Date:-

Assignment No - B4.

Title:- Hill Climbing.

Problem Statement:-
Use heuristic search to implement Hill - Climbing Algorithm.

Objective:-
To understand and implement Hill Climbing Algorithm.

Outcome:-
To understand and implemented Hill Climbing Algorithm.

Software & Hardware Requirements:-
Python 3, code editor, UNIX/LINUX, based OS, 64 bit CPU, 8GB RAM.

Theory:-
In numerical analysis, hill climbing is a mathematical optimization techniques 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 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 inputs and a good heuristic function it tries to find a sufficiently good solution to the problem. However this problem might not be the global optimum.

'Heuristic' 'search' implies that optimal solutions are not guaranteed, however a good solution will be reached in a resonable time.

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 the algorithm select the best route out of all possible routes.

Hill Climbing Algorithm is a variant of the generate and 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 and return success. Otherwise make initial state as current state.

2) Loop until the solution state is found or there are no new operators present which can be applied to the current state.

  i) Select a state that has not yet been applied to the current state and apply it to produce a new state.

  ii) 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 current state & proceed further.

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

3) Exit.

Conclusion:-

Successfully implemented Hill Climbing Algorithm.