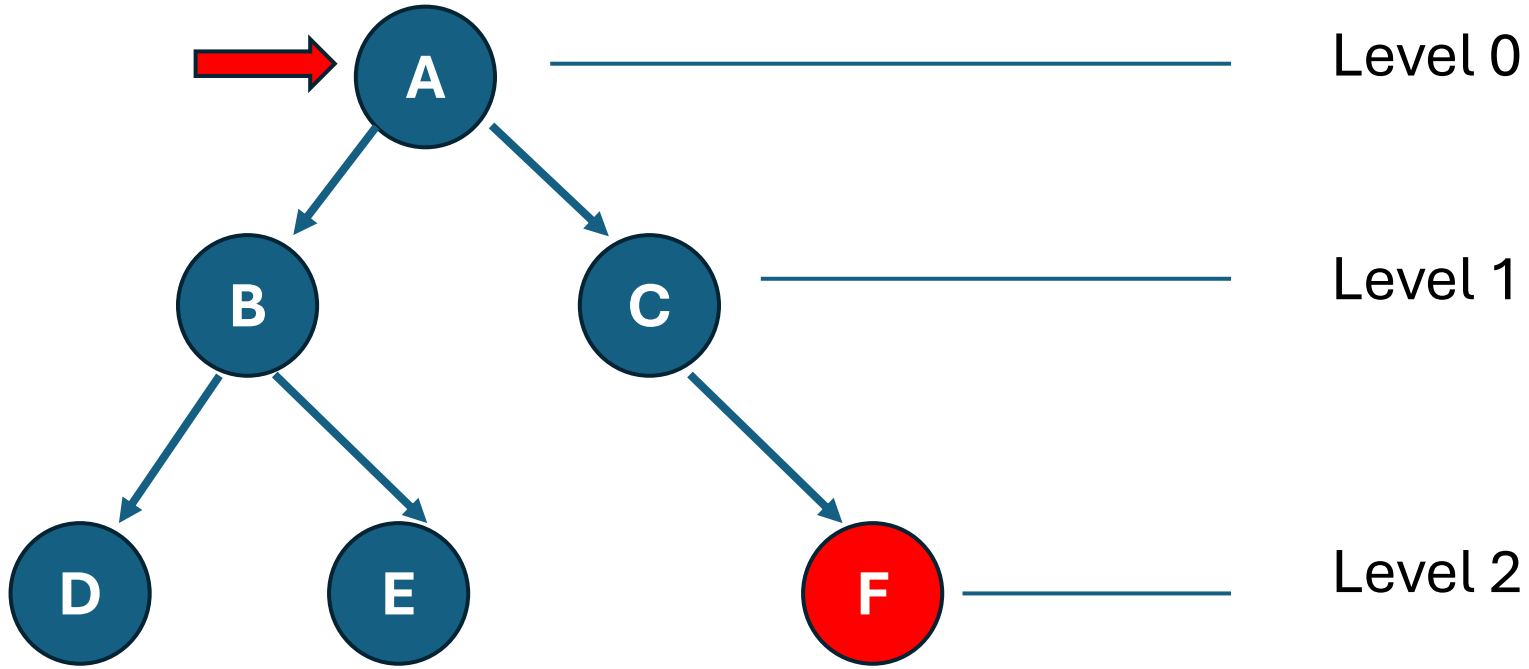
# DLS and IDS

**Shaikat Das Joy**

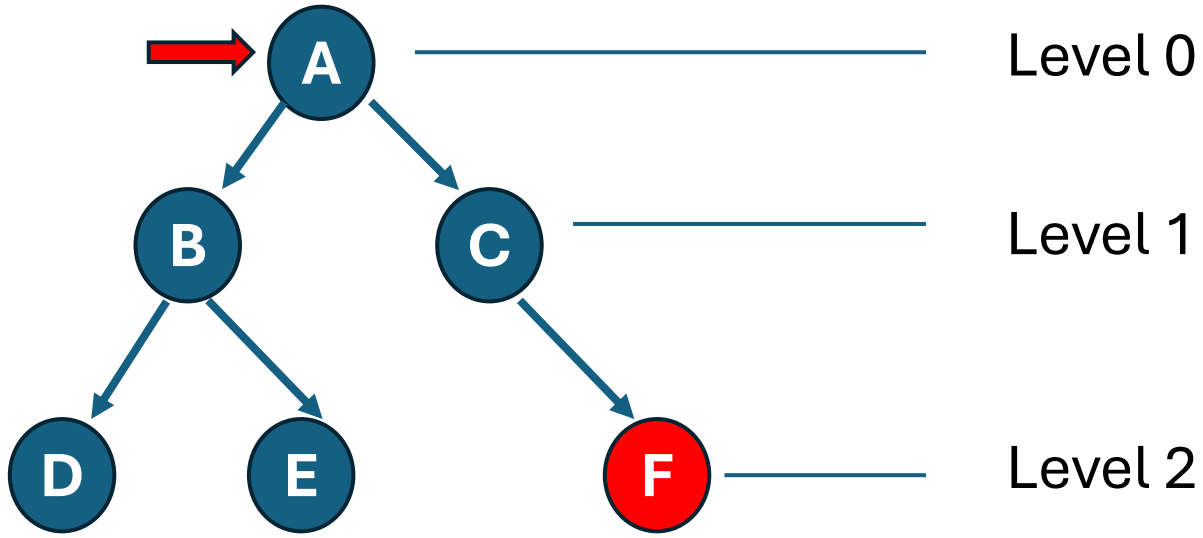
**Lecturer, AIUB**

# DLS (Depth Limited Search)



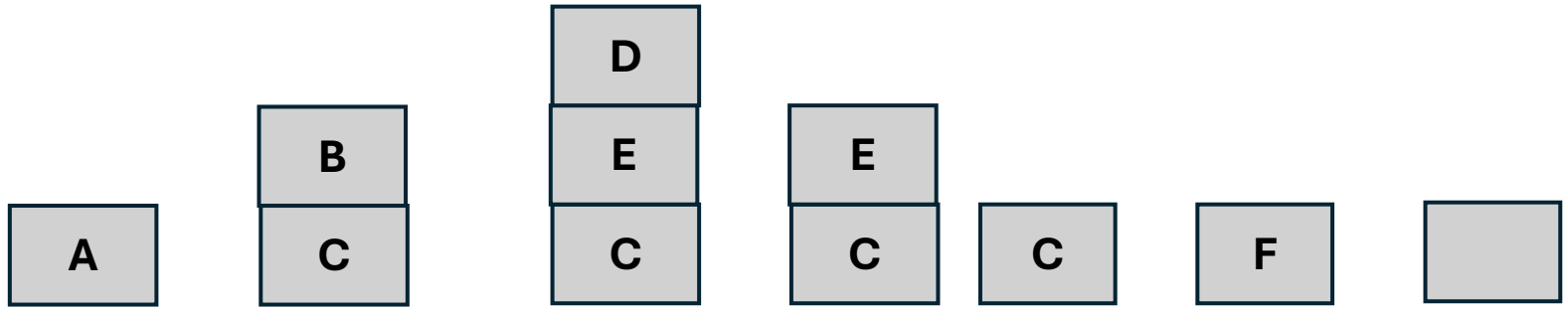

Same as DFS method with pre-determined limit. To solve the drawback of infinite path in DFS

# DLS (Depth Limited Search)




Apply DFS till level 2:

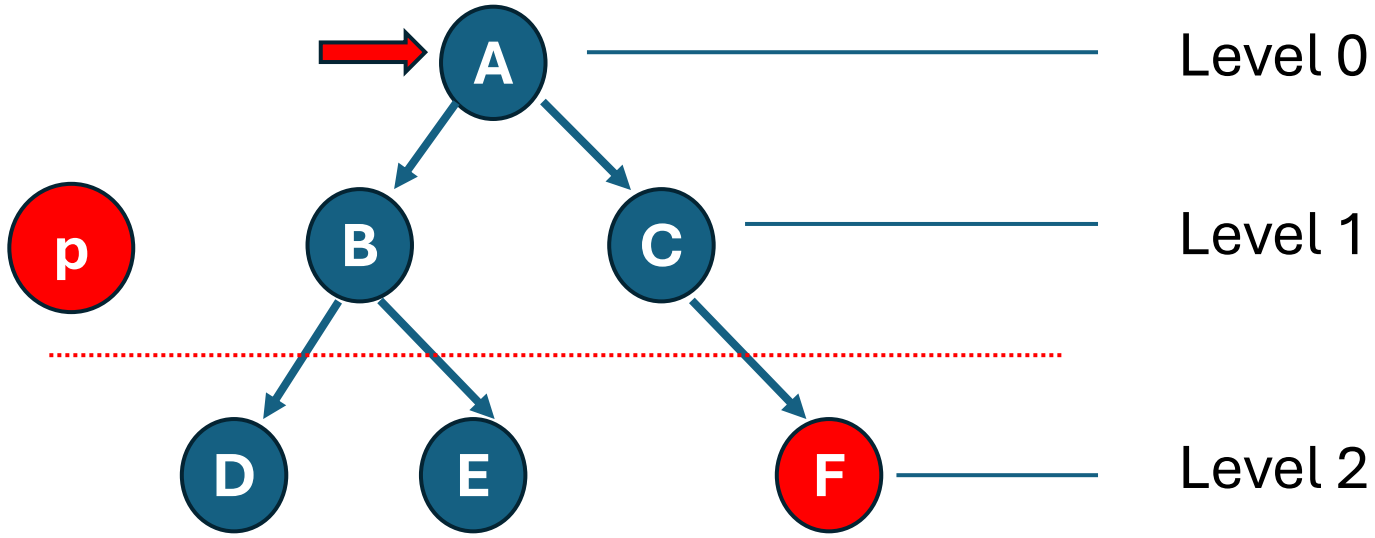
Frontier:




Explored List:

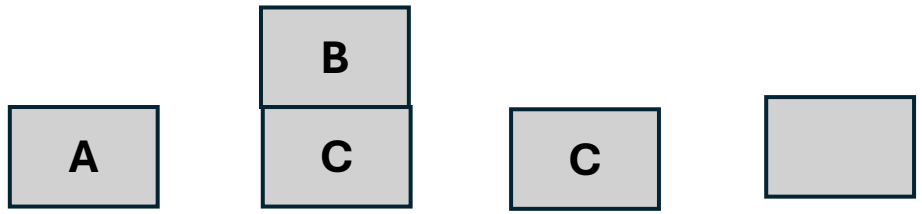
| Null | A | A,B | A,B,D | A,B,D,E | A,B,D,E,C | A,B,D,E,C,F |
|---|---|---|---|---|---|---|

# DLS (Depth Limited Search)




Apply DFS till level 1:

Frontier:




Explored List:

Null | A | A,B | A,B,C

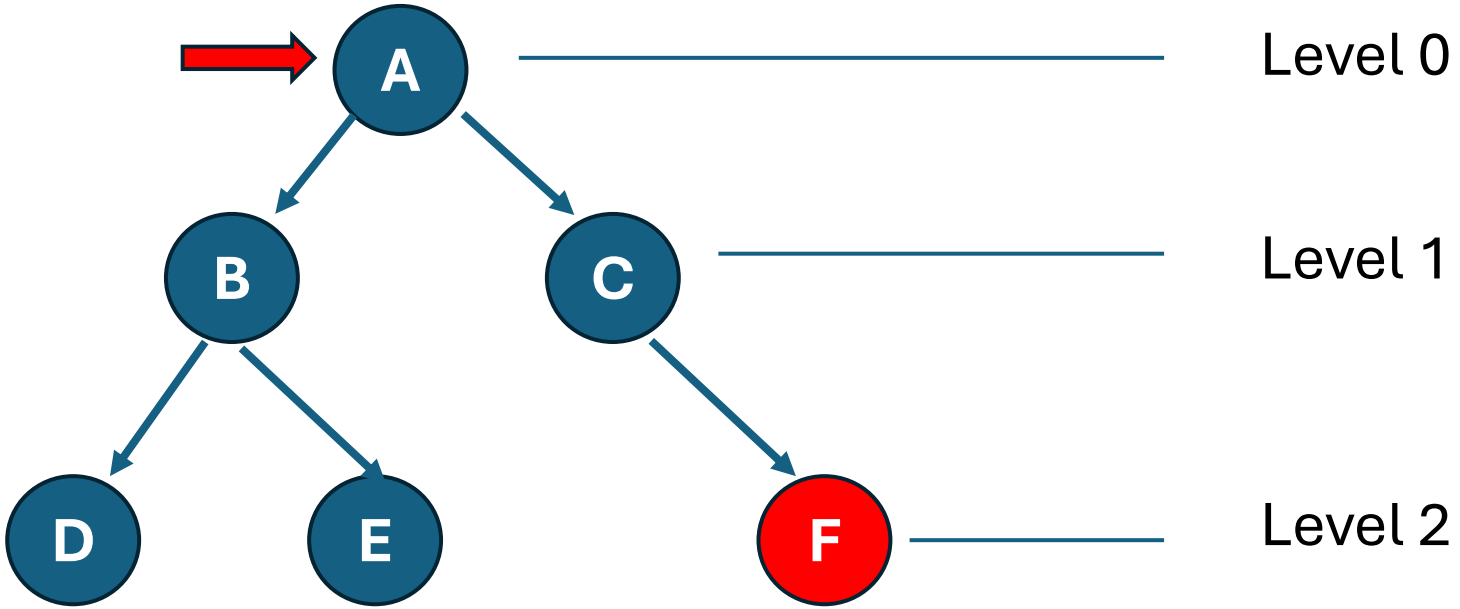
Here, If I go till level 1 then I can not find the goal node for this problem.

DLS can fail in two ways:

1. **Standard failure value** : problem has no solution (Like if the Goal node is **P**)
2. **Cutoff Failure Value:** No solution within the limit

**Incomplete**
**Non-Optimal**
**Time Complexity**: $O(b^d)$
**Space Complexity:** O(bxd)

# Iterative Depending Search (IDS)/ (IDDFS)




Iteration Number - Explored List

1st iteration - A

2nd iteration - A, B, C

3rd iteration - A,B,D,E,C,F

**In 3rd iteration we are getting our result**

Mixed of BFS and DFS because it is complete like BFS and less memory like DFS.

Properties:
**Complete**
**Optimal** : if path cost if non decreasing (Depends)
**Time Complexity**: $O(b^d)$
**Space Complexity:** O(bxd)

# THANK YOU