Adrian Ridder

CS461

9/10/18

Program 1

As would be anticipated, the higher the sample size, the better the results. When the sample was set to only 20 hands, the results were not very good. Here are the results of one test:

Expected win rate at 20: 0.32075499999999996 Actual win rate: 0.164 Error: 0.15675499999999995

Expected win rate at 100: 0.3185570000000001 Actual win rate: 0.164 Error: 0.15455700000000008

Expected win rate at 200: 0.31346550000000006 Actual win rate: 0.164 Error: 0.14946550000000006

The error rates here are rather enormous, much worse than it should be. My best guess is that since the computer doesn’t choose the best cards from the community cards when we do the rollout (20/100/200), it is highly overestimating the odds of success since the opponents will always choose the best two community cards in the actual hands. Now let’s see how it fairs when the rollout chooses the best community cards instead of drawing randomly:

Expected win rate at 20: 0.33377999999999997 Actual win rate: 0.168 Error: 0.16577999999999996

Expected win rate at 100: 0.3200380000000001 Actual win rate: 0.168 Error: 0.1520380000000001

Expected win rate at 200: 0.32240549999999996 Actual win rate: 0.168 Error: 0.15440549999999995

This is the error rates with the old method of computing guesses. They all sit at right about .33. This might be offset, however, by the speed increases. The other method is much, *much* slower. I don’t have exact measurements, but what took the above portion took the below at least 30 minutes. Here it is:

Expected win rate at 20: 0.114005 Actual win rate: 0.2 Error: 0.08599500000000002

Expected win rate at 100: 0.11138559999999999 Actual win rate: 0.2 Error: 0.08861440000000002

Expected win rate at 200: 0.11280865000000002 Actual win rate: 0.2 Error: 0.08719134999999999

As can be seen, the results here are much better. Not perfect by any means, but still much better than before. Where the random community card strategy made the rollouts overestimated their respective expected values, the best community card strategy underestimated how often we would win by a significant portion. The error for the second strategy, however, is much lower than the first. They’re nearly halved, which is quite striking. The difference in run time is rather significant, though I could make improvements to the code to speed things up somewhat. By how much is a big question.