For each of the two puzzles, look for or come up with one or two heuristics that help you reach the solution faster and implement them. Then answer the following questions.

Peg Solitaire

***Heuristic 1***

In the A\*- and the Greedy-Best-First-Search we used the number of remaining pegs on the board as the heuristic function. This number is equivalent to the number of moves that are left to reach a goal state (in the ideal case).

1. Are they admissible/consistent? Why or why not?

The heuristic is admissible because the cost (here equal to the number of moves) to reach the goal will never be higher than the current number of pegs on the board, because it is part of the games’ rules that you can’t move without removing a peg.

1. Does it help or not? If there is a gain, is it in the cost of the search, in the cost of the solution found, both , neither? Is there a tradeoff? Do a little analysis and discuss your results.

No improvement in the cost of solution, since the cost to reach the goal state is per definition in this game always the same. The cost ( assuming a step cost of 1) would always be equal to the number of pegs on the initial board configuration – 1.

***Heuristic 2***

We could also have a Heuristic that tries to avoid isolated pegs (meaning pegs that are surrounded by empty holes)

We could also use a heuristics, which would make moves towards the middle of the board game preferable. This would avoid to be left with the corner pegs.

Missionaries and Cannibals

The heuristic function in this example would be the number of people on the initial shore-1. This heuristic is admissible, because every boat trip over the river (except the last one) would result into at most one person to change the shore, since always one person has to row the boat back.

This heuristic function has a local minimum because every return trip would increase h(n) instead of decreasing our function.