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LP1 - AIR4

* Title: Hill Climbing

* Problem statement:
Use heuristic search techniques to implement Hill-Climbing Algorithm.

* Objective:
To understand and implement Hill Climbing algorithm.

* S/w and H/w requirements:
i) 64 bit processor
ii) RAM
iii) Linux OS
iv) Pytho 3

* Theory:
In numerical analysis, hill climbing is a mathematical optimization technique which belongs to the family of local search. It is an iterative algorithm that starts with an arbitary solution to a problen, then attempts to find a better solution by making an incremental change to the solution.
If the 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, and given a large set of I/P's and a good heuristic function, it tries to find a sufficiently good solution to the problem. However, this solution might not be the global optimum.

Heuristic search implies that optimal soln's are not guaranteed, however a good soln will be reached in a reasonable time.

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

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

* Algorithm:

① Evaluate the initial state. If it is a goal stat then stop and return success. Otherwise, make the initial state as current state.

② Loop until the solution state is found or there are no new operators present whi can be applied to the current state.
i) Select a state that has not been applied yet to the current state and produce a new state.

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iii) Evaluate new state by -

a) If the current state is a goal state, stop and return success.

b) If it is better than the current state, then make it as the current state and proceed further.

c) If it is not better than the current state, then continue in the loop until a solution is found.

(3) Exit

* Conclusion:

From this assignment, I was able to understand the concept of Hill-Climbing algorithm and hence implement this assignment.