19/1/2022   AI.

Depth First Search

Let fringe be a list containing initial state
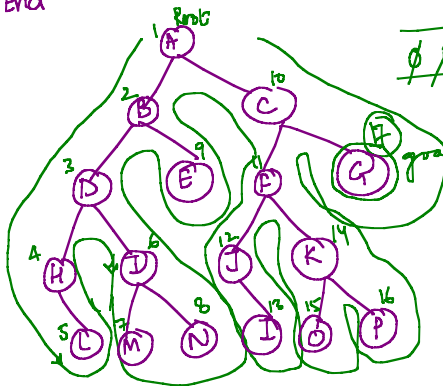
Loop

    If fringe is empty   return failure.

    Node ← Remove first (fringe)

    If Node is a goal

        return path from initial state to goal/Node

    else

        expand Node and generate all the successors of the Node.

        Add generated Nodes to the front of fringe.

End

X BDC

Fringe. Stacks (LIFO)

∅ P I J K F G M N K A I D E B C A

b : branching factor.

m : max. depth of tree
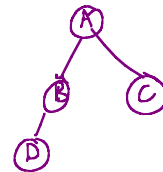
d : depth of shallowest goal node.

Time Complexity = $O(b^m)$

Space complexity = $O(b \cdot m)$

b = 3

$b + b + \ldots b$

E F G B C D A

$b + b + \ldots b = (b \cdot m)$

    m-times

Completeness of DFS
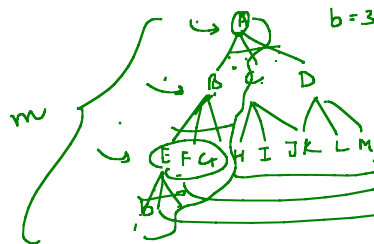
DFS is not complete if the search tree has infinite depth. $(m = \infty)$
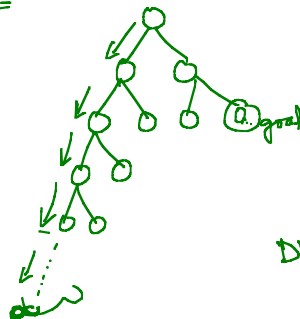
⇒   DFS will not return the solution.

Optimality

DFS is not optimal.