

**The goal is to finish all of these by the date**

- Nov 18: Clean Texas Hold ‘em gameplay
- Nov 20: Probability based AI algorithm done
- Nov 22: Multiplayer option Implemented
- Nov 23: MVP
- Nov 28: Animations looking spicy & more AI types
- Nov 29: Save Game
- Dec 1: Finalize project, smooth out style and make things perfect

## Version Control Plan:

I will (and have been) backing up my code into Github. I will have folders for each stage of the TP process and generally push when I have a good amount of progress done. See image below:



## Modules:

No external modules are used in this project.

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**TP 2 Update:**

I changed the UI, bot AI, and option for multiplayer. I added buttons to the main menu and added a selection for the amount of enemies the user would like to play against. As for the bot AI, I began implementing it and it is a work in progress. It's a lot more complex than I anticipated, so the debugging process has been tough. Additionally, the multiplayer option has been scrapped since we determined that it doesn't make the most sense for multiple people being able to see each other's hands on the same screen. A complex replacement is currently TBD.