Good to know before MIT 15.550 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.