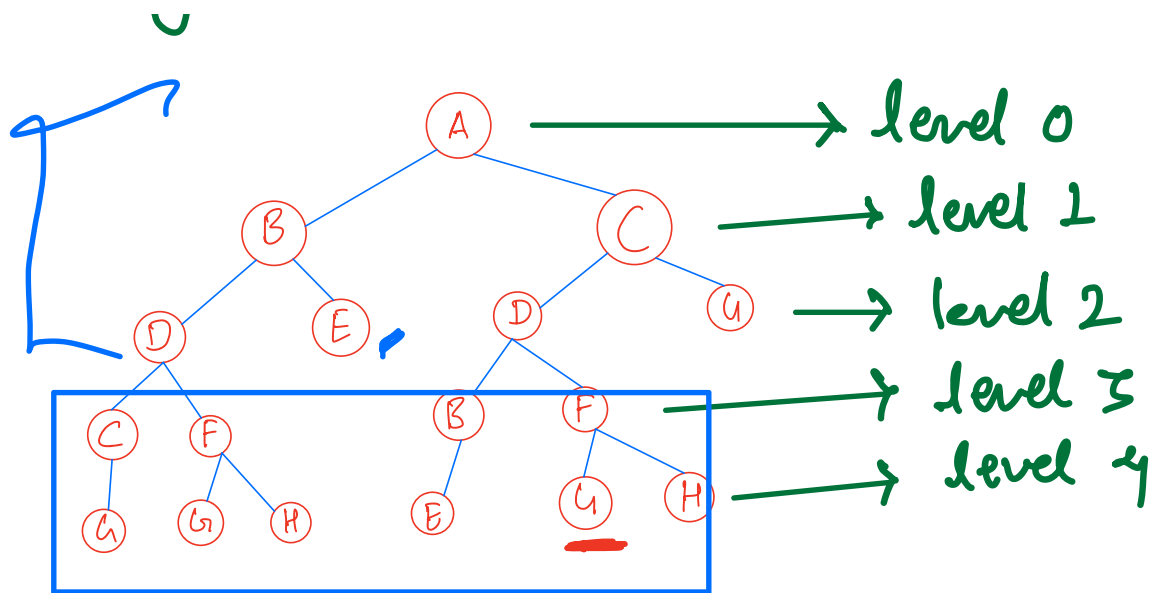# Depth Limited Search:

- To avoid infinite loop condition which may arise in DFS

- Depth limited search is carried out with a predetermined depth limit 'l'.

- Conditions:
  - If $l > d$, gives solutions where, l is depth limit d is depth of goal

  - If $l < d$, incomplete because it cannot find solution at given depth.
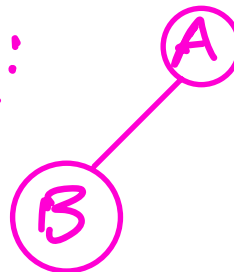
For a given state space:

level 0
level 1
level 2
level 3
level 4

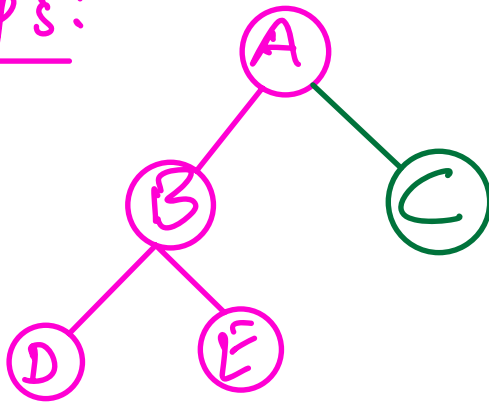let the depth limit be 2, & the
goal node is G

Here,
step 1:
(A)

step 2:
(A)
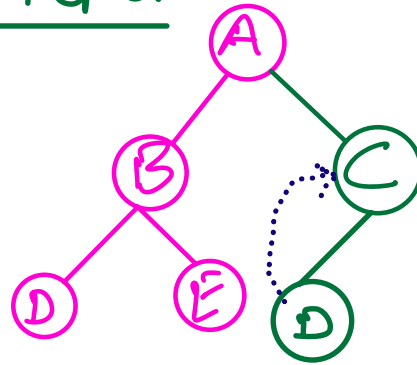(B)

step 3:
(A)
(B)
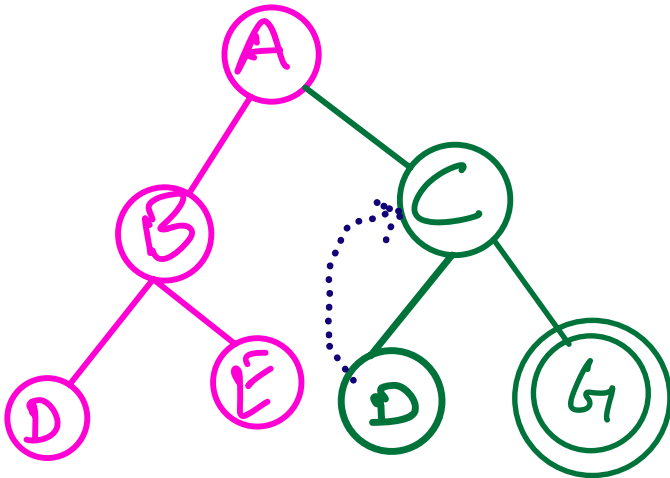(D)
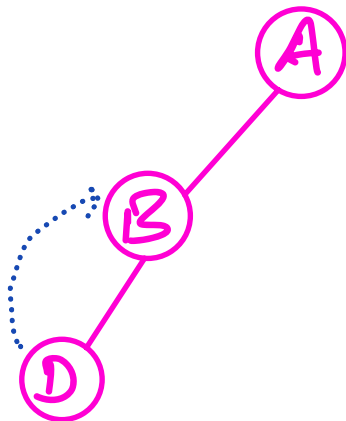
step 4:
(A)
(B)
(D) (E)
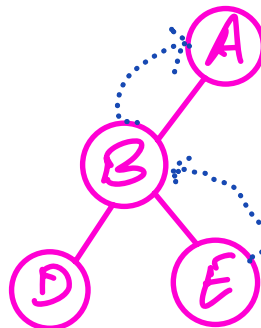
Step 5:

Step 6:

Step 7:

Hence, at the given depth limit 2, the search algorithms terminate finding goal node G.

Performance evaluation:

Completeness:

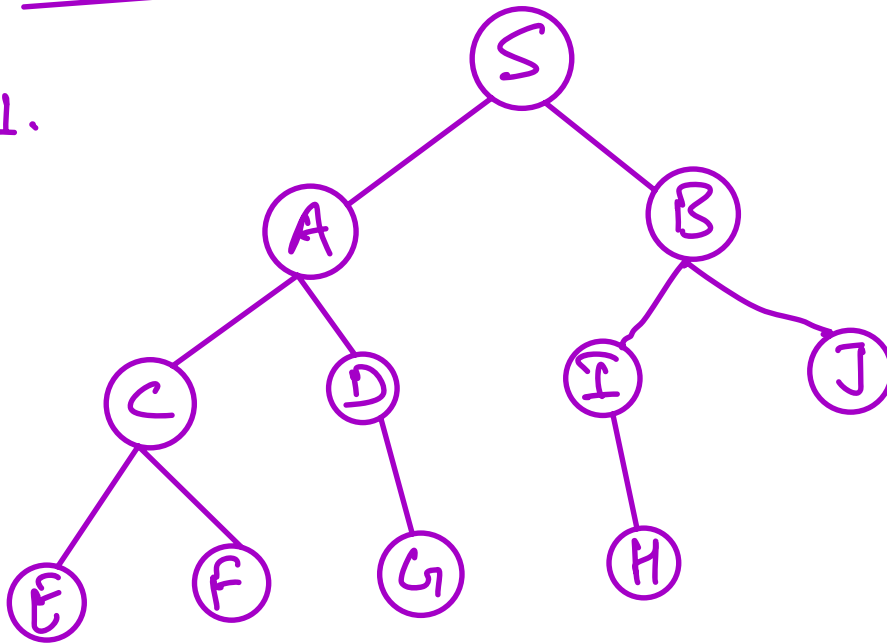- Complete if solution is above the depth limit l.

Time Complexity: $O(b^l)$

Space complexity: $O(bl)$

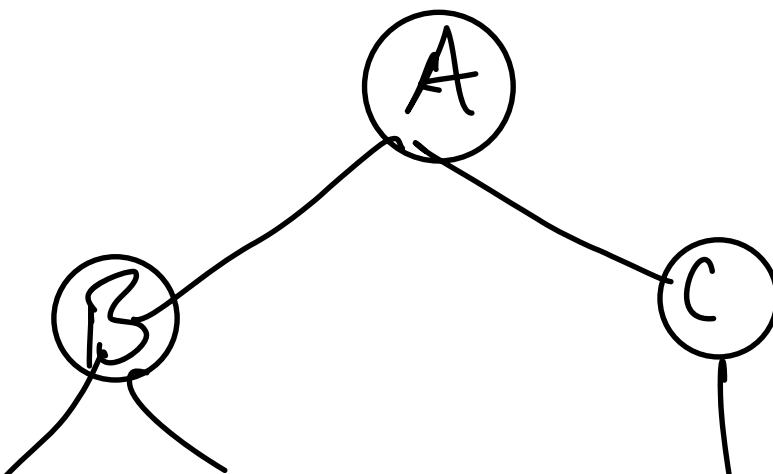### Optimal: it can be taken as special case of DFS & not optimal even if $l > d$.

Practice:

1.

perform Depth limited search for
the above given state space with
depth limit 3. Here, Start node is S
& goal node is G.

2.

Consider the given graph with depth limit (l) = 3 with start node A & goal node M.