Answers to MIT 15.S50 Homework 1

1) KK, KJ, KT, and K7 (any suits)

2) 4/52 is the probability of getting the first ace; 3/51 is the probability of getting the second ace after getting the first ace. Multiply those together to get 1/221 or approximately 0.45%.

3) Intuitively, the best strategy is to raise and attempt to “steal” the blinds with any 2 cards, since the blinds are only putting up resistance with AA, which occurs with a very small probability (calculated in Question 2). However, if they do put up resistance, then we should only continue on flops where we can beat AA, since we know they have AA.

4) At this point in the hand, 7 cards (the 2 cards in each player’s hand, and the 3 flop cards) have been exposed. Out of the 45 cards remaining in the deck, 6 are “good”, 9 are “bad”, and 30 are “neutral”. We are interested in the probability of hitting at least one good card without hitting any bad cards.

This can occur if we hit two good cards, or one good card and one neutral card. The probability of hitting two good cards is 6/45*5/44=1/66. The probability of hitting a good card and a neutral card is 2*(6/45*30/44)=3/55. Add these fractions to get 13/66.

To construct an example, think of where the numbers 9 or 6 could come from. The 9 “bad” cards could correspond to our opponent having 4 to a flush, and needing 1 of the remaining 9 from the suit. The 6 “good” cards could correspond to one of 6 outs to hit an open-ended straight draw (after subtracting the 2 outs which would complete a flush). A concrete example is:

Us: 9c 8c
Opponents: Kh Ks
Board: Th 7h 2h