Assignment: AIR4

* TITLE: Hill climbing.
* PROBLEM STATEMENT: Use heuristic search to implement Hill-Climbing Algorithm.
* OBJECTIVE: To understand & implement Hill Climbing Algorithm.
* OUTCOME: Understood & implemented Hill Climbing Algorithm.
* SOFTWARE AND HARDWARE REQUIREMENTS: Python 3, UNIX/LINUX based OS, 64 bit CPU, 8GB RAM.
* THEORY:

In numerical analysis hill climbing is a mathematical problem optimization technique which belongs to the family of local search. It is an iterative algorithm that starts with an arbitrary solution to a problem, then attempts to find a better solution by making an incremental change to solution. If change produces a better solution, another incremental change is made to the new solution, until no further improvements can be found.

It is a heuristic search algorithm, Be given a large set of inputs & a good heuristic function tries to find a sufficiently good solution to the problem.

"heuristic algorithm 'search' implies that optimal solutions are not guaranteed. However, a good sol" will be reached in reasonable

A heuristic function will rank all the possible alternatives at any branching step in a search algorithm, based on available information that is, it helps the algorithm select the best route out of possible routes.

Hill Climbing Algorithm is a variant of the generate & test algorithm ; it also uses a greedy approach.

Simple Hill Climbing examines the neighbouring nodes one by one, and selects the first neighbouring node which optimizes the current cost as next node.

The algorithm for simple hill climbing is as follows:

1) Evaluate the initial state. If it is a goal state, then stop & return success. Otherwise, make initial state as current.
2) Loop until soln state is found, or there are no new operations present which can be applied to current state.
   i) select a state that has not yet been applied to current state & apply it to produce a new state.
   ii) a) If it is better than the current state, then make it current state & proceed further.
   iii) b) If it is not better than current state then continue in loop
   c) If current state is a goal state, stop & return success.
3) Exit.

* CONCLUSION:

Successfully implemented Hill Climbing Algorithm.