

Question 2:

Given: Known the opponent throw list; times we will throw out at paper, scissor, rock.

Aim: Win as much as possible

Solution:

We know the opponent throw list, check how many times of each paper, scissors, rocks of your opponent have, then find the most type, least type and normal type among the paper, scissors and rocks then try to reserve as many most type as possible to counter as many as possible throws of type from your opponent; reserve as many normal type as possible to counter as many as possible throws of type from your opponent; reserve as many as possible least type to counter as many as possible throws of type by your opponent. If you run out of times to counter opponent, then try as much most type as possible to be the same with the opponent type. Then try as much normal type as possible to be the same with the opponent type. Then try the least to be the same with opponent. This is using the greedy method to find out the most cases that we can win partially.

Prove to be optimal:

Assume that the original method is not optimal. So from these three sets $\text{Rock}\{R_0, R_1, R_2, R_3, \dots, R_n\}$, $\text{Paper}\{P_0, P_1, P_2, P_3, \dots, P_n\}$, $\text{Scissor}\{S_0, S_1, S_2, S_3, \dots, S_n\}$ that our enemy will throw, If we do not try to counter the enemy as much as we can at early stage, then this new result compare to the result that we get from greedy method, we can find out that this result will definitely have a higher amount of draws or have a higher amount of loses, since there we not try to counter enemy, then there must be a round that we could win, but we didn't. This is contradicted to our assumption since there are no way to get a higher amount of wins. So that greedy method is optimal.