

Q5.

(i) Because, we only need to append an unexplored state ~~the~~ to the Fringe when it's not the target. Otherwise we could add/explore the same state multiple times, which can play a move back to the last state. We need to make sure we are keeping moving forward.

(ii)

It's around 22 moves on average.

We can generate ~~9~~ a program using `stl-search.py`, with  $9!$  different positions, ~~summing~~ summing all the moves of solvable ~~moves~~ puzzles then divided by the # of all solvable cases ( $9!/2$ ), we could see it's around 22. Besides,  $9!$  is a lot positions to run, I picked few thousands of them ~~sum~~ randomly to estimate the over all solvable puzzles.