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(7) Compare BFS over DFS with example.

=>

→ BFS stands for best first search and DFS stands for Depth first search.

→ BFS uses Queue ↓data structure for finding the shortest path. and DFS uses stack data structure for finding path.

→ BFS can be used to find single source shortest path in an unweighted graph because in BFS, we reach a vertex with minimum numbes of edges from a source vertex.

→ In DFS, we might traverse through more edges to reach a destination vertex from a source.

→ BFS is more suitable for searching vertices which are closes to the given source.

→ DFS is more suitable when there are solutions away from source.

→ Time complexity of BFS is O(V+E) when Adjecency list is used and O(V²) when Adjecency metrix is used.

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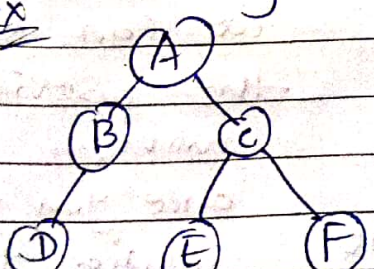

BFS:- A B C D E F

DFS:- A B D C E F.

→ Best first search more efficiet when compared to DFS.

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→ Best first search can switch between BFS and DFS, thus gaining the advantages of Both.

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(1) Towes of hanoi :-

Thsee sules in towes of hanoi :-
(1) ony one disk can be moved at a time
(2) Each move consist of taking the uppes disk from one of the stacks and placing it on top & anothes stack In othes coosds, a disk can only be moved if it is the uppes most disk on the stack.
(3) No longes disk may be placed on top of a smallest disk.

⇒ seven psoblem chasacteristics :-

	Psoblem chasacteristic	satisfied	
(1)	Is psoblem decomposables	No	one game have single solution.
(2)	Is the psoblem universse ?sedictable	yes	we can psedict aboat the solution.
(3)	can solution steps be ignosed os undone ?	yes	we can undo the psevious move.
(4)	Is a good solution absolute os selative	absolute	once you get one solution to do not need to bothes about othes solution.

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(5) Is a solution a state or path?	path	a path to a state = you have perfect rules for problem, no need to worry about logic of words.
(6) what is the sake of knowledge?	Need Knowledge	lot of knowledge helps to constrain the search for a solution.
(7) Does the task require interaction with a person as human?	No	conversational in which there is intermediate communication between person and computer either to provide additional assistance to the computer In Towes of Hanoi additional assistent is not required.

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(6) Hill climbing :-

→ Hill climbing algorithm is a local search algorithm which continuously move in the dires of increasing elevation value to find the peak of mountain or best solution of problem.

→ Hill climbing is a technique to optimize the mathematical problem.

ex

Hill climbing algorithm is travelling salesman problem in which we need to minimize distance travelled by salesman.

→ it is also called as greedy local search as it only looks at its immediate neighbour.

→ A node of hill climbing has two components state and value. It is mostly used when a good heuristic is available.

(+) limitations :-

⇒ local maxima : Hill climbing algorithm reaching on a local maximum value gets drawn towards peak and gets stuck there.

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=> Ridges: these are sequences of local maxima making difficult for algorithm to navigate.

=> plateaus:- this is a flat-state-space region As these is an uphill to go, algorithm often gets lost in the plateau.

=> ways to overcome these issues:-

→ stochastic hill climbing selects at random from uphill moves.
→ first-choice climbing implements the above one by generating successors randomly until a better one is found.
→ Random-restart hill climbing searches from randomly generated initial moves until the goal state is reached.

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(8) Cryptarithmetic problem:

C_4	C_3	C_2	C_1	
	S	E	N	D
+	M	O	R	E
M	O	N	E	Y

Character	Code
S	9
E	5
N	6
D	7
M	1
O	0
R	8
Y	2

		1	1	
	9	5	6	7
+	1	0	8	5
1	0	6	5	2

S + M = MO ⇒ 9 + 1 = 10

F + O = N ⟶ (crossed) 5 + 0 = 5

(1) ← carry
E + O = N ⟶ 5 + 0 = 6

N + R = E ⟶ (crossed) 6 + 8 = 14

(1) ← carry
N + R = E ⟶ 6 + 8 = 15

D + E = 4 ⟶ 7 + 5 = 12

1 + E = N
D + E = 10 + Y
If Y = 2,
D = 5 + 2
D = 7

SEND
+ MORE
MONEY