Assignment 3 for CSE 415, Winter 2021, University of Washington

I. Group Members:

Partner 1 Name: Qiaoxue Liu

Partner 2 Name: Sheng Yu

II. Deterministic Simplified Backgammon Agent

1. Who did what for this agent:

Sheng Yu started the implementation with a draft on each of the required functions. Then, Sheng Yu and Qiaoxue Liu discussed together and fixed the staticEval implementation. We finalized the implementation together in a Zoom meeting.

2. How the static evaluation function works:

Firstly, we want the static evaluation to return large numbers for W and small numbers for R. If white checkers on index i, then we have the number of white checkers to multiply $10(i + 1)$. Since the indexed of the white checkers' base are from index 18 to 23, this will assure the more white checkers near their home base, the higher static evaluation will be. Then for red checkers, we have the number of red checkers on index i multiply $5(i - 24)$. Since red checker's home base are from index 0 to 5, the more red checkers' near home base, the more negative the static evaluation will get. Then, when we have white checkers on the bar, we will multiply 100 for the number of it, and have our evaluation value minus that number. Since white checker on bar is bad for white side, and remember the larger evaluation value is, the more beneficial toward the white side. We minus the number since it is a disadvantage for the white side. Then we did the reverse for red checkers on bar, reason is the same. Lastly, we want big reward for white

checkers to bear off the board. For each white checker removed from the board, we add 1000 to our evaluation. We minus 500 for each red checkers removed from the board.

3. Any special considerations for Alpha-Beta pruning, such as ordering of successors best-first:

We only implemented the basic required function for Alpha-Beta pruning. It works perfectly. But we will spend more after class time to try those out. Both of us have a relatively busy schedule this quarter.

III. Stochastic Simplified Backgammon Agent

Who did what for this agent:

After implementing the first agent, this one is very straight forward. We discussed it together, then Sheng Yu implemented this part. Sheng Yu simply followed the pseudocode on the Wikipedia page given on the assignment page.

IV. Partnership retrospective

1. What issues you faced or didn't face related to the partnership.

The issue mainly occurred in part 1 when we implement the deterministic agent. After the first submission, only 16 out of the 40 points acquired. Later we found out that the problem was inside the minimax and alpha_beta function, the move generator was not called so that all the movs examined in minimax and alpha_beta was ‘p’ which basically meaningless. We added the line to initialize the move generator inside the minimax and alpha_beta function, and the problem was resolved.

2. Lessons you learned as a result of working in this partnership:

-- Qiaoxue Liu

I learned that working in partnership is a great opportunity to learn from the classmate and ideas from partners often lead me to the aspects that I have never thought about. Also, with this homework, I have more practice in interpreting code wrote by others as well as testing and integrating it my own thought into it.

-- Sheng Yu

It is always good to start on working homework early. I did not even know what to start at the beginning. But after talking and exchanging ideas with Qiaoxue Liu, things start to become clear. Teamwork makes the job much easier than working alone. Also, it is usually good to just take a break when we stuck in one place for a long time. It really helps!