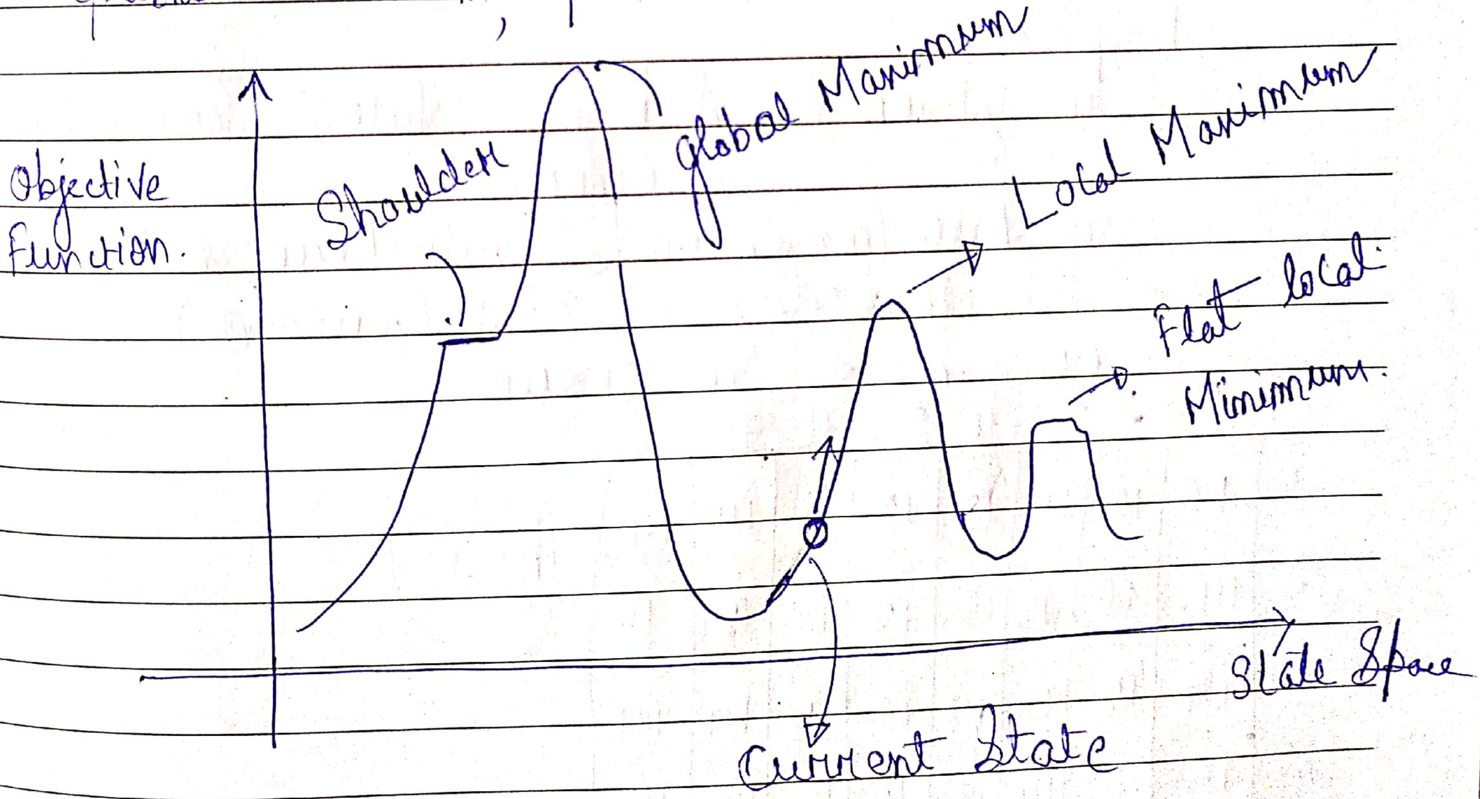
Notes **Local Search Algorithms :→** Date | | | | |

* no Path Maintenance
* operates on a Single current state
* Not Systematic
* Useful to solve the pure optimization Problem
* Find the best states according to an objective function heuristic cost function.

State Space landscape

Global Maximum, Global Minimum.



* Complete State formulation.

Ex: 8- Queens Problem.

Algorithm:

→ Returns a State which is local maxm

Hill_Climbing (Problem)   Steepest Ascent

inputs: Problem
local Variables: current_node
                 neighbor_node

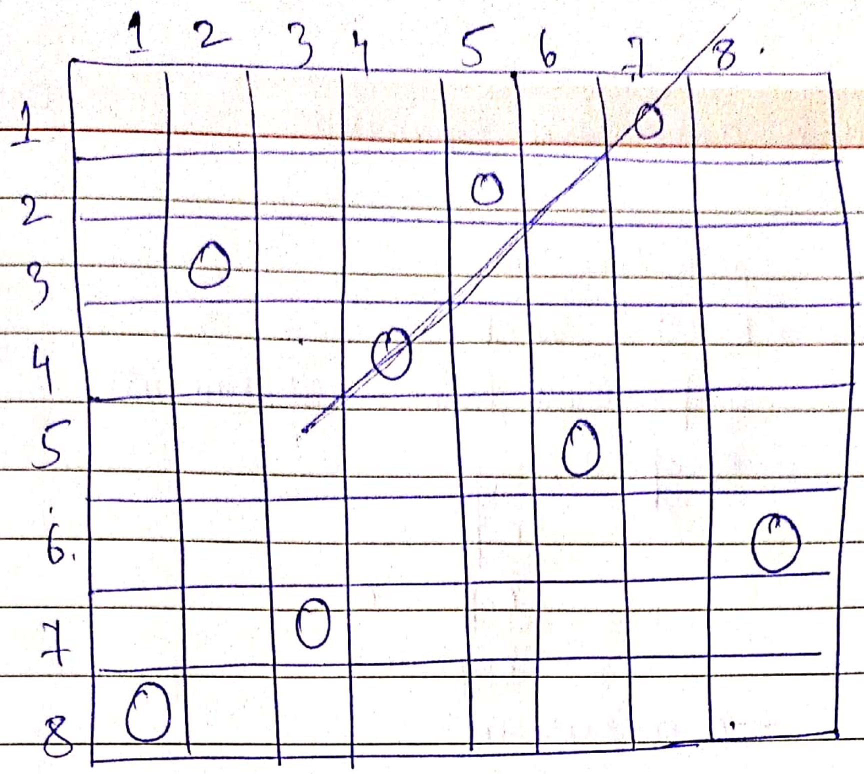
current ← Initial_State (Problem)
Loop do
  neighbour ← A highest valued successor of current
  if Value(neighbour) < Value(current)
     then return State(current)
  current ← neighbour.

	1	2	3	4	5	6	7	8
1	18	12	14	13	13	12	14	14
2	14	16	13	15	12	14	12	16
3	14	12	18	13	15	12	14	14
4	15	14	14	●	13	16	13	16
5	●	14	17	15	●	14	16	16
6	17	●	16	18	15	●	15	●
7	18	14	●	15	15	14	●	16
8	14	14	13	17	12	14	12	18

$h = 17$.

Notes

Date



Hill climbing : Greedy local search.

Problems : →

* Local Maxima
* Ridges.
* Plateaus

* Side-ways moves
* Stochasistic hill climbing
* First choice " "
* Random Restart hill climbing

Artificial Intelligence :→

1. Simulated Annealing :→

Hill climbing + Random walk

Annealing :

metals or glass → Cool (gradually)

heat to a high temperature

Lower Energy Crystalline States

2. gradient Descent (Minimizing the cost)
3. Example of the ball on a bumpy Surface.
4. SA Instead of the best move pick the random moves

If the move improves the situation, then Accepted

Else

Accept the move with Probability less than 1

The Probability goes down, when the temperature goes down.

Algorithm:

SA(Problem, Schedule) → Returns a State

Current ← Initial mode

for t ← 1 to ∞, do

T ← Schedule [t]

T = temperature prob. controlling the downward ?

if T = 0, then return current

next ← random_Successors (current)

ΔE ← Value [next] − Value [Current]

if $\Delta E > 0$, then current ← next

else

current ← next only with probability $e^{\Delta E / T}$