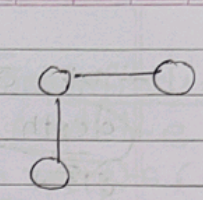
AI
practical - I
DFS & BFS.

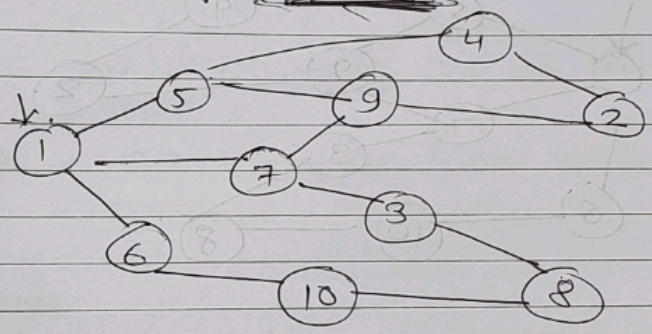
The process of visiting (exploring) a graph for processing is called graph traversal

① BFS :- Breadth first search.



- BFS is a graph traversal algorithm that explore all nodes at the present depth level before moving on to nodes at the next depth level. (level wise node explore करते)
- It uses a queue data structure.
- Time complexity = O(V+E)

eg:



BFS :-

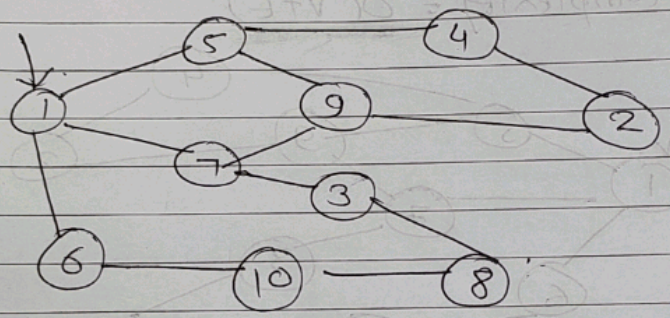
1	5	6	7	4	9	10	3	2	8

② DFS : (Depth first search).

- DFS is a graph traversal algorithm that explores as far down a branch as possible before backtracking.
- It uses a stack, but recursive Implementation. It uses the call stack.
- Time complexity : O(V+E)

- DFS हे graph traversal साठी वापरले जाते. पण ते depth wise काम करते - म्हणजे एका path वर शेवट होईल तितके खाली जाते आणि मग परत backtrack करते
- हो stack वापरते

eg



⇒ 1 5 4 2 9 7 3 8 10 6

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A* Algorithms.

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- A* :- A* is a graph traversal and pathfinding algorithm that is used to find the shortest path between two points (nodes) especially in maps or grids.

Find shortest path start → Goal.

formula:

$$f(n) = g(n) + h(n)$$

∴ f(n) :- Total estimated cost of path through node n.

∴ g(n) :- Actual cost from the start node to node (n).

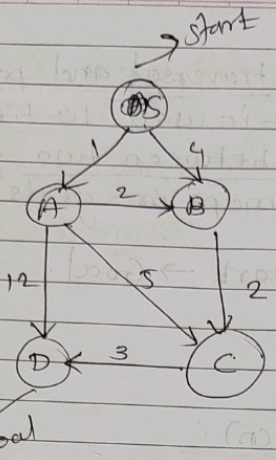
∴ ~~Heuris~~

h(n) :- Heuristic : Estimated cost from node n to goal (guess).

- Heuristic function in A* Algorithms :-

- A heuristic function is a method to estimate the cost (or distance) from the current node to the goal Node.

eg]:-



heuristic value.

S	7
A	6
B	2
C	1
D	0

① S →

f(n) = g(n) + h(n)

= 0 + 7

f(n) = 7

② S → A

f(n) = g(n) + h(n)

= 1 + 6

f(n) = 7

S → B

f(n) = 4 + 2

f(n) = 6

③ S → B → C

f(n) = g(n) + g(n)

= 6 +

f(n) = 7

main o/p:-

S → A → B → C → D

= (8)

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Selection sort & prims algorithms

*. selection sort:- { Best case : $O(n^2)$ / Worst case : $O(n^2)$ }

→ selection sort is a simple algorithm that sort a list repeatedly finding the minimum element and moving the correct position.

steps:

1> start from the first element
2> finding the smallest element in the unsorted path
3> swap it with current element
4> Repeat for the next elements
5> continue until the array is fully sorted.

eg] [29, 10, 14, 37, 13]

① find min element = 10
swap with 29. [10, 29, 14, 37, 13]

② Find min element = 13
swap with 29 [10, 13, 14, 37, 29]

③ Already sorted

④ swap 29 with 37 : [10, 13, 14, 29, 37]

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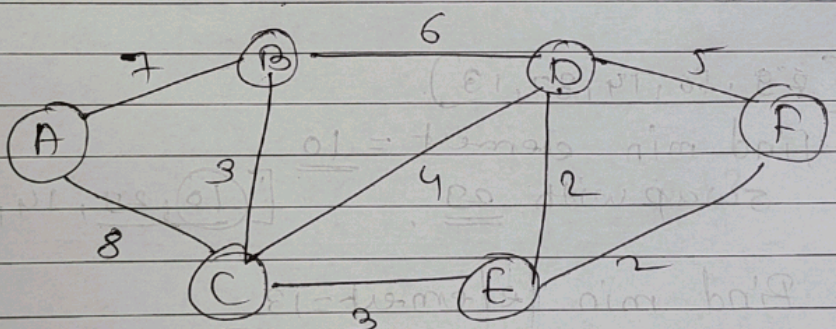
* Prims algorithms :- } Time compl = O(V)

⇒ prims algorithm is a greedy algorithm used to find the minimum spanning Tree (MST) of a connected weighted, undirected graph.

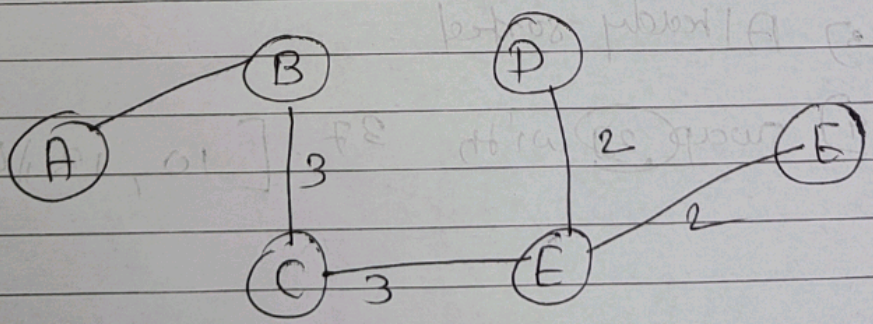
Steps :

① कोणत्याही Node पासून start करा
② त्या node पासून connected असलेले सर्व edges बघून सर्वात कमी weight असलेली.
③ ती edge आणी Node MST मध्ये जोडा.
④ Repeat the until all nodes are included in the MST.

eg



o/p.



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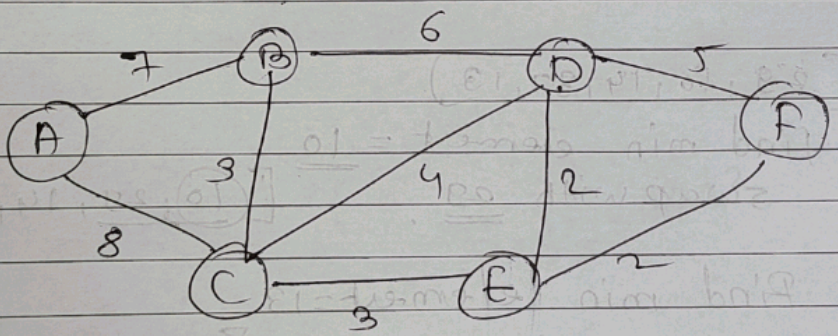
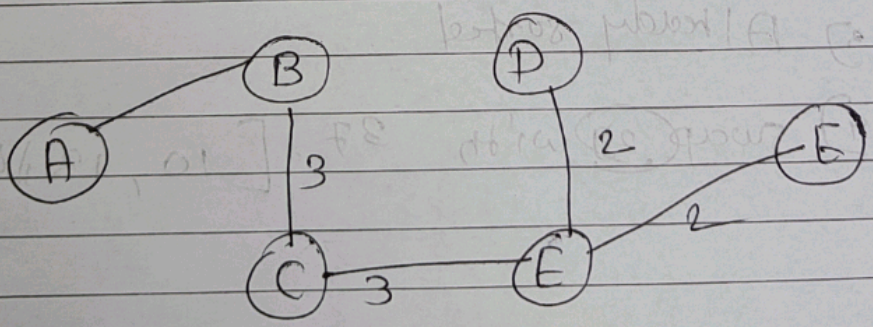
eg



O/P.



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N-Queen :-

- You have to place N queens on an NxN chessboard so that two queen attack each other [i.e. no two queens can be in the same row, column & diagonals)

(N queen अर्थात्कोड लावायला की एक queen दुसऱ्या queen ला मारू शकत नाही

1. horizontally
2. vertically
3. diagonals.

} —— 1

eg

1	0	0	0	0
0	0	1	0	0
0	0	0	0	1
0	1	0	0	0
0	0	0	1	0