

# COMP3121 Homework Q2

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## 1 Answer

In this question, we have to prioritize wins, then draws and then losses. What that means is that when the opponent throws a hand, we check our available hands and throw a hand which will let us win that round. If that's not possible (i.e there is no hand available which will make us win the round) we will throw a hand which will draw that round for us and when even that's not possible, we will throw a hand that will make us loose the round. This way we are minimising our losses by either winning or drawing.

We can prove this solution is optimal by 'greedy stays ahead' strategy. Lets assume that we have a set  $S$  of best possible hands to gain the highest points that are optimal and let  $G$  be the set of hands we get from greedy. As we go through each round, if there is a round that is won in  $S$  and lost in  $G$  then this must be a contradiction since we are playing our most optimal hand in each turn, if it was possible to win that round in greedy, we must have won it. Further more during each round we play a hand that will make us win, if winning is not possible then draw and if even that is not possible then a loss. This way we are throwing our most optimal hand each round. This proves that the greedy algorithm will either stay ahead in each round or be equal to the optimal solution.