

Good to know before MIT 15.S50 begins

Poker / Texas Hold'em Rules

- Obviously, you should know the ranking of the poker hands, and how cards are dealt in texas hold'em. Know the terms **straight flush**, **four-of-a-kind** (or quads), **full house** (or boat), **flush**, **straight**, **three-of-a-kind**, **two-pair**, **pair**, **high card**; know **preflop**, **postflop**, **flop**, **turn**, **river**.

Betting Rules

- You should know how betting in poker works. Understand the terms **bet**, **raise**, **call**, **check**, **fold**, and **all-in**. **Check-raising** means checking and then later raising in the same betting round.
- Know what a **blind** is. There will be a **small blind** and a **big blind** each hand.
- Know that preflop, the big blind is last to act. On each postflop betting round, the small blind is first to act, and the **dealer** is last to act. Know when a betting round ends (eg. if all players check, then the betting round ends).
- Other good terms to know for positions are **cutoff** (right of the dealer), **hijack** (right of the cutoff), **under-the-gun** (the person left of the big blind; first to act preflop).

Mathematical Concepts

I will run through an example to illustrate the terminology you should know.

- Suppose the pot has \$500 in it, and your opponent bets another \$250.
- You may call his \$250, in which case cards are flipped over:
 - If your cards beat his, you win the whole pot of \$500 + \$250 (that he just put in) + \$250 (that you just put in) = \$1000. You profited \$750 from this gamble.
 - If his cards beat yours, you get \$0 back. You lost \$250 from this gamble.
- Or, you can fold, resulting in a payoff of \$0.
- In this example, we say that you are getting **3-to-1 odds** to call. When you win, you profit 3 times what you risk losing.
- Suppose the probability that your cards beat his is 10%. Then your **expectation** for calling is $0.1(+750)+0.9(-250)=-150$. By calling, you expect to lose \$150 in the long run. Your expectation for folding is always \$0. Therefore, you should fold, since your expectation for calling is negative.
- Suppose the probability that your cards beat his is 50%. Then your expectation for calling is $0.5(+750)+0.5(-250)=250$. By calling, you expect to earn \$250 in the long run. Therefore, you should call, since your expectation for calling is positive. If you were to play this game a large number of times, your average payoff per game would be \$250, with 100% certainty. This is called the **Law of Large Numbers**.
- We say that a gamble has **high variance** if it takes a large number of trials to converge to the expected average payoff per game. A gamble has **low variance** if it converges quickly. In general, high variance means high risk, and high risk usually means higher reward, ie. higher expectation.