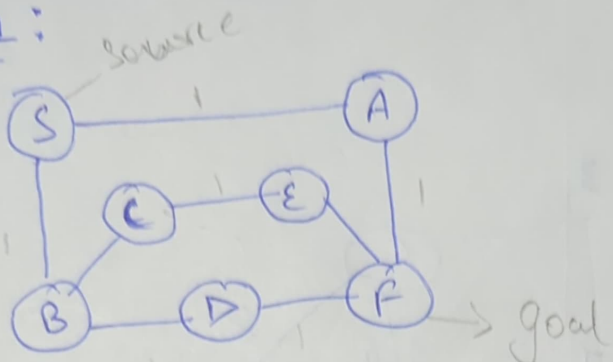
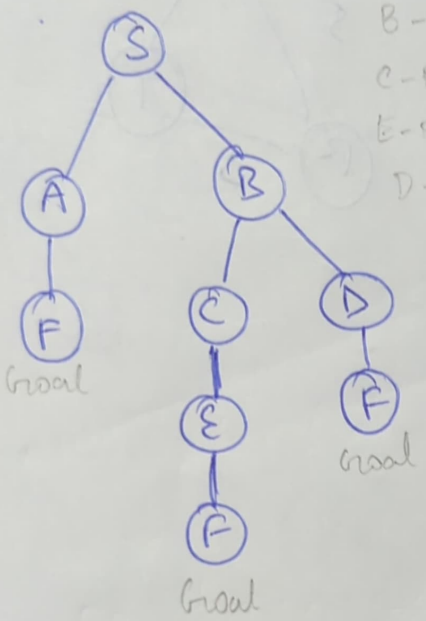
Assignment 1

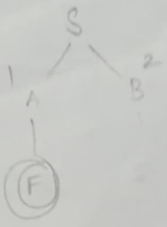
Q1) Graph 1:



S-F : 2
A-F : 1
B-F 2
C-F : 2
E-F : 1
D-F : 1

BMS





Paths:

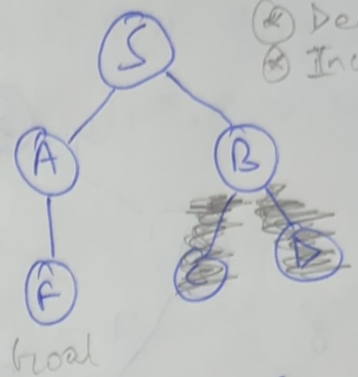
$P_1 \Rightarrow S \rightarrow A \rightarrow F$

$P_2 \Rightarrow S \rightarrow B \rightarrow C \rightarrow E - F$

$P_3 \Rightarrow S \rightarrow B \rightarrow D \rightarrow F$

DFS

- not optimal
- LIFO (Stack)
- Deepest node
- Incomplete

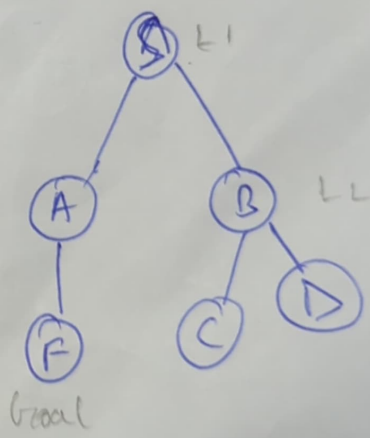


Shows P_1 only (only 1 Path)

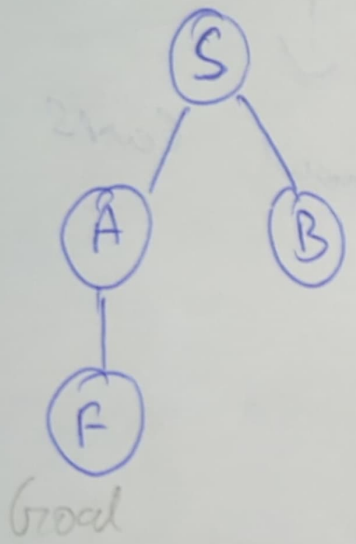
BFS

- optimal
- FIFO (queue)
- Shallowest node
- complete

S L1
A B → L2
B F → L3
C D F



- HC
  - β = 1 (Default)



- Loop until Sol is found
- If goal then quit
- Chooses less cost first
- greedy
- NO Backtracking

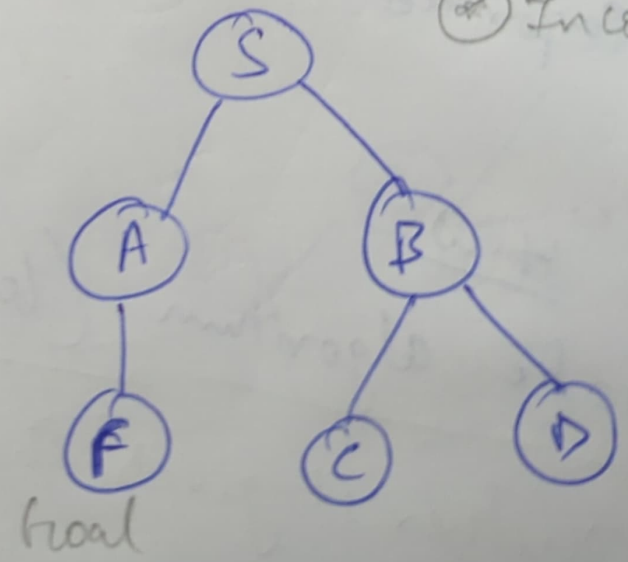
β = ? (Given)

Beam

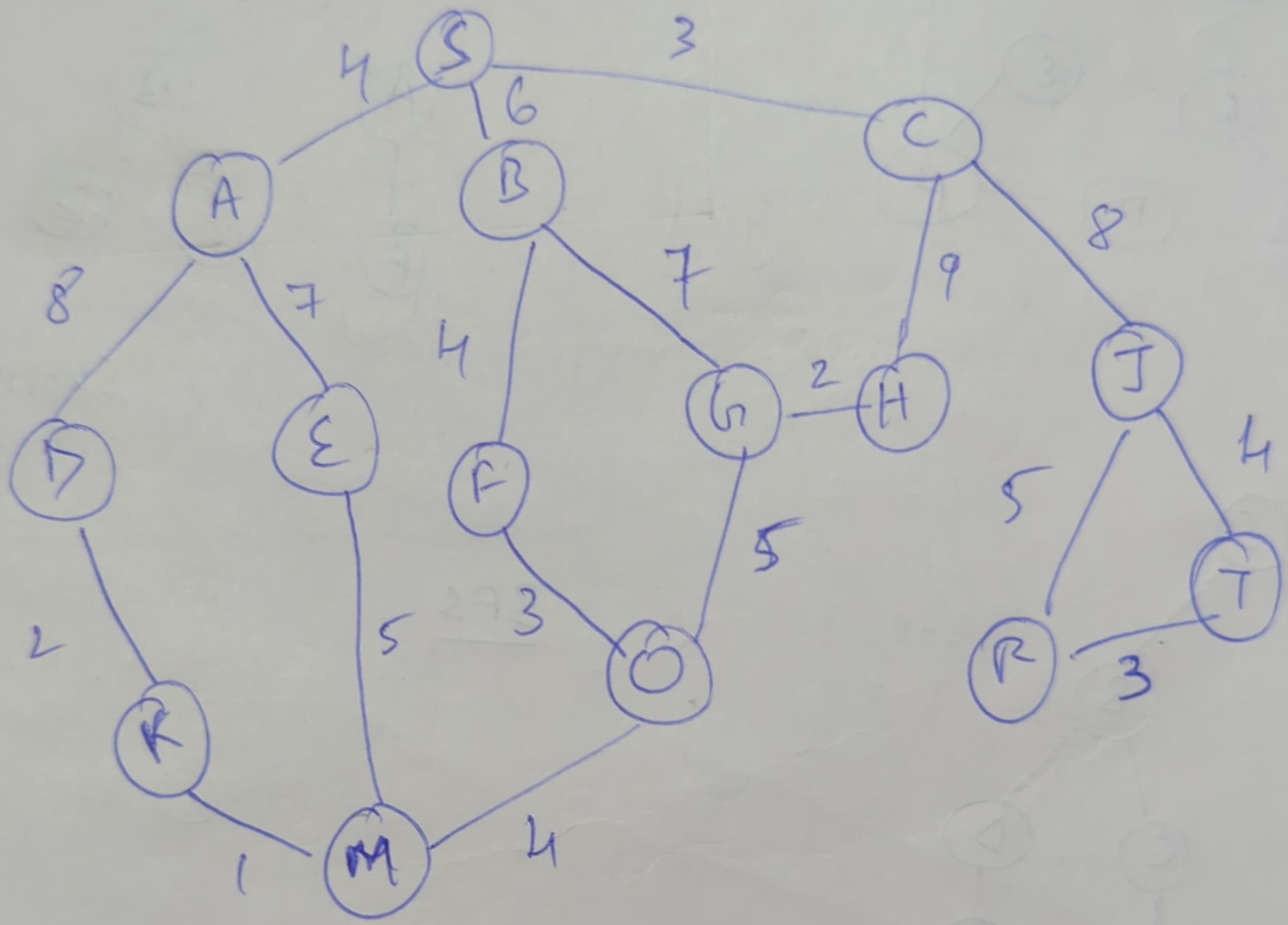
- Take care of Space complexity
- Priority queue
  - Sorting
    - min value (cost)
- Beam width = 2 (will be given)

If ABC are here A & B are best options having less cost that will be explored

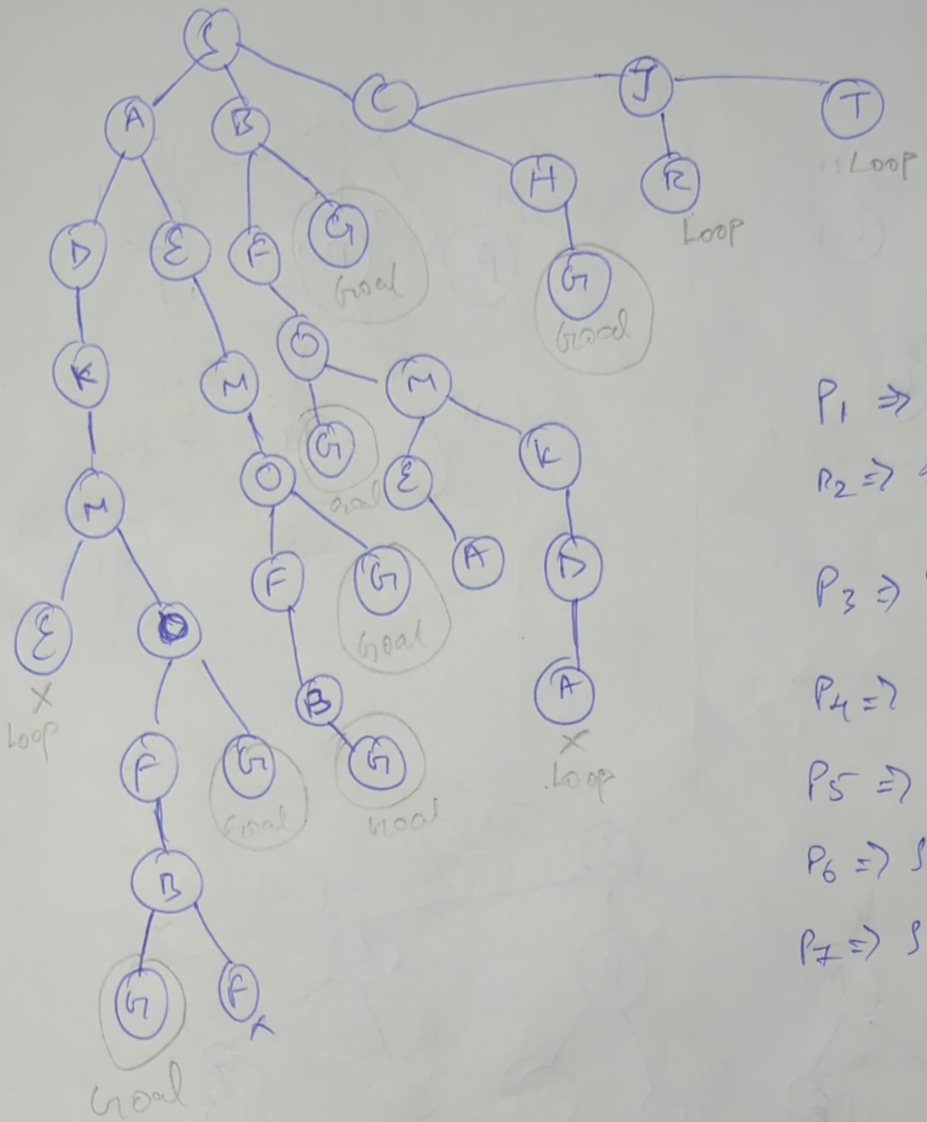
- Incomplete



Graph 2 :



BMS



$P_1 \Rightarrow S, B, G$

$P_2 \Rightarrow$ ~~S, A, C, D, E, H, G~~
S, C, H, G

$P_3 \Rightarrow S, A, D, K, M, O, G$

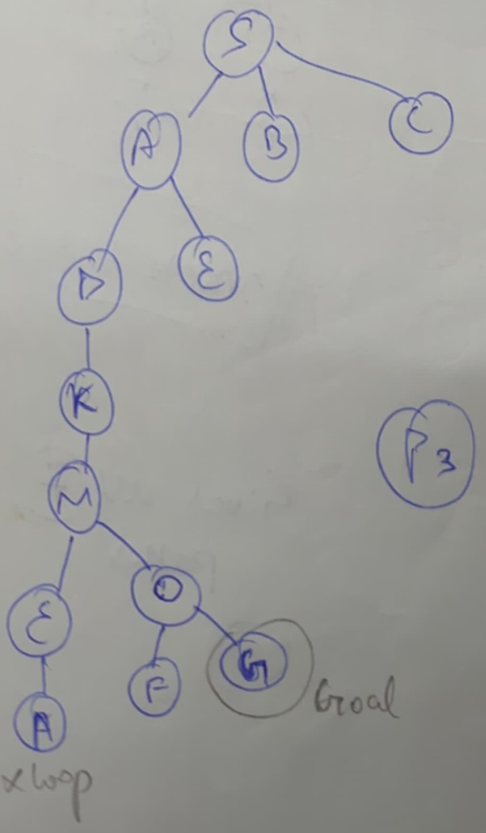
$P_4 \Rightarrow S, A, E, M, O, G$

$P_5 \Rightarrow S, A, D, K, M, O, F, B, G$

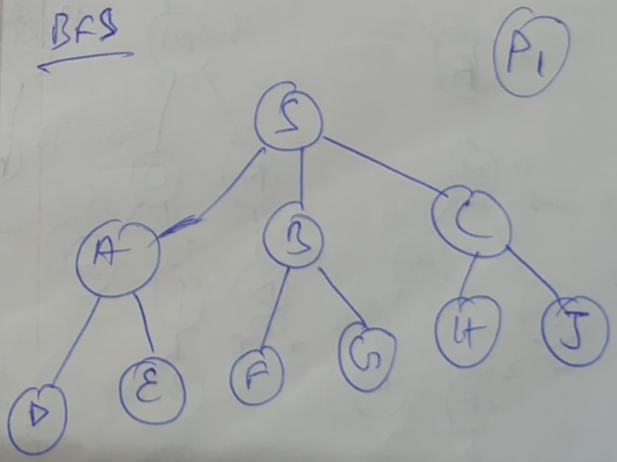
$P_6 \Rightarrow S, A, E, M, O, F, B, G$

$P_7 \Rightarrow S, B, F, O, G$

DFS

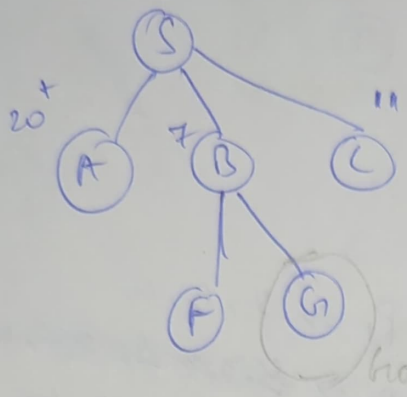


BFS

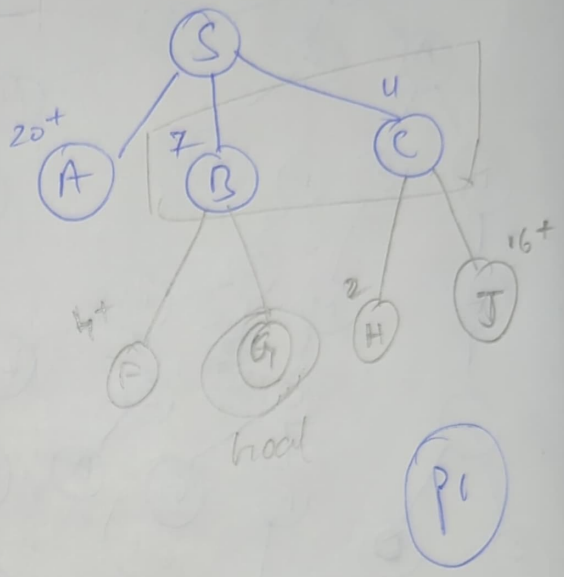


(HC)
Hill Climbing

Heuristics
A : 20+
B : 7
C : 11

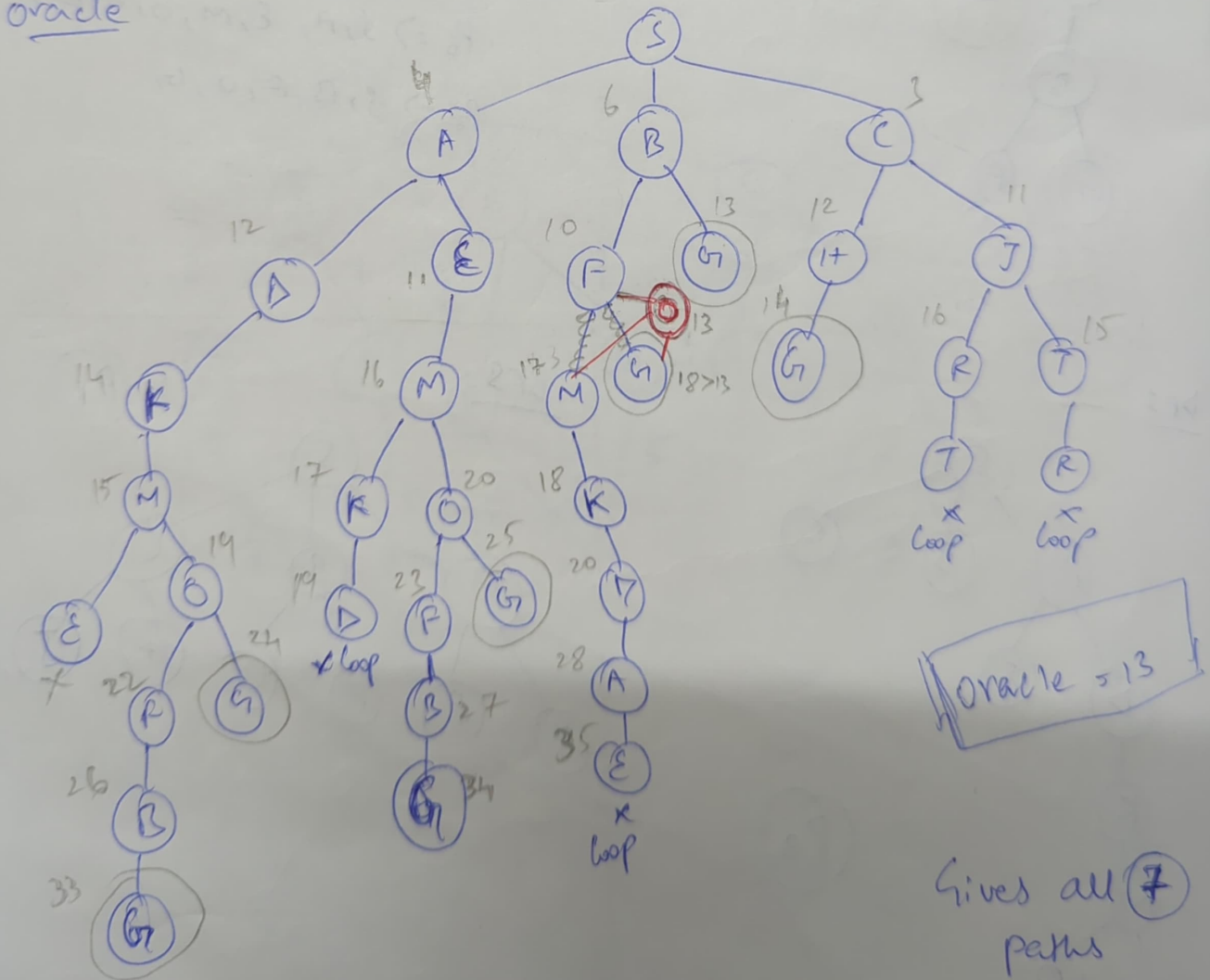


Beam B=2



P1

oracle

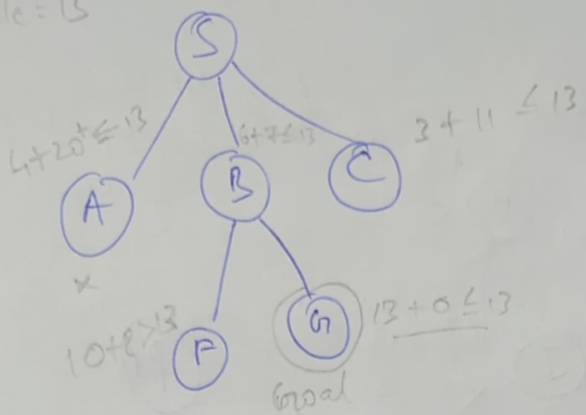


Gives all 7 paths

A*

Cost + heuristic ≤ oracle

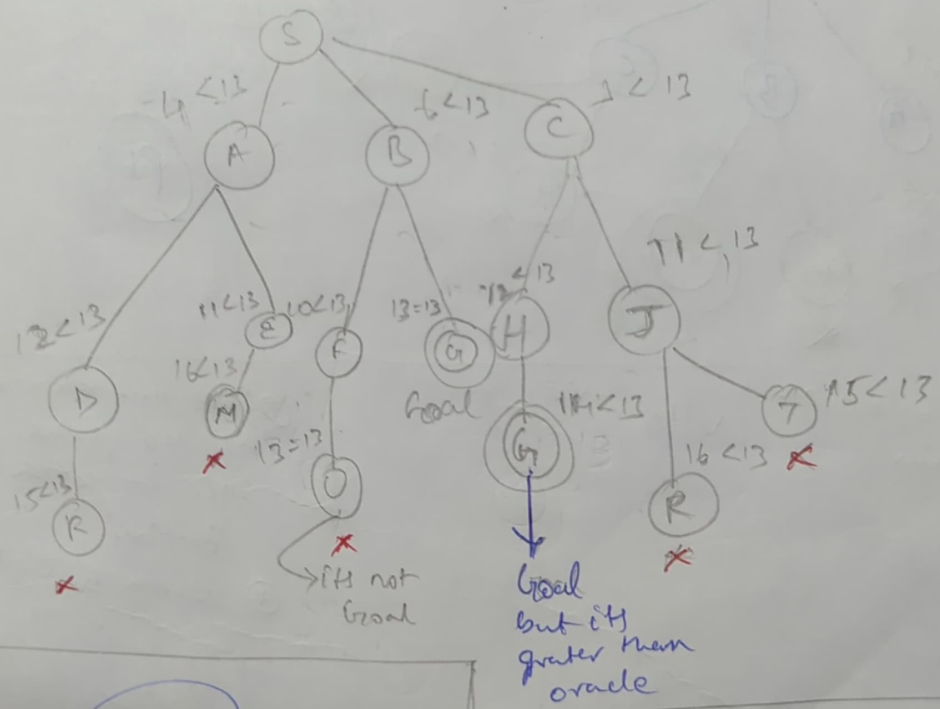
oracle = 13



Informed searching
(have some info)

B&B (Cost)

Defined oracle 13



P1

optimal solution
cost > oracle
it will ignore the path.

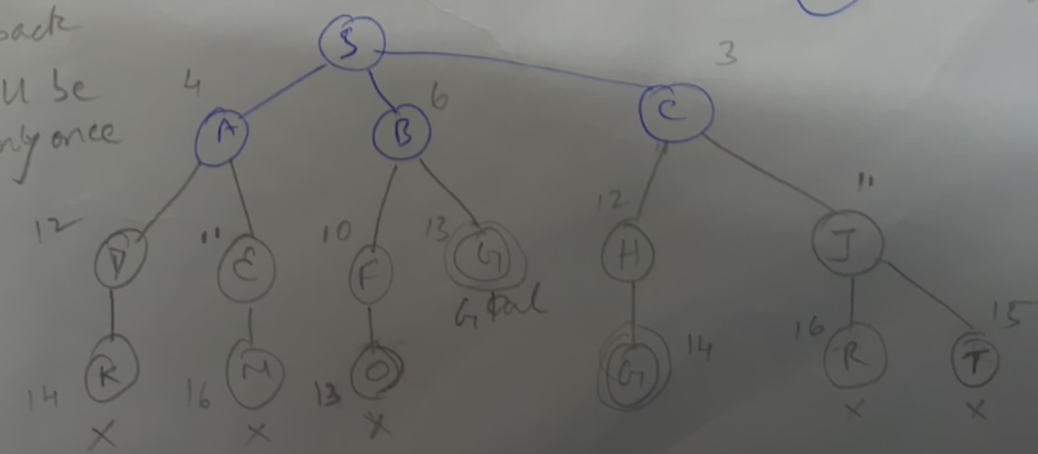
B&B (EL)

oracle = 13

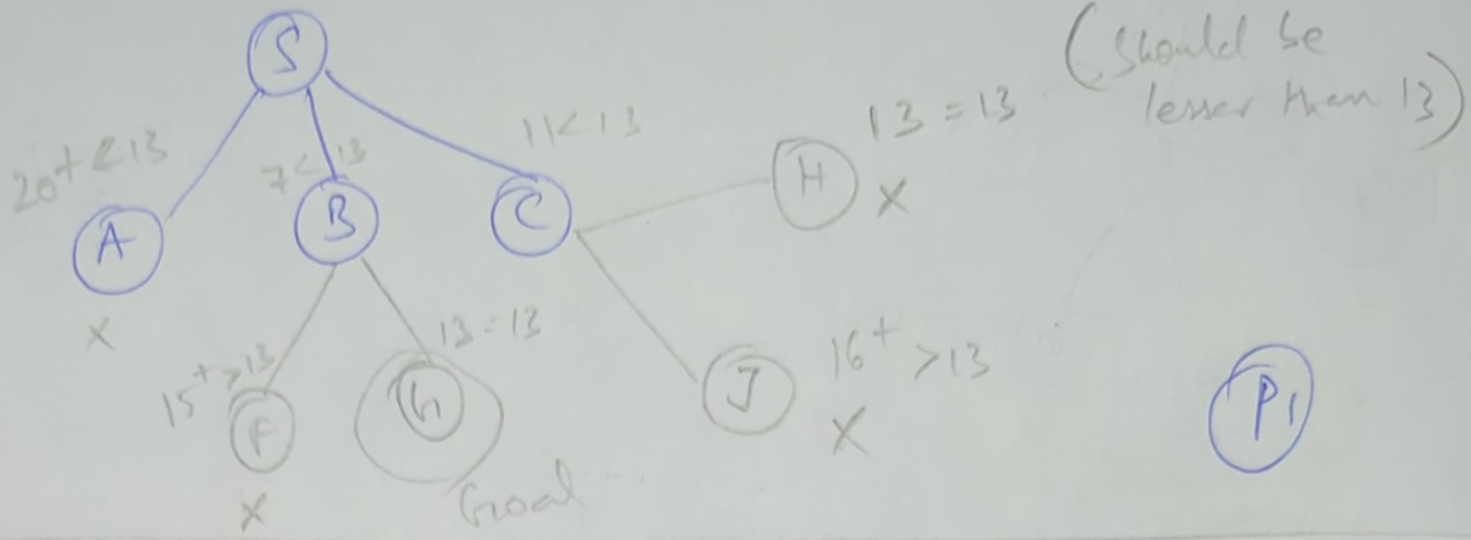
P1

No trace back

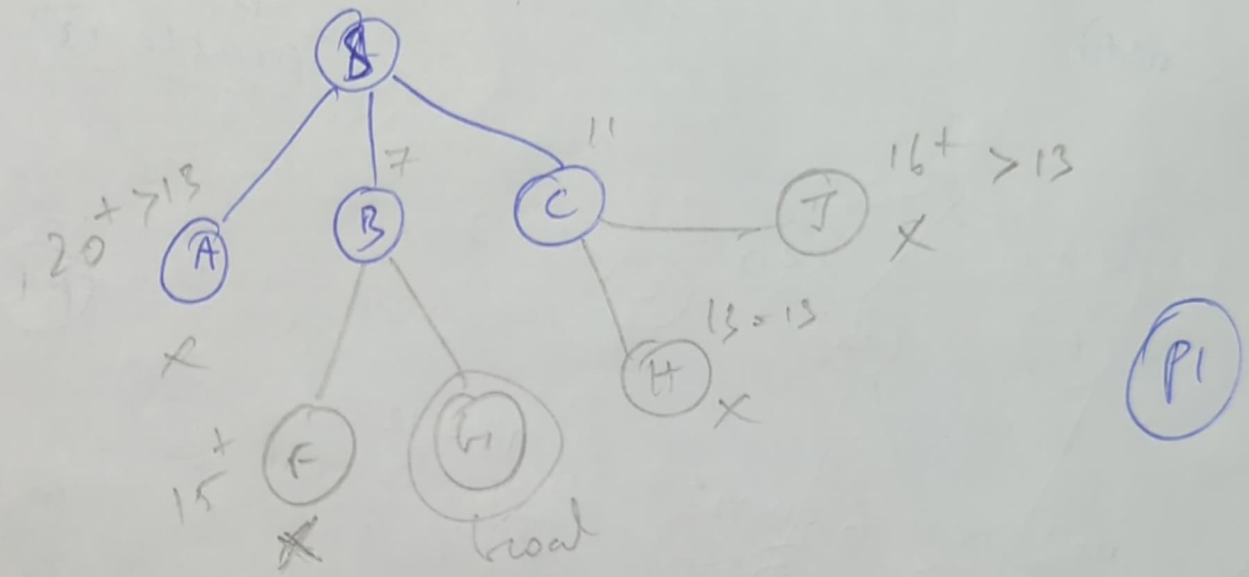
Node will be Extended only once



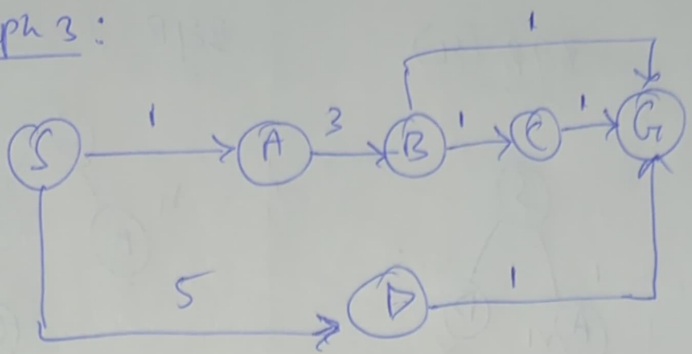
B&B (Heuristics)



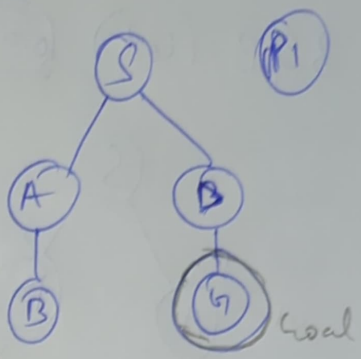
B&B (Heuristics + EC)



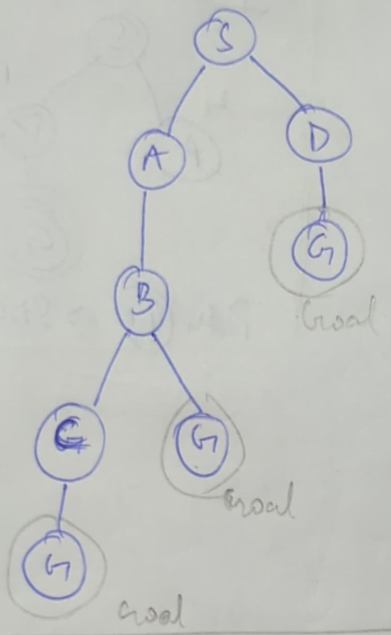
Graph 3:



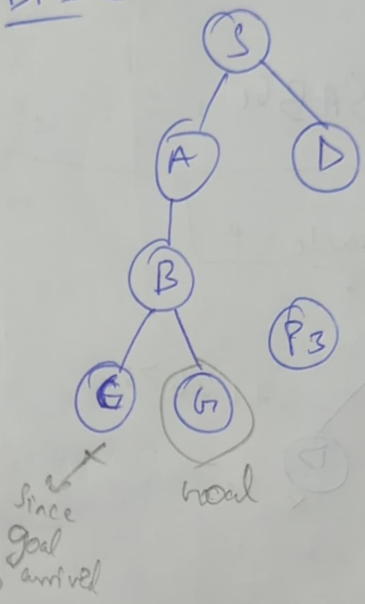
BFS (queue)



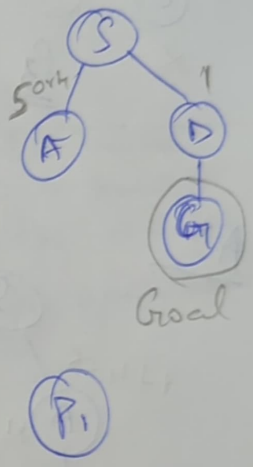
BMS → P1: SDG
P2: SABCG
P3: SABG



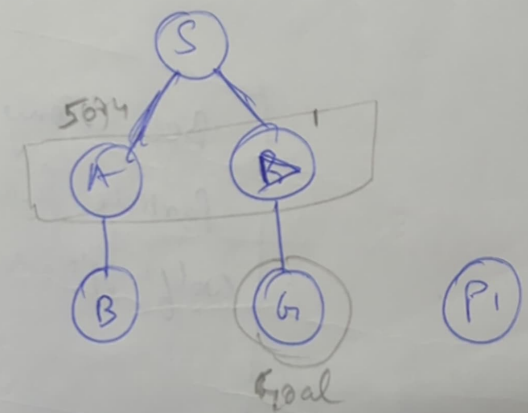
DFS (Stack)



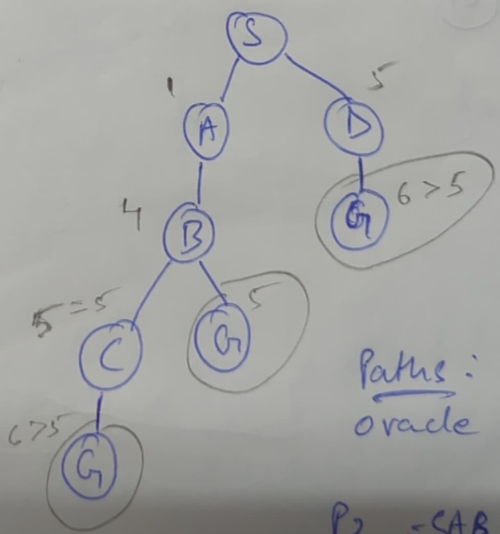
Hill climbing



Beam Search: B=2



Oracle Search



Paths:
oracle : SABG
=5

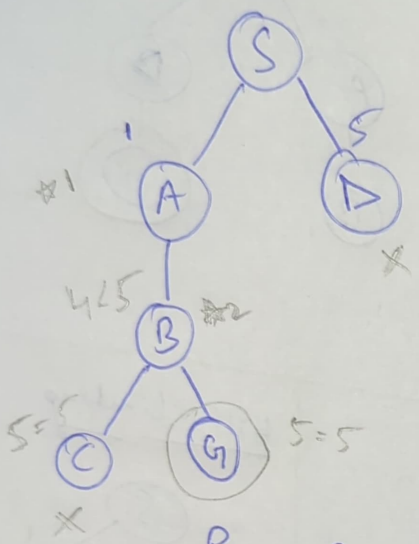
P2 = SABCG = 6

P3 = SDG = 6

P.T.O

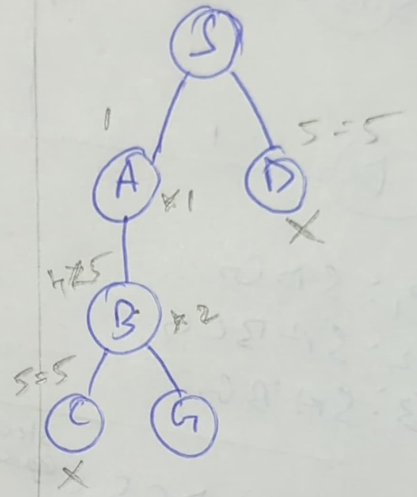
B&B (Cost)

oracle = 5

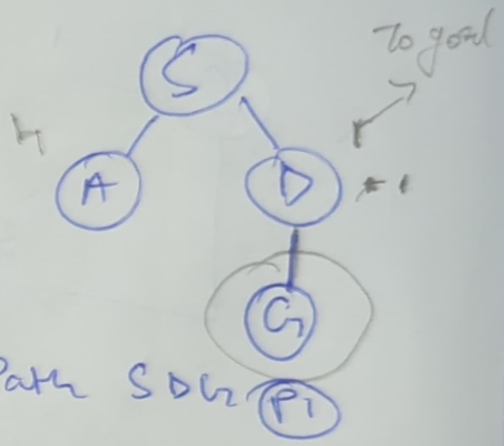


P3 SABG

B&B (EL)

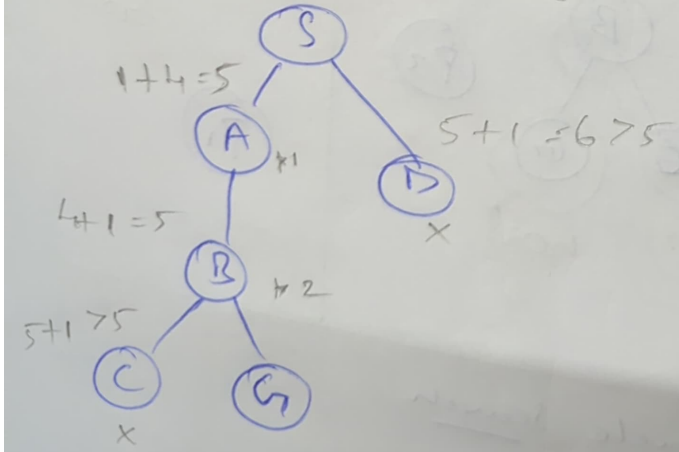


B&B (Heuristics)



A*

oracle = 5



B&B (EL) + Heuristics