hill climbing Algorithm in AI.

> It is a local search Algorithm.

> It continoously moves in the direction of increasing value to find the peak of the mountain.

> It finds the best solution to the problem.

> It terminates when it reaches Peak value.
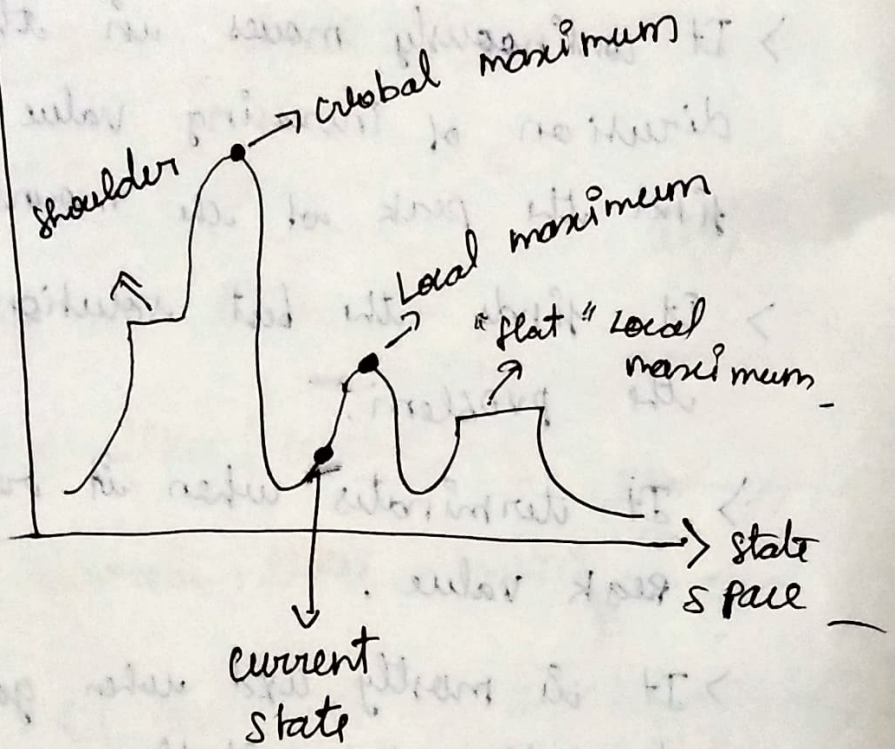
> It is mostly used when good heuristic is available.

Features of hill climbing:

> Generate

> Greedy approach

> No back Tracking.

State - space diagram For hill climbing.

Objective
function.

Local Maximum :
  > It is a state which is better
    than neighbor state.
  > But there is also a change
    to another state which is
    higher than it.

Global Maximum :
  > It is the best possible
    state of state space.

> It is a higest value.

Current state :

> It is a state in a diagram where the agent is currently present.

Flat :

> It is flat space.
> All the neighbor states are flat in this state.

Types of hill climbing Algorithm :

> simple hill climbing.
> steeptest -Ascent hill-climbing.
> Stochastic hill climbing.

1. simple hill climbing :

> It is a simple way to implement a hill climbing Algorithm.

> It checks the neighbor node and
Select the first one as the
Current state.

> Checks the next state if it is
better that the current state then
move ito the next state.

Algorithm:

1. Create current, neighbor, Goal node.

2. If current node is the goal node
then returns.

3. Else current node <= neighbor node
move ahead.

4. Loop until the goal node is
reached.

2. Steepest - Ascent hill climbing:

> It is a variation of simple hill
climbing Algorithm.

> It checks all the neighbouring
nodes of the current state.

> And select one of the neighbor node which is closest to the goal state.

> It consumes more Time.

Algorithm:

1. Create a Current, Goal node.

2. If current node = Goal node, return goal node. and Terminate.

3. Loop until a better node is not found to reach the solution.

4. If there is any better node is present, expand it.

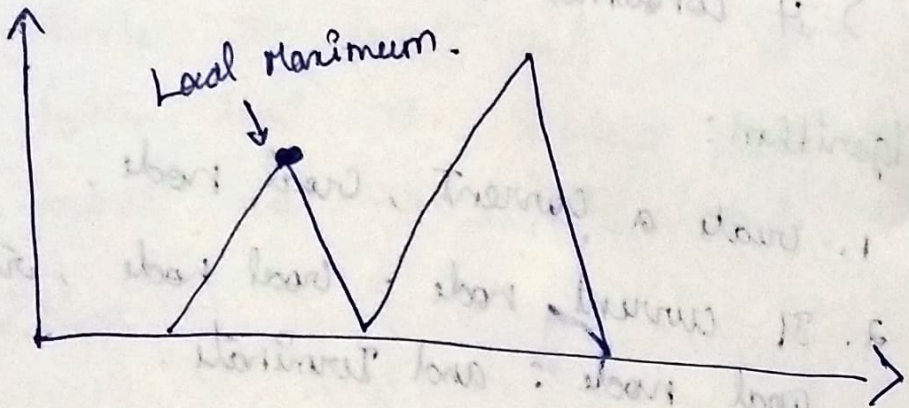5. When the goal is reached, return goal and Terminate.

3. Stochastic hill climbing:

> It does not focus all the nodes.

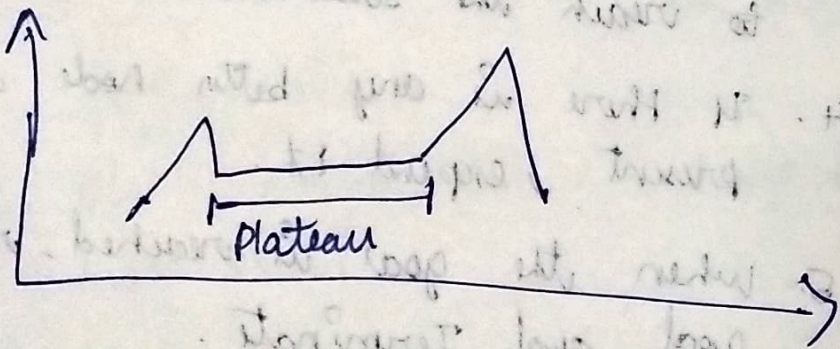> It selects one node at random and decides whether it should be expanded or search for a better one.
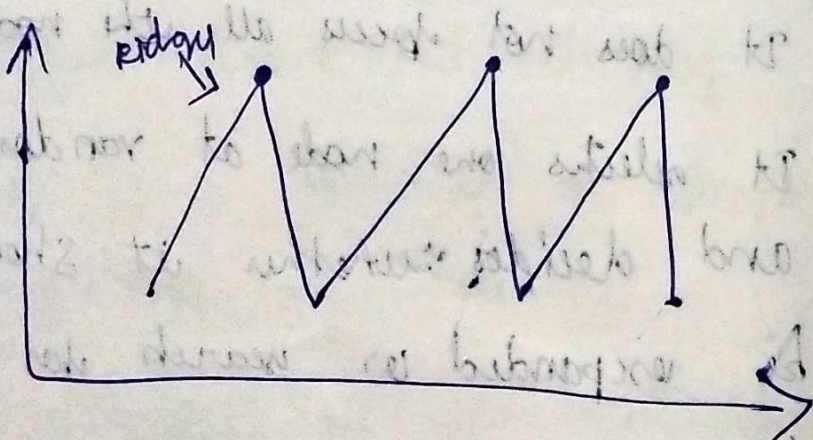
Problems in Hill Climbing Algorithm:

1. Local Maximum:

Local Maximum.

2. Plateau:

Plateau

3. Ridges:

Ridge

Simulated Annealing:

> It is similar to the hill climbing Algorithm.

> It yields both efficiency and completeness

> In mechanical term Annealing, is a process of hardening a metal or glass to a high temperature then cooling gradually, so this allows the metal to reach a low-energy crystal state.

> Same process used in simulated Annealing. In which the Algo-picks the random move, instead of picking a best move.

> If random move improves the state then follows the same path, otherwise. It follows a path which is less than probability of 1.