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Algorithms & Problem Solving
Level 6
DFS in Trees and Graphs
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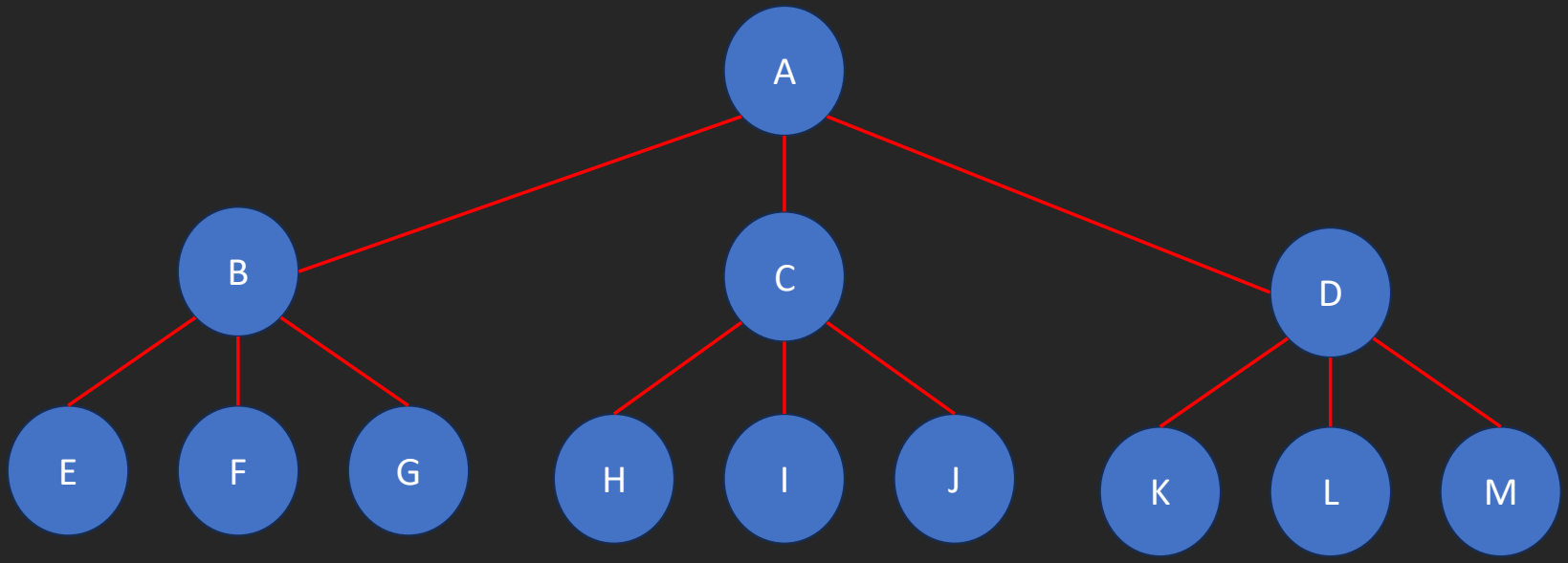
BFS: Breadth First Search.

Level By Level



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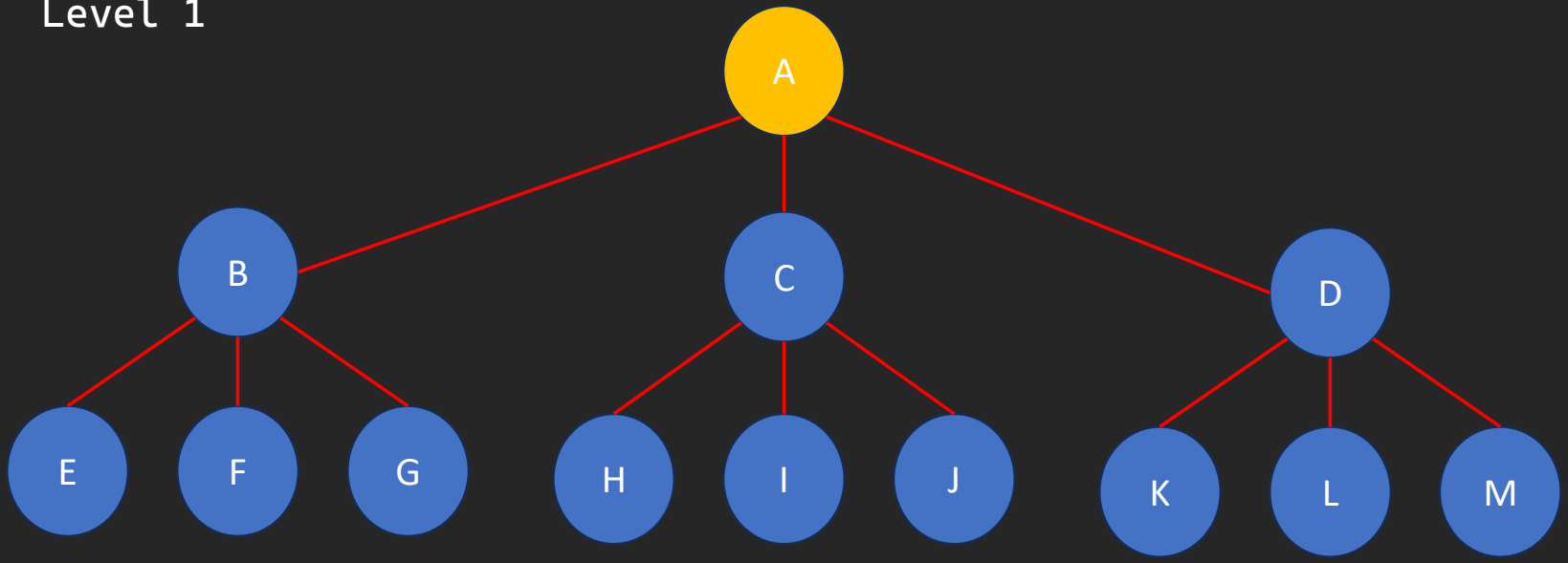
BFS: Breadth First Search.

Level 1



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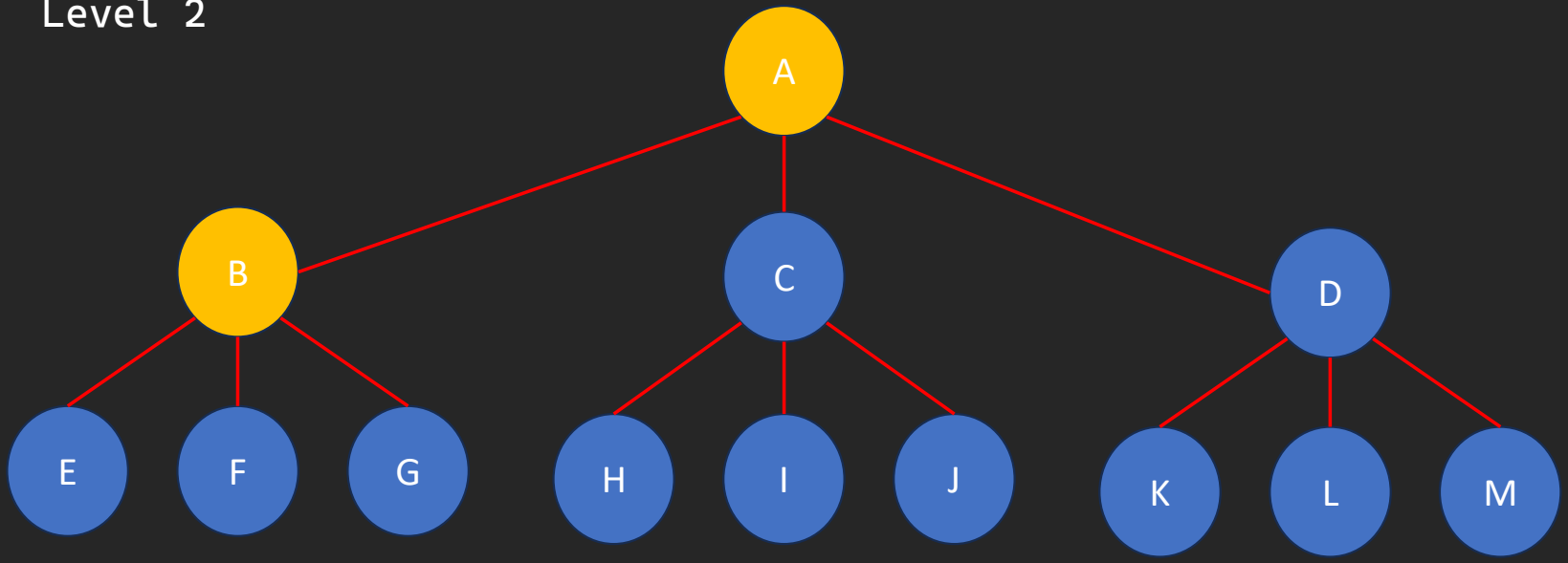
BFS: Breadth First Search.

Level 2



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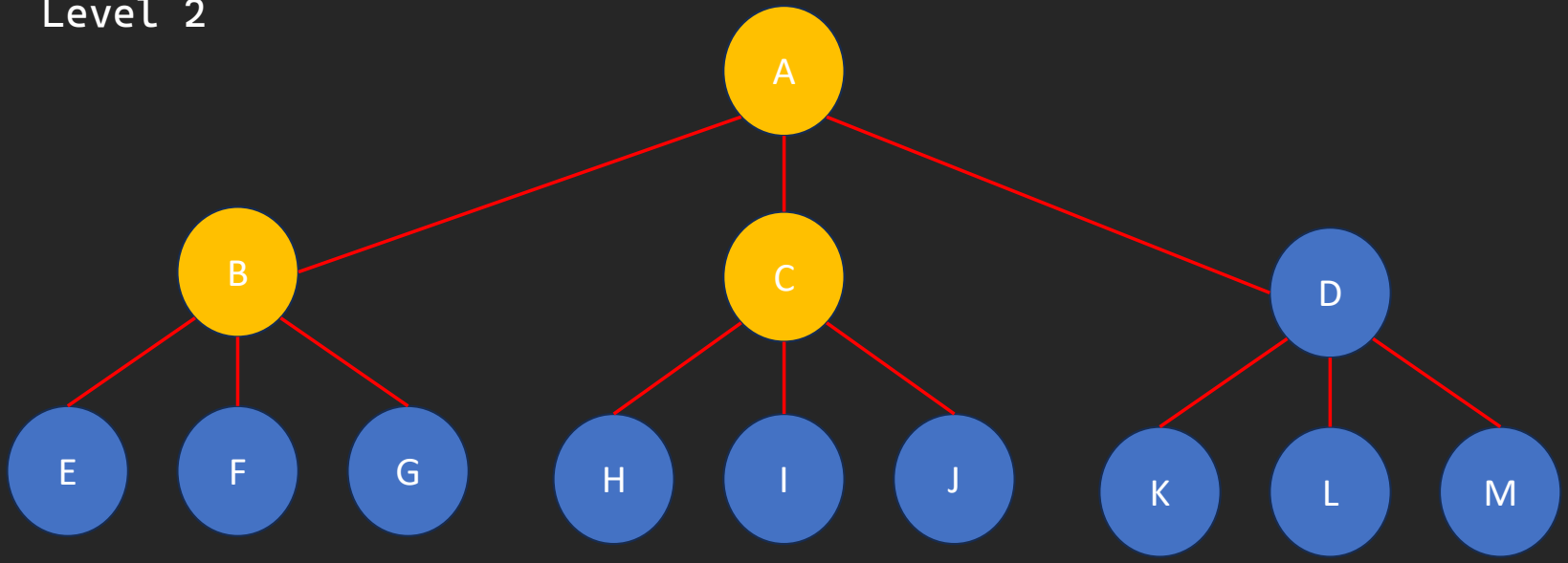
BFS: Breadth First Search.

Level 2



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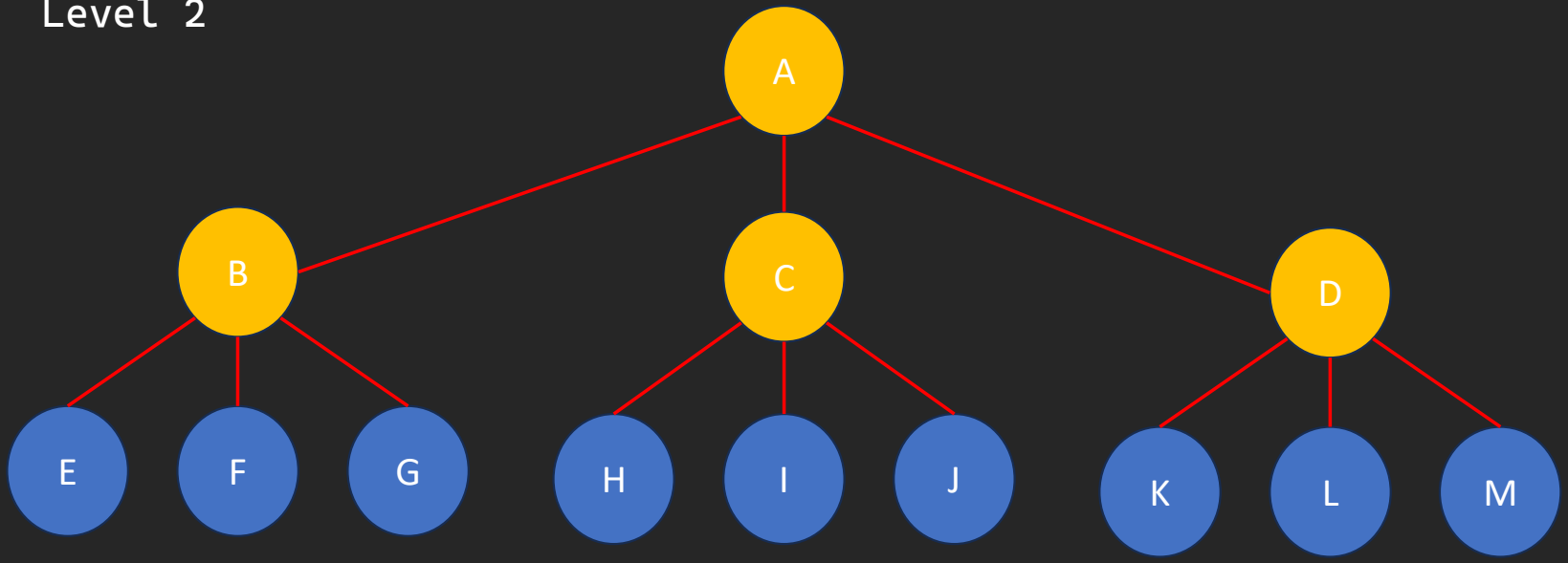
BFS: Breadth First Search.

Level 2



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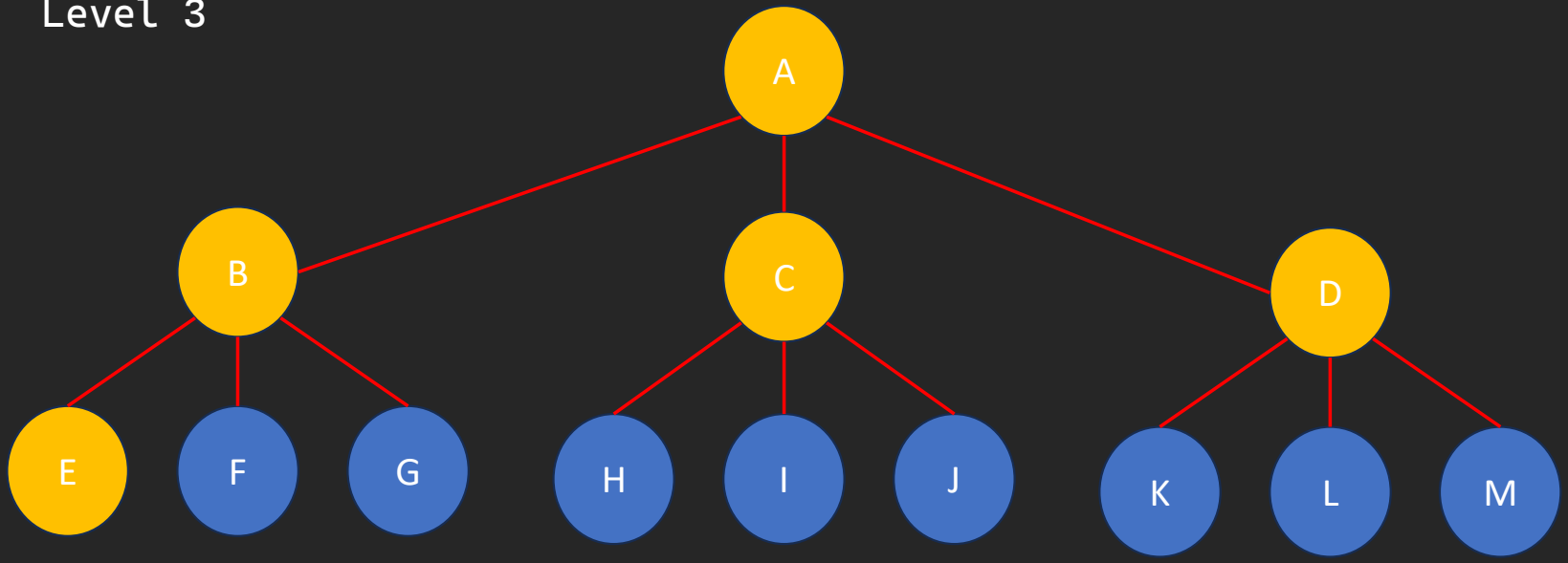
BFS: Breadth First Search.

Level 3



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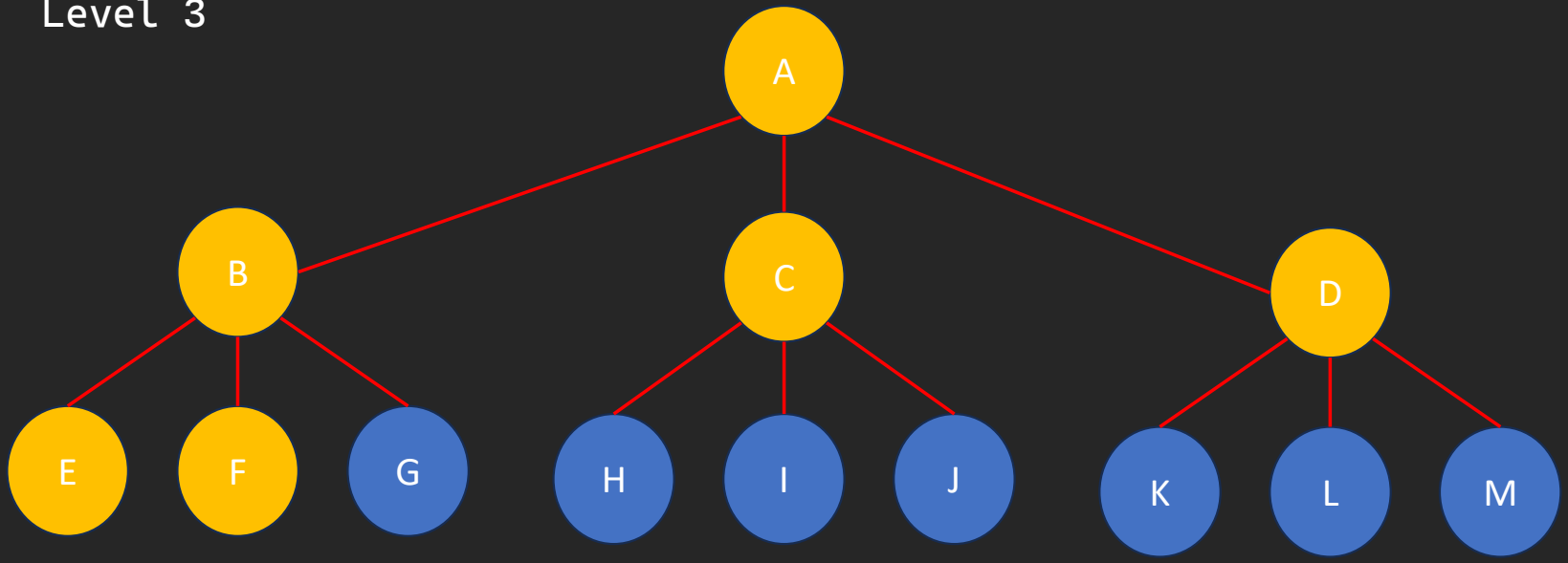
DFS: Depth First.

Level 3



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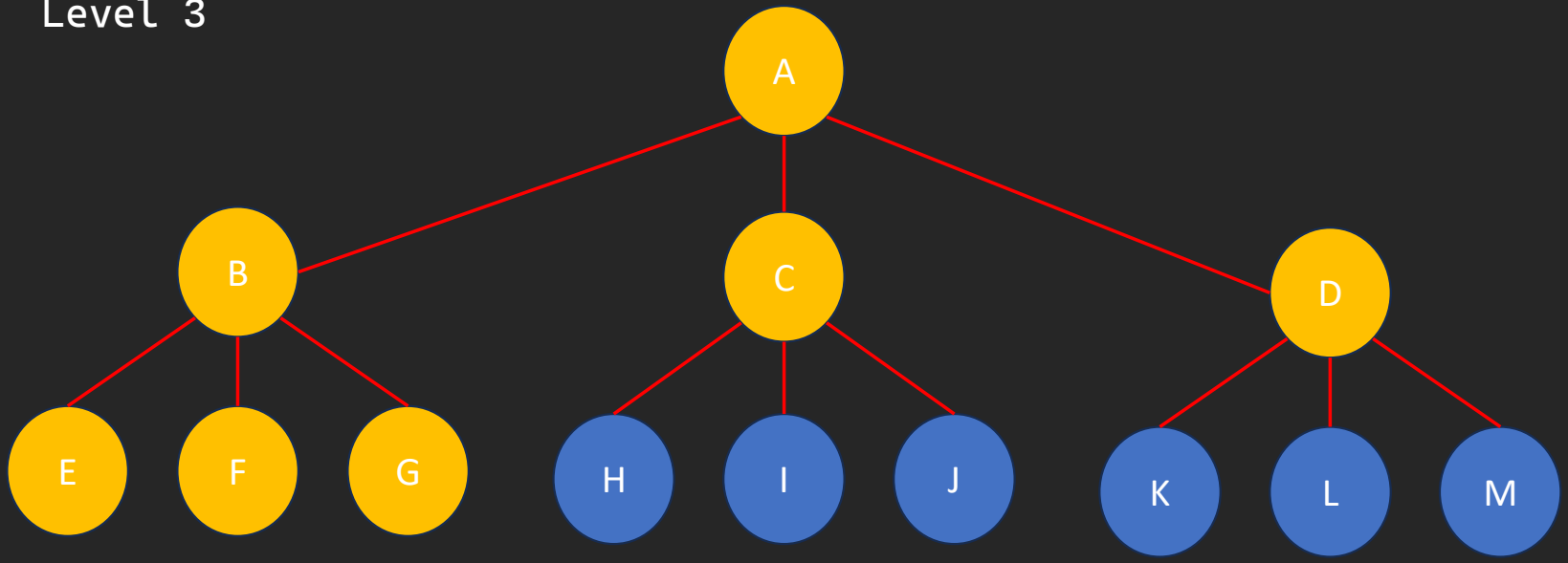
BFS: Breadth First Search.

Level 3



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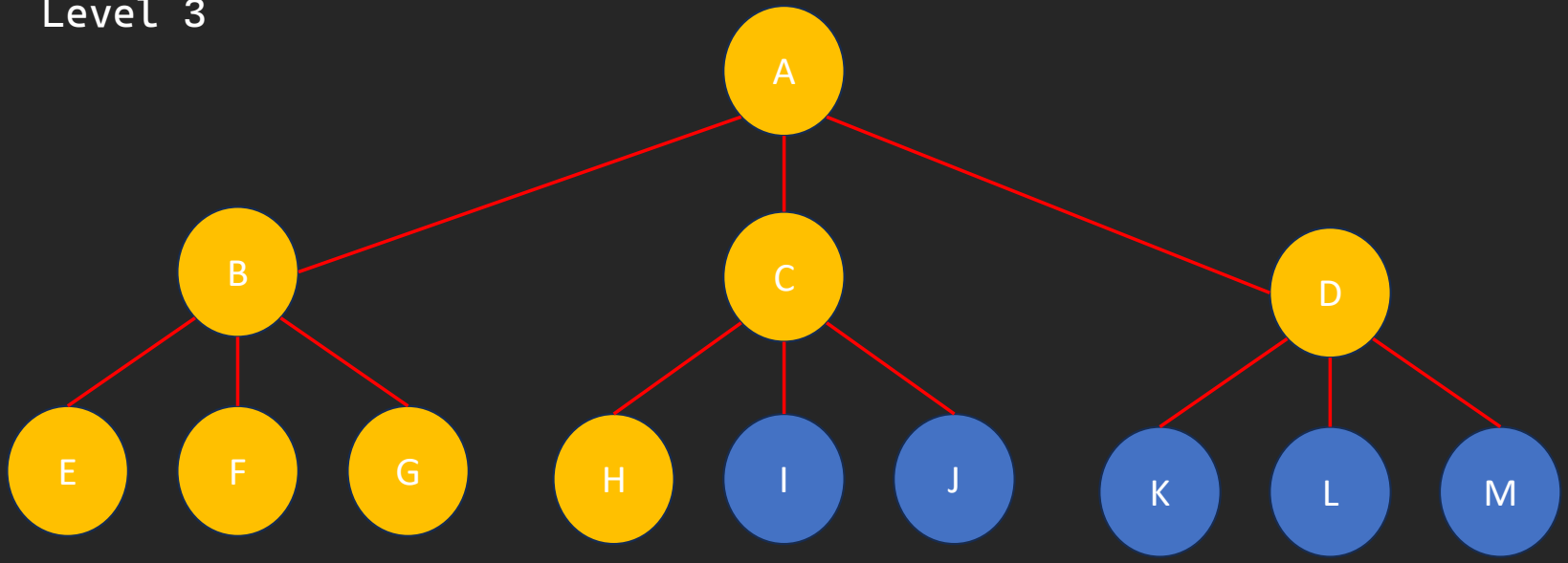
DFS: Depth First.

Level 3



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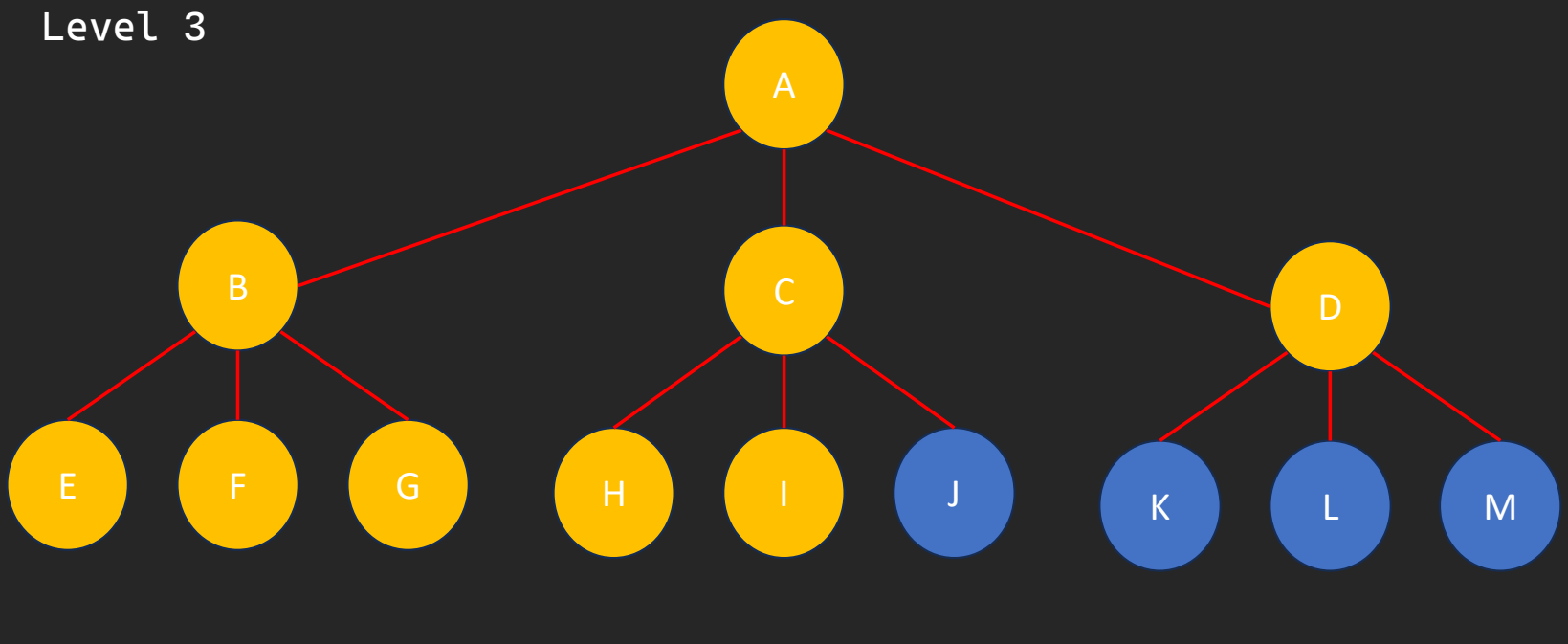
BFS: Breadth First Search.



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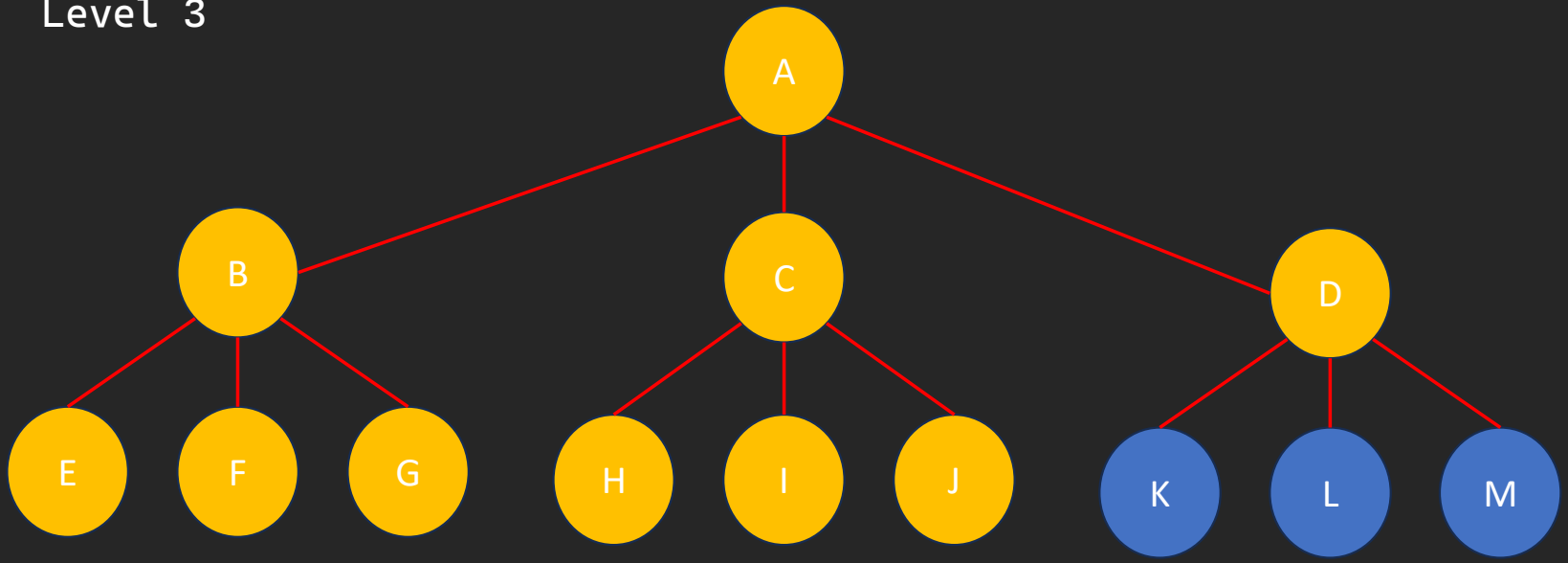
Level 3



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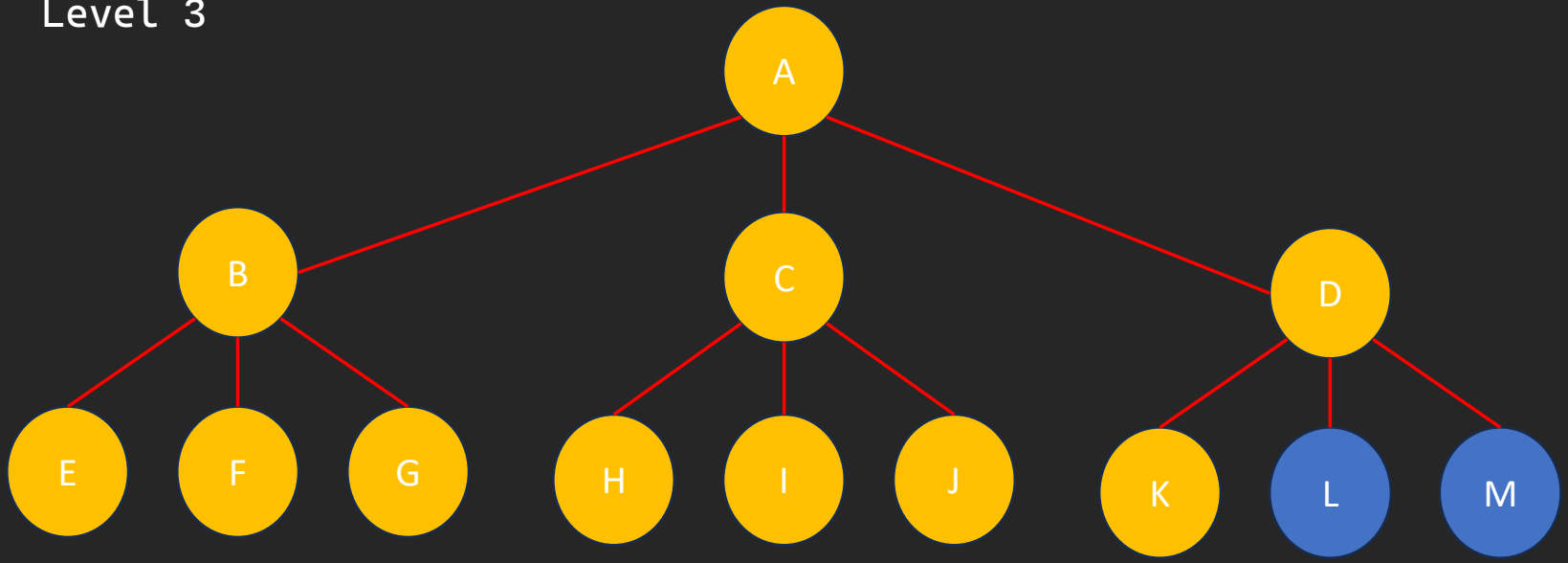

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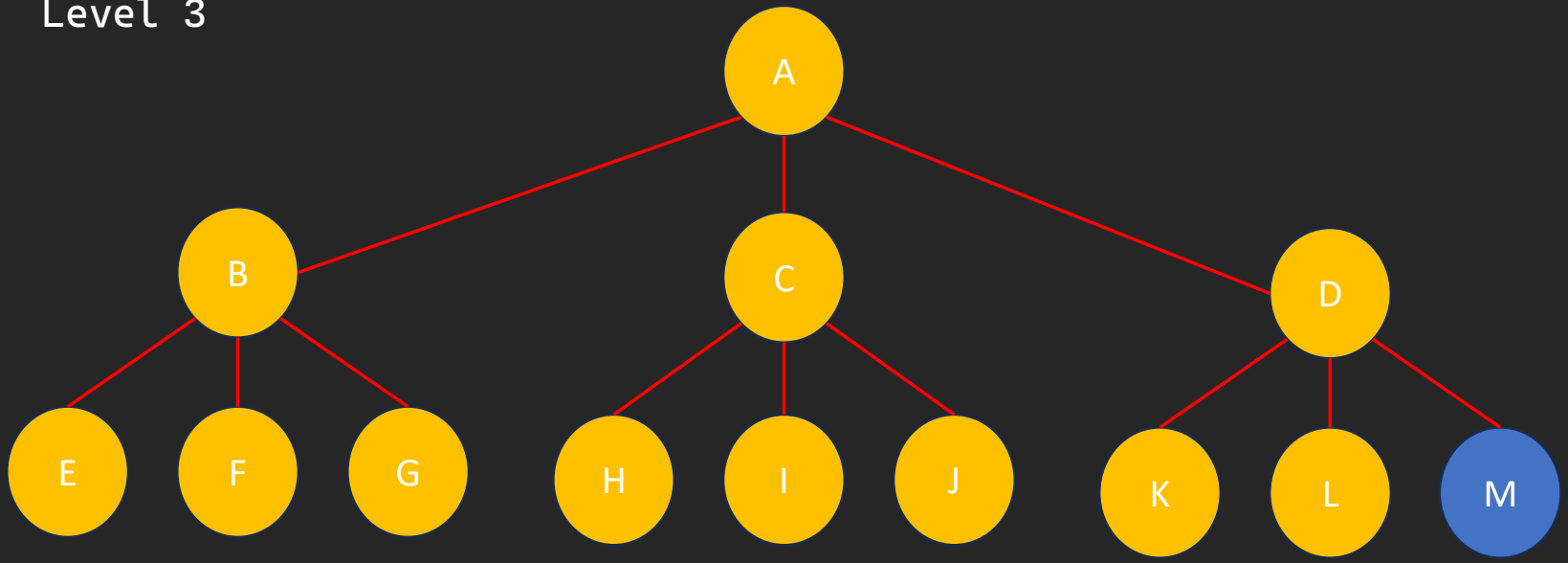
BFS: Breadth First Search.

Level 3



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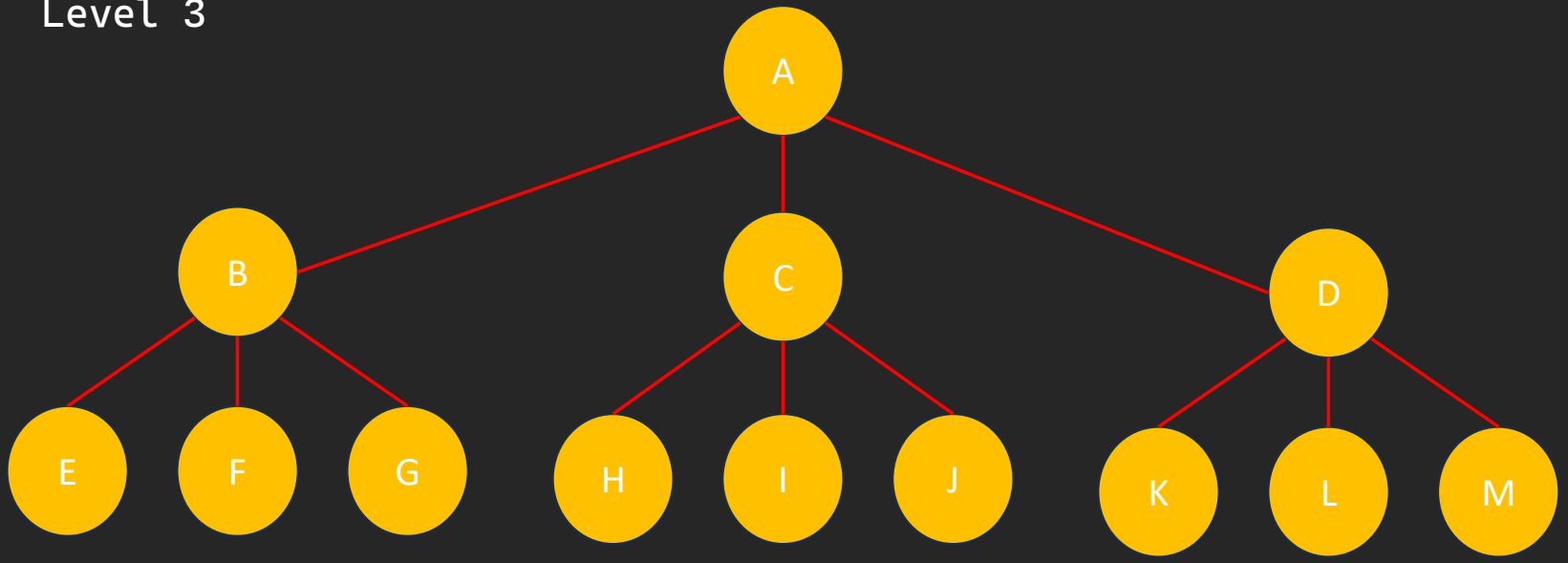
BFS: Breadth First Search.

Level 3



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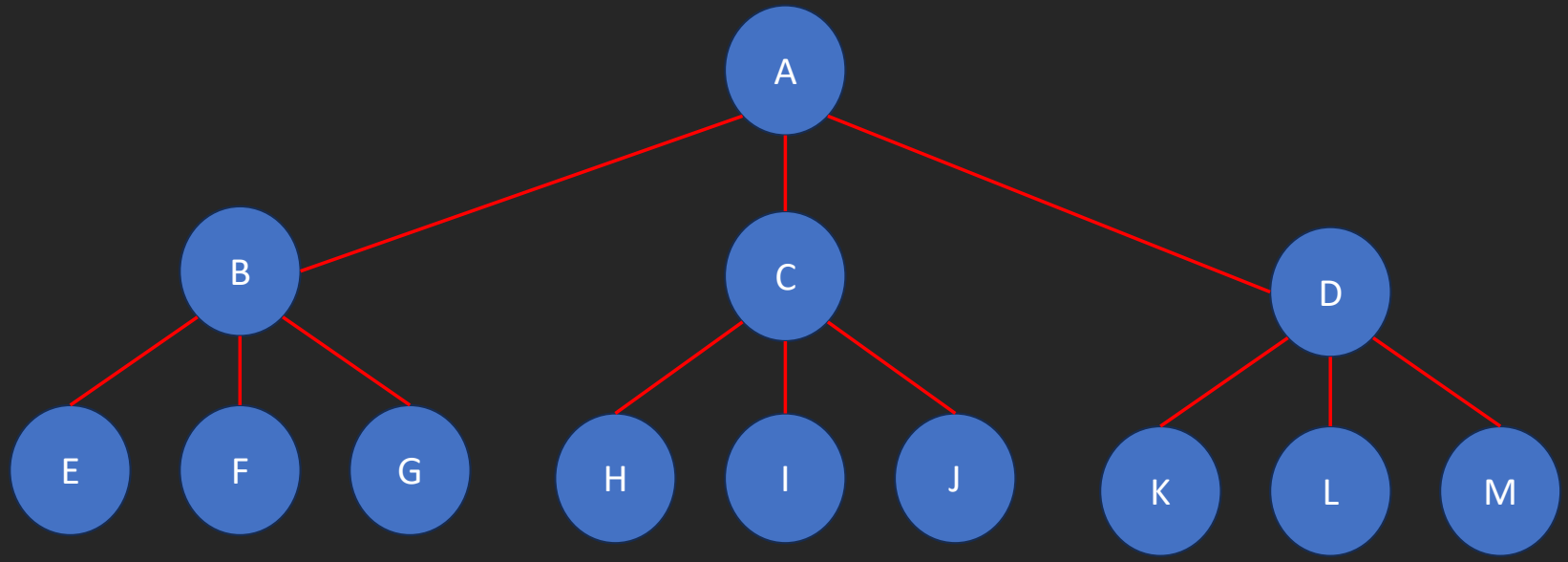
DFS: Depth First Search.

We traverse all adjacent vertices one by one.
When we traverse an adjacent vertex, we completely finish the traversal of all vertices reachable through that adjacent vertex.



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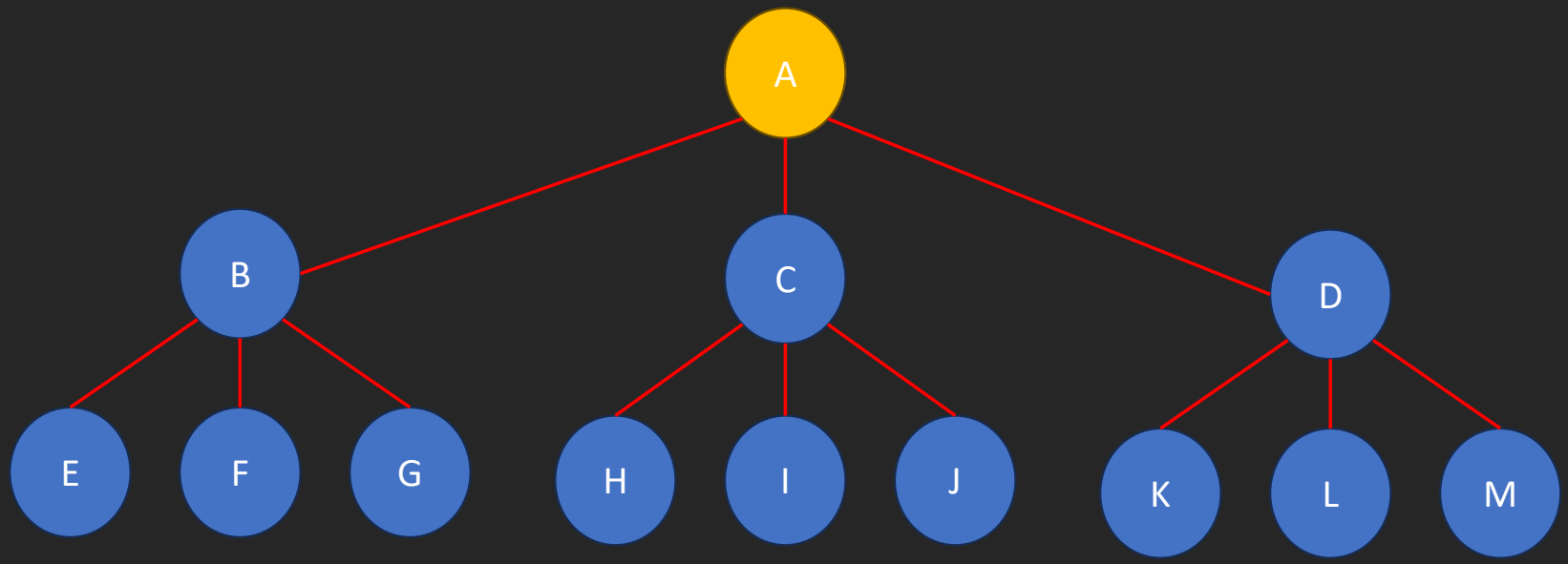
DFS: Depth First Search.

We start with A or any node.

Print

A



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DFS: Depth First Search.

Then we go to B

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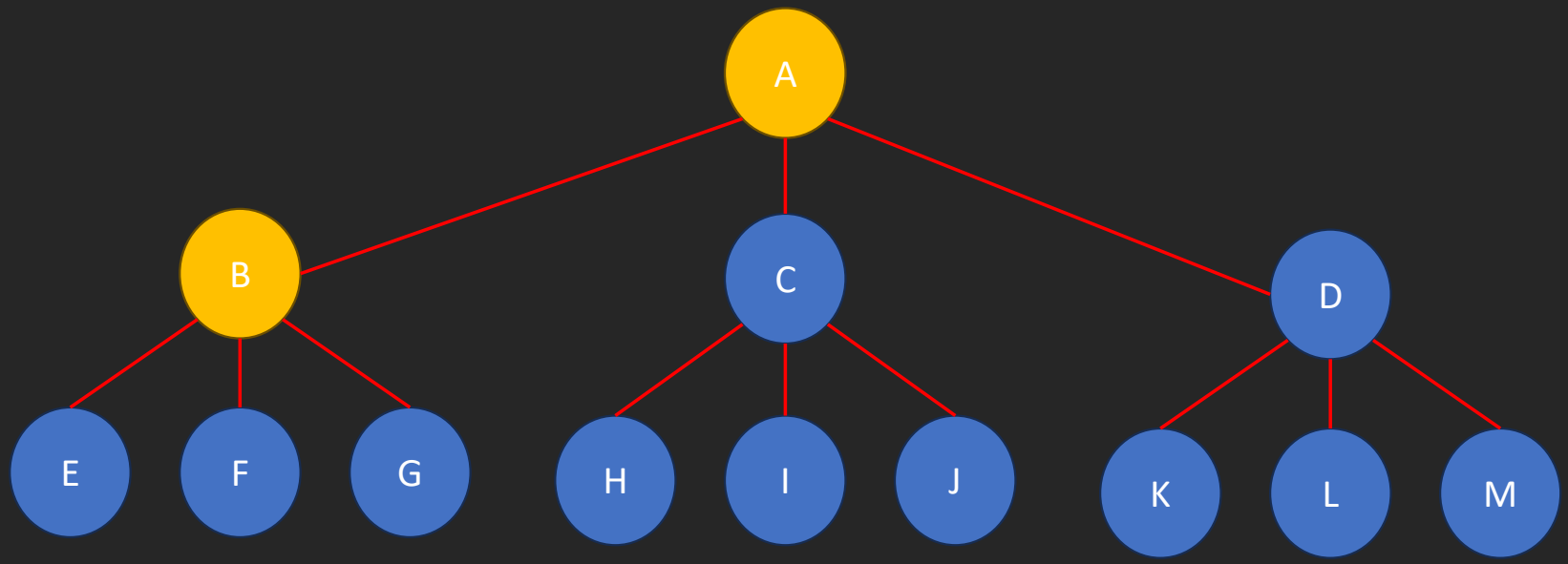
B



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DFS: Depth First Search.

Then we go to E

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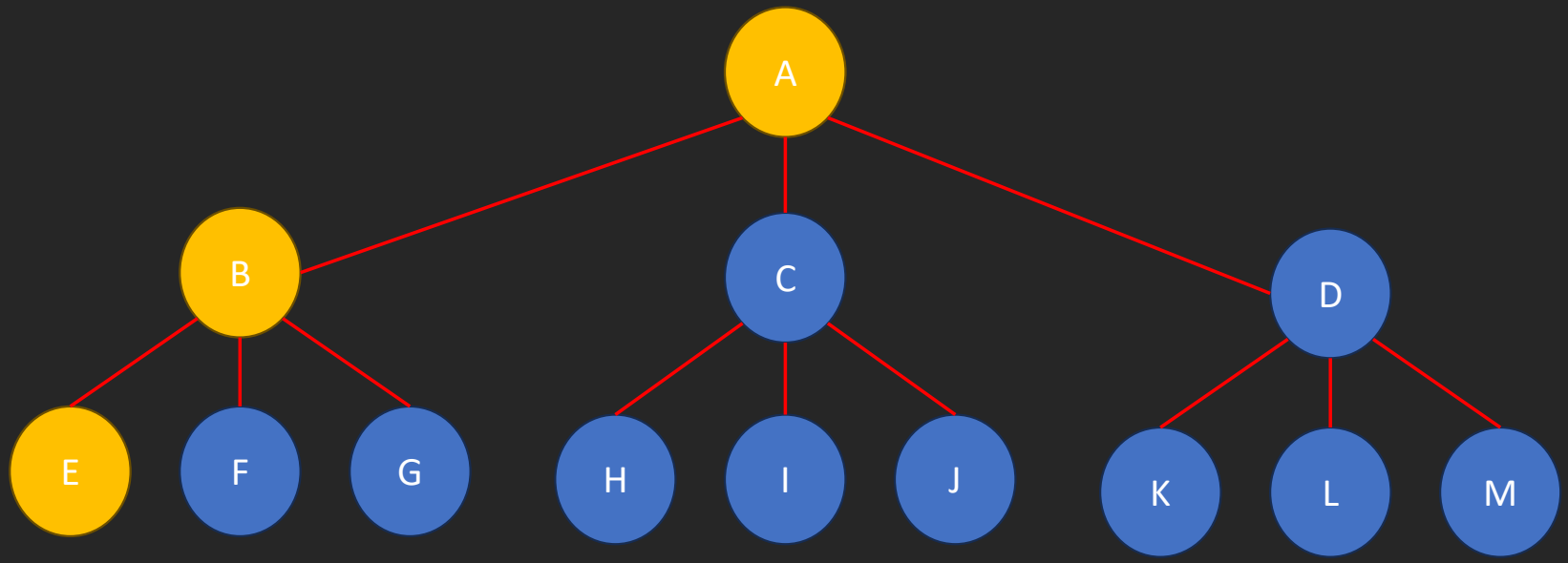

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DFS: Depth First Search.

Now E has no connected nodes to it, we back track to B and branch from there so we go to F

Print

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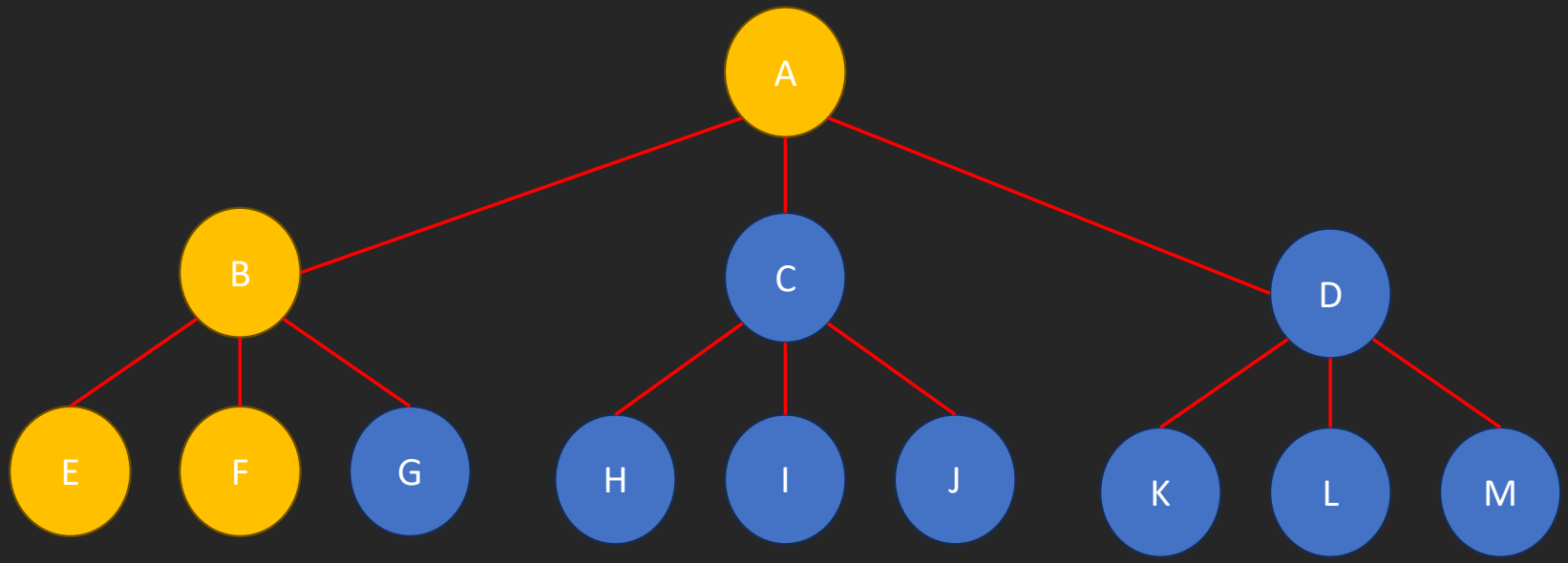

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DFS: Depth First Search.

Now F has no connected nodes to it, we back track to B and branch from there so we go to G because F is visited already

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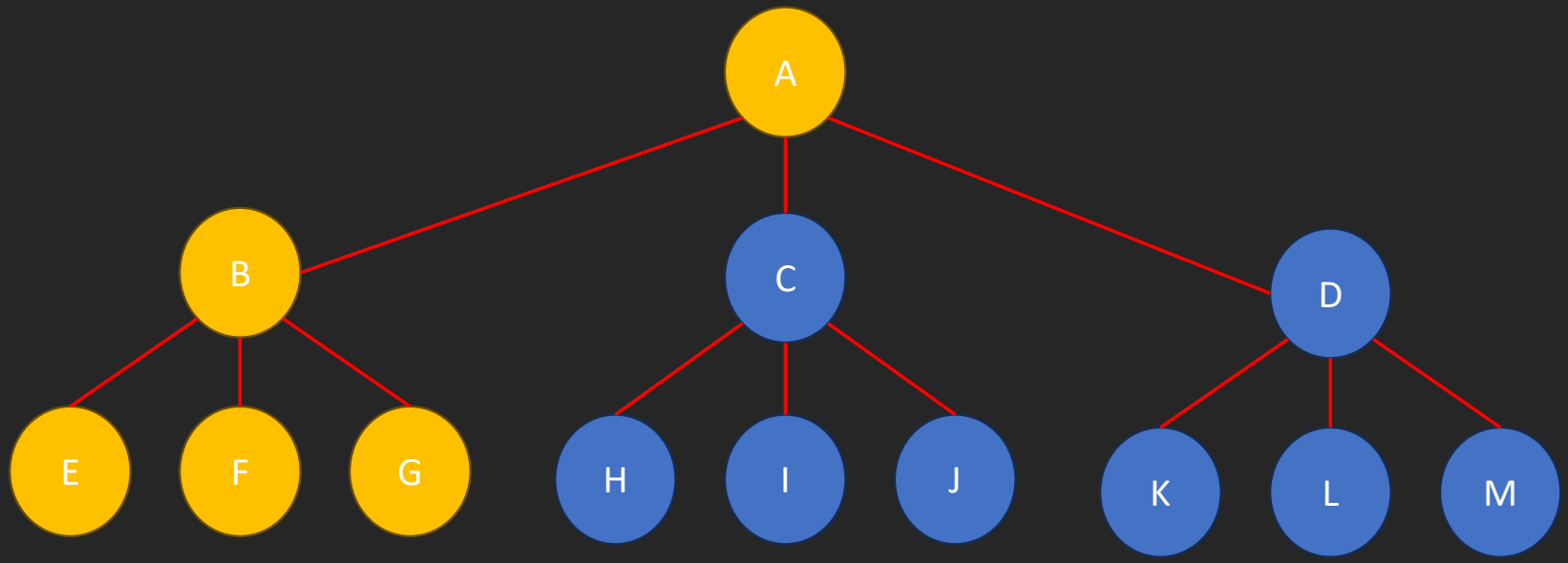

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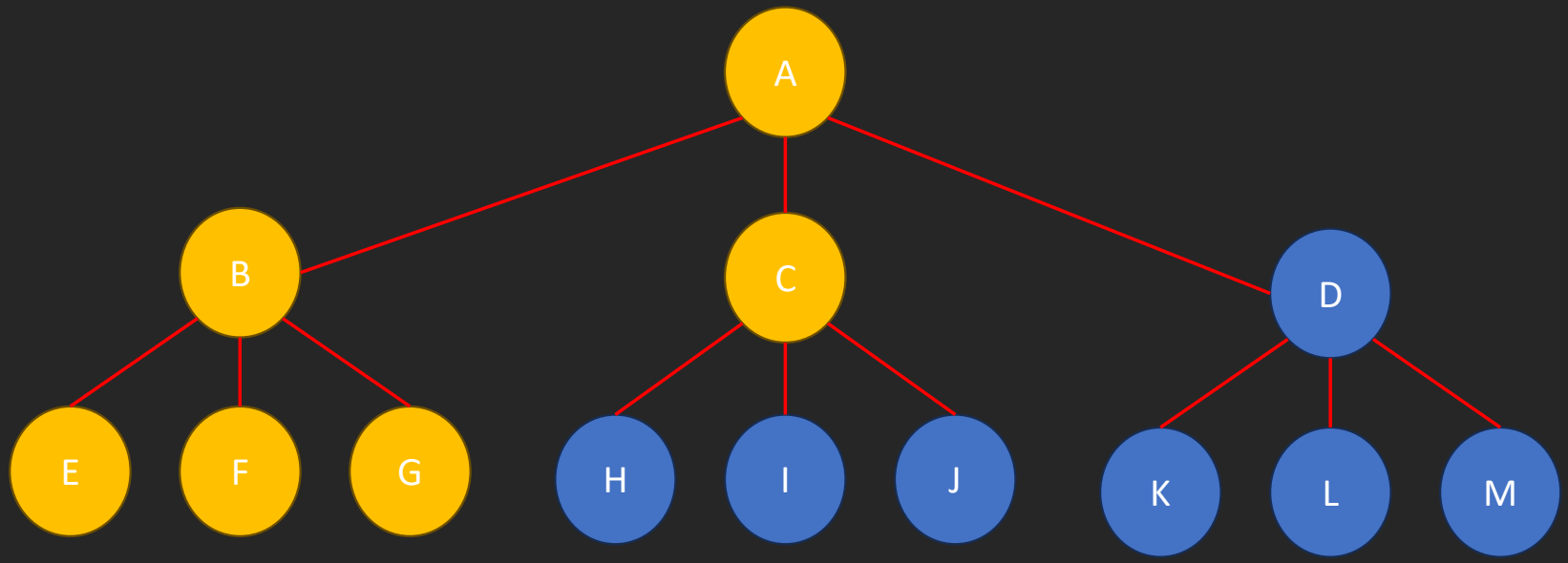
DFS: Depth First Search.

Now G has no connected nodes to it, we back track to B but B and all branches are visited so we back track to A and branch from there so we go to C.



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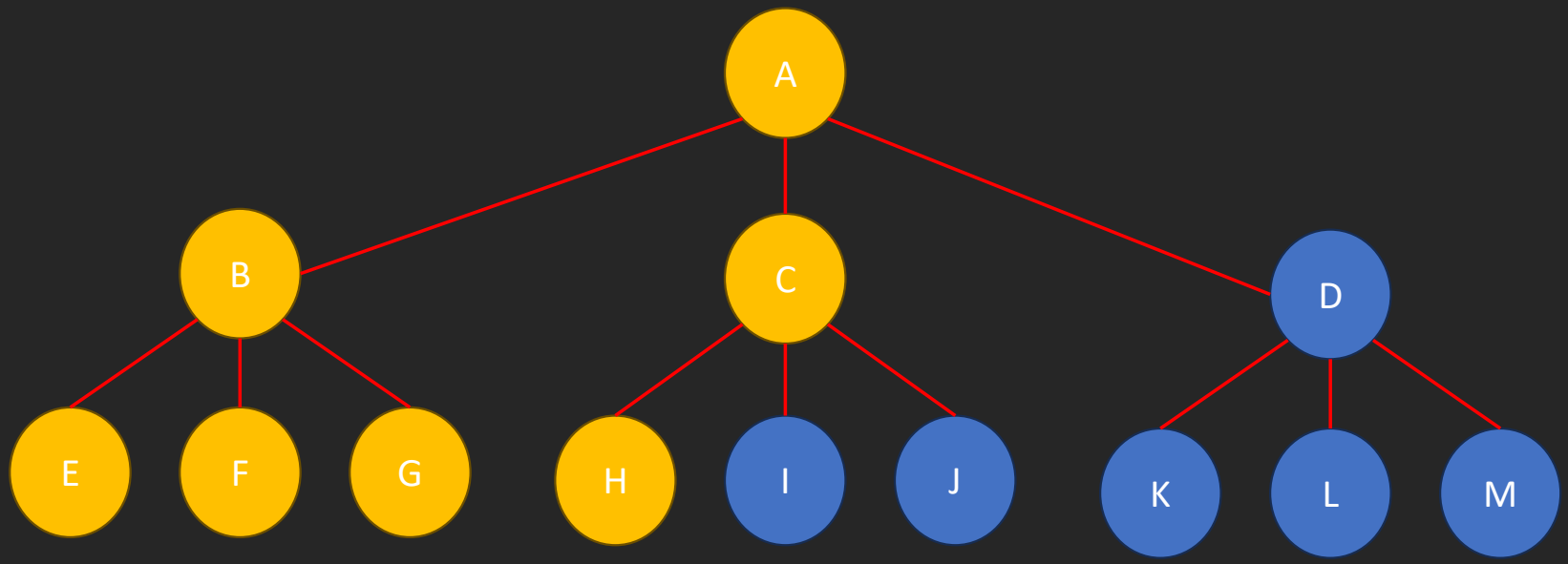
DFS: Depth First Search.

Now C has connected nodes to it, we go to H.



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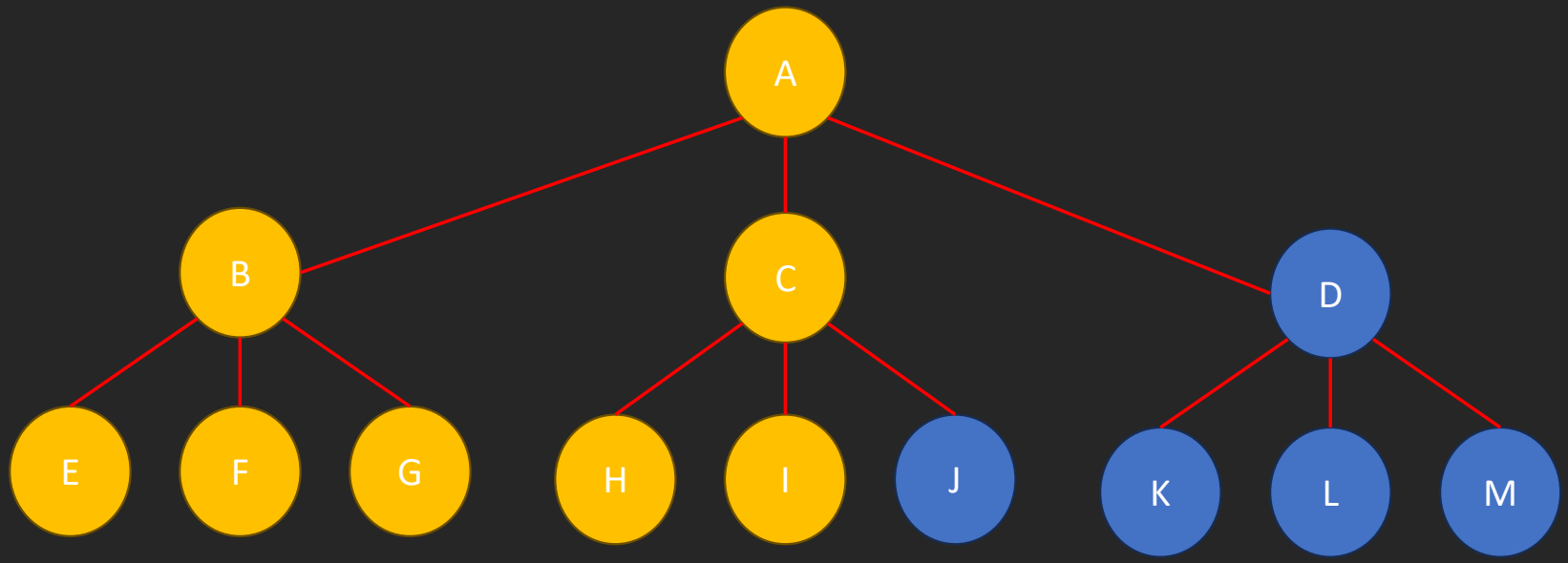
DFS: Depth First Search.

Now H has no connected nodes to it, we go back track to C and branch from there, so we go to I.



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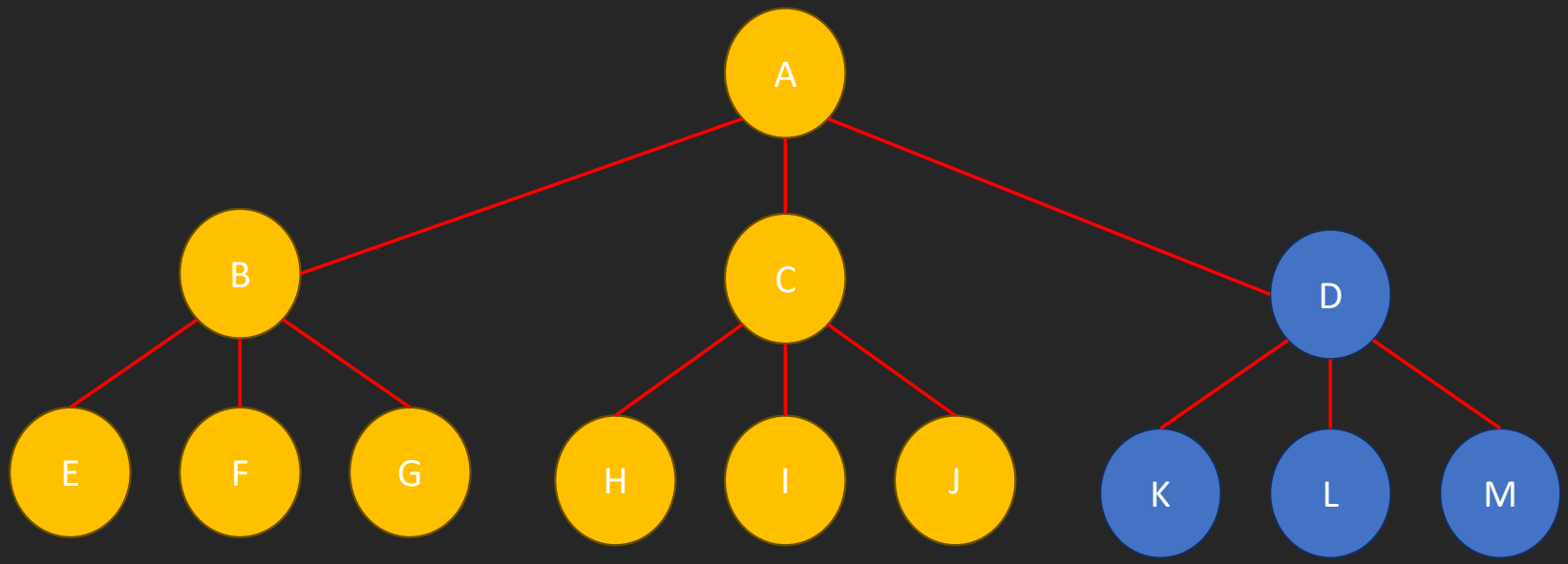
DFS: Depth First Search.

Now I has no connected nodes to it, we go back track to C and branch from there, so we go to J.



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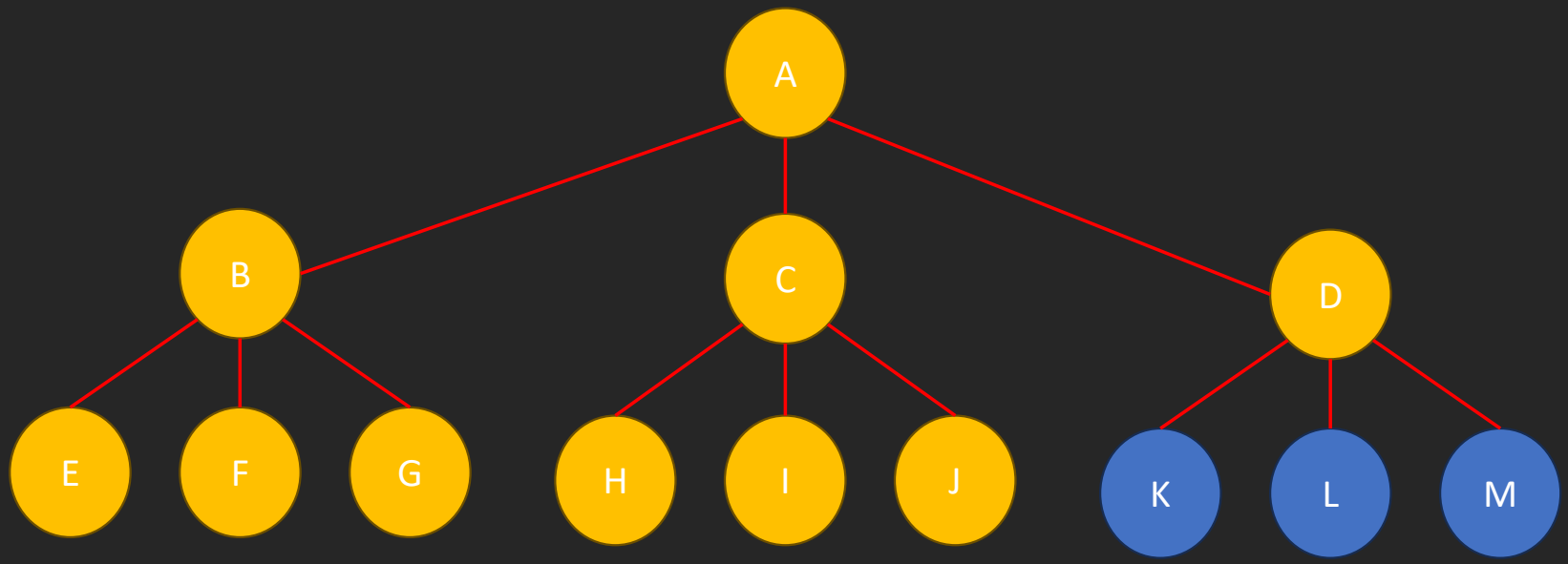
DFS: Depth First Search.

Now J has no connected nodes to it, we go back track to C and branch from there but we visited all node, so we go to backtrack A then D.



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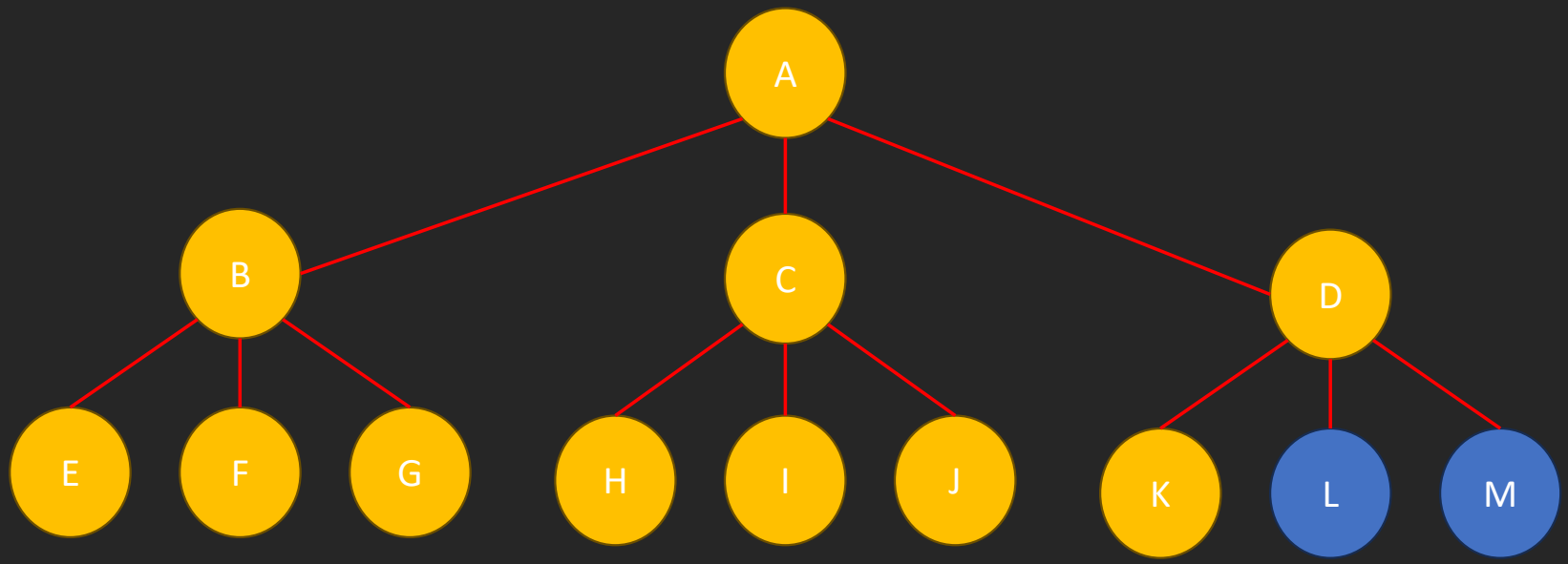
DFS: Depth First Search.

Now D has connected nodes to it, we go to K.



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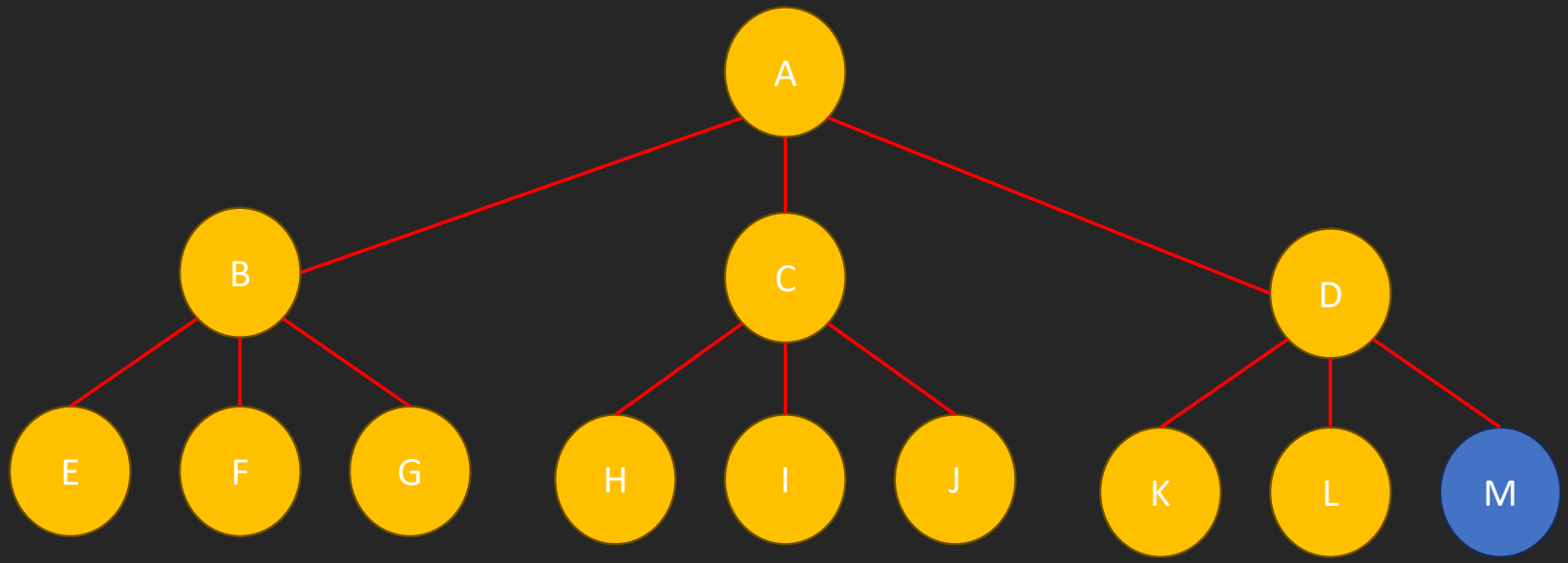
DFS: Depth First Search.

Now K has no connected nodes to it, we go backtrack to D and branch from there , so we go to L.



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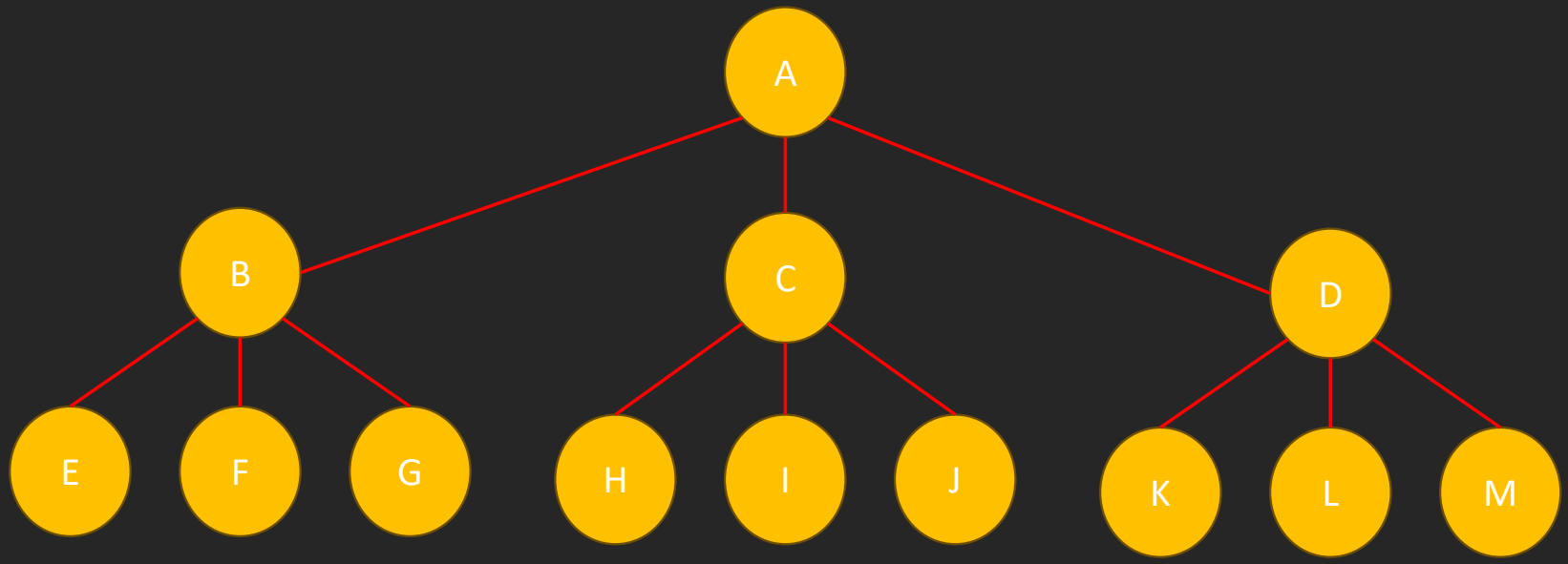
DFS: Depth First Search.

Now L has no connected nodes to it, we go backtrack to D and branch from there , so we go to M.



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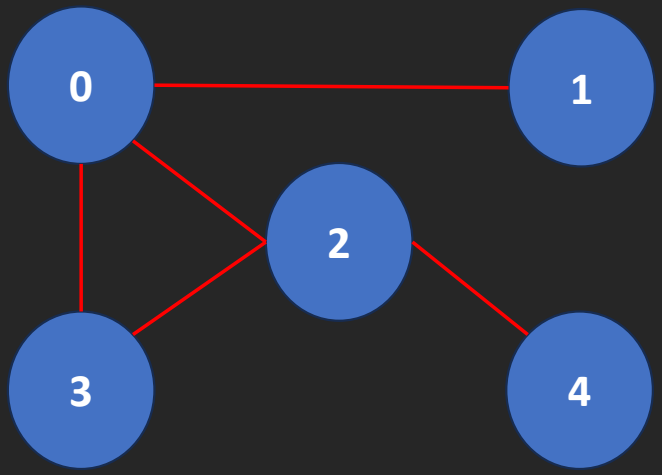
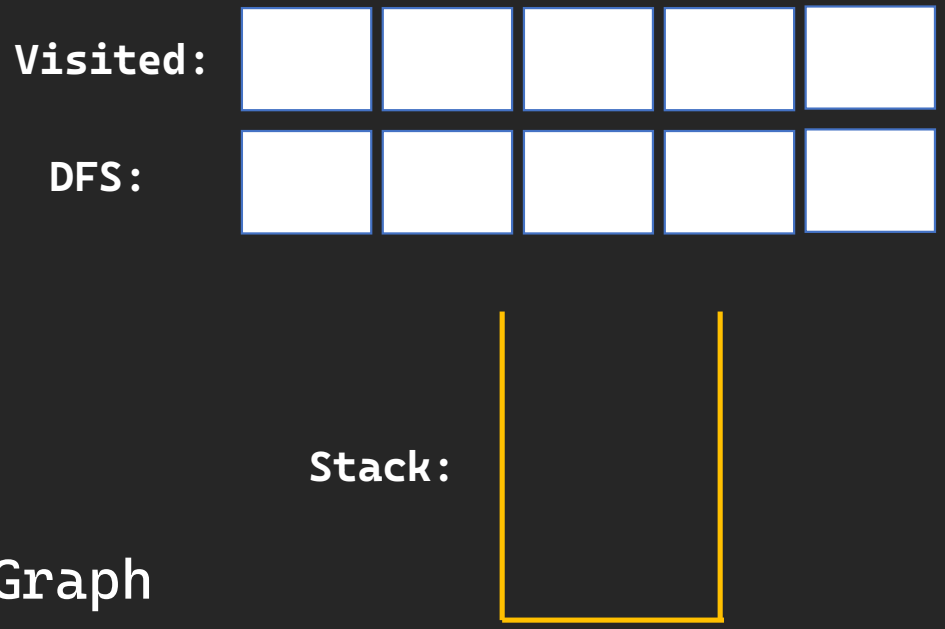
How Does DFS Work?

Step 0: Initially Stack and Visited Array are Empty.





DFS On Graph

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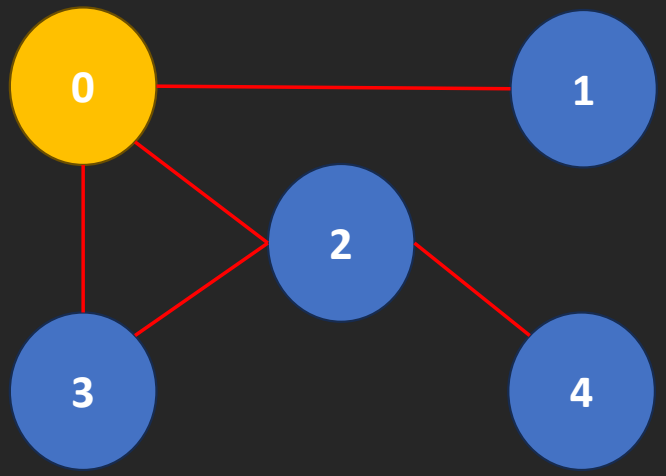
How Does DFS Work?

Step 1: Visit 0 and put all it's adjacent nodes which are not visited yet into the stack.



Visited: | 0 | | | | |

DFS: | | | | | |

Stack:

DFS On Graph

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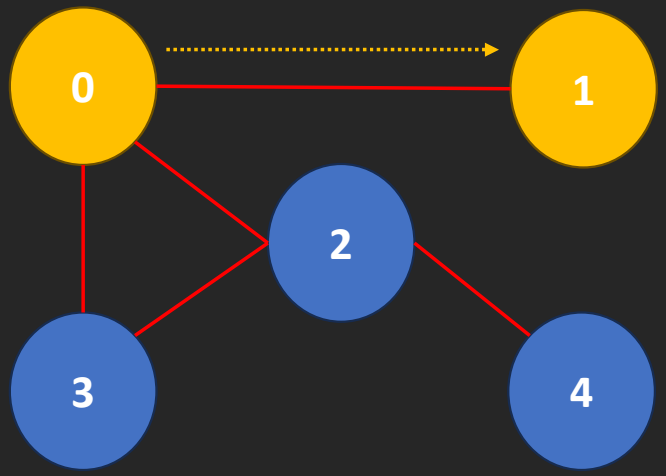
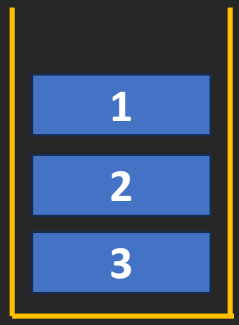
How Does DFS Work?

Step 2: Now Node 1 at the top of the stack, so visit node 1 and pop it from the stack and put all it's adjacent node in the stack.



Visited:	0	1	2	3	
DFS:	0				

Stack:



DFS On Graph

Mohammed Abu-Hadhoud
MBA, PMOC, PgMPD, PMPD, PMI-RMPD, CM, ITILF, MCPD, MCSD
26+ years of experience

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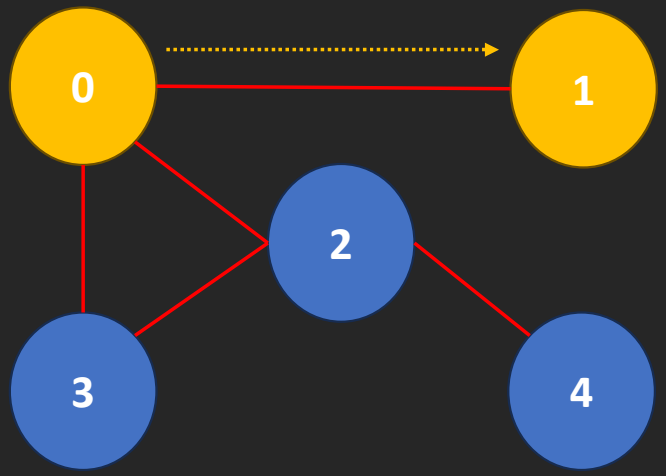
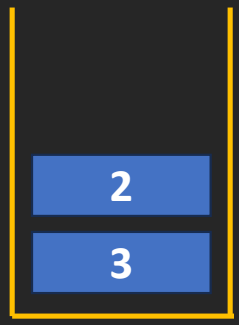


Visited:	0	1	2	3	
DFS:	0	1			

Stack:



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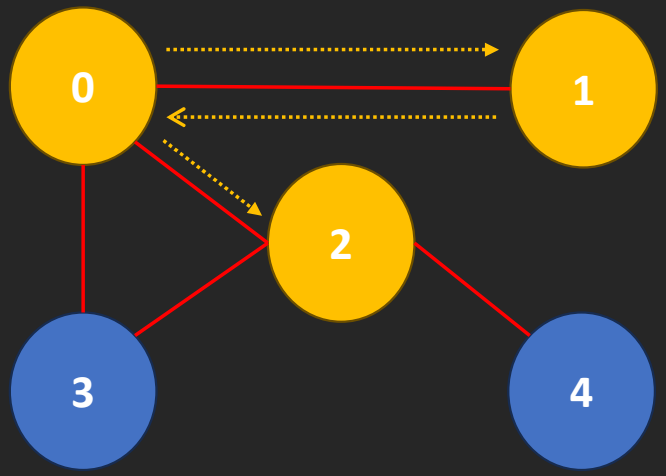
26+ years of experience

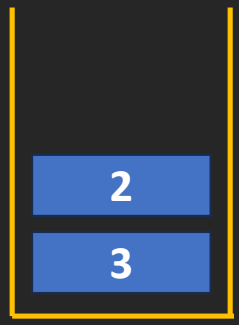
How Does DFS Work?

Step 3: Now Node 2 at the top of the stack, so visit node 2 and pop it from the stack and put all it's adjacent node in the stack.



Visited:	0	1	2	3	
DFS:	0	1			

Stack:



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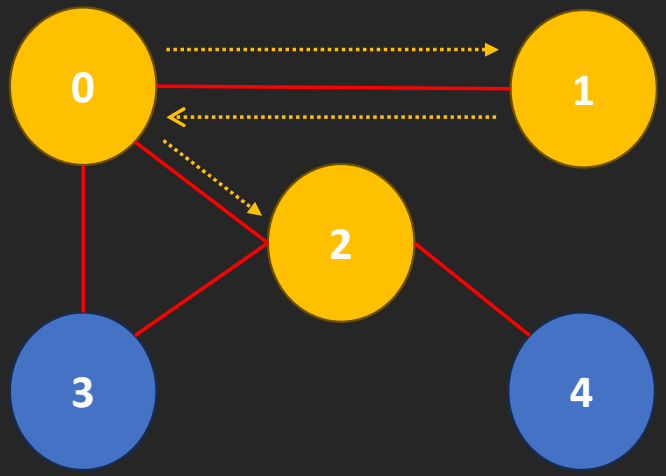

Visited:	0	1	2	3	
DFS:	0	1	2		

Stack:

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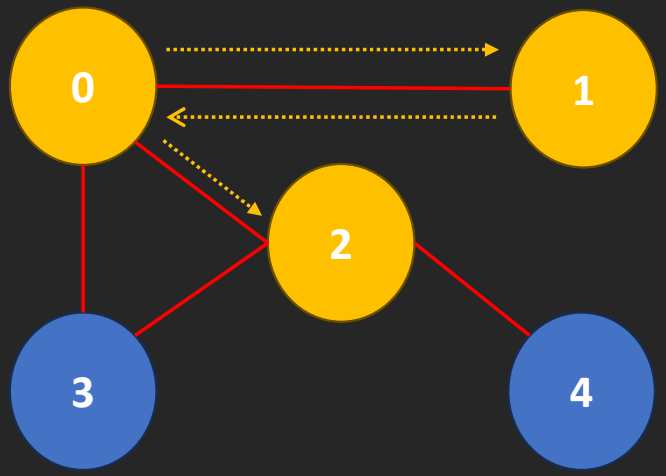
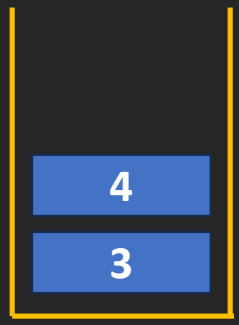


Visited:	0	1	2	3	4
DFS:	0	1	2		

Stack:



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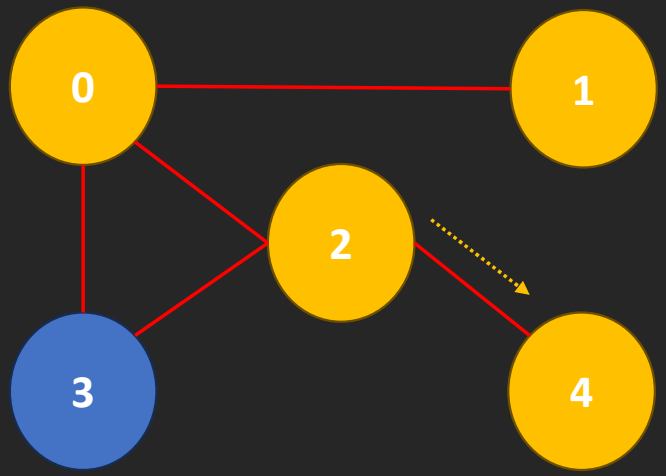
26+ years of experience

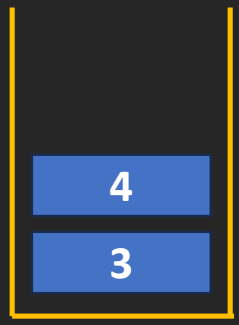
How Does DFS Work?

Step 4: Now Node 4 at the top of the stack, so visit node 4 and pop it from the stack and put all it's adjacent node in the stack.



Visited:	0	1	2	3	4
DFS:	0	1	2		

Stack:



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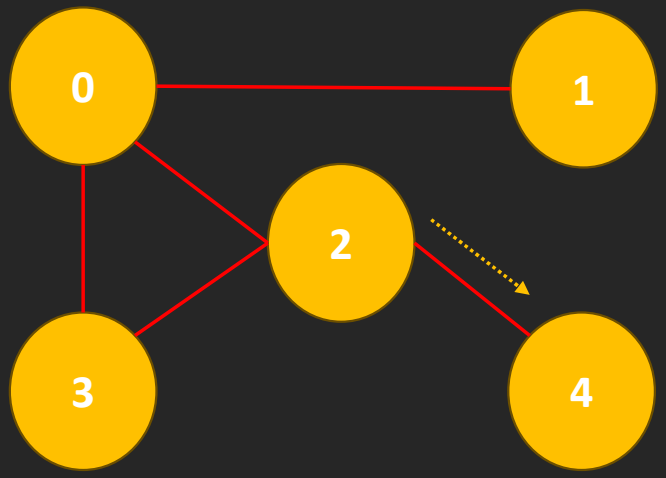
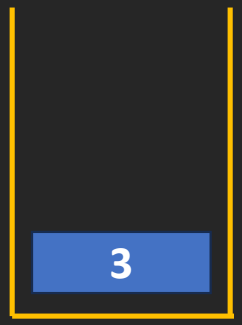
How Does DFS Work?

Step 5: Now Node 3 at the top of the stack, so visit node 3 and pop it from the stack and put all it's adjacent node in the stack.



Visited:	0	1	2	3	4
DFS:	0	1	2	4	

Stack:



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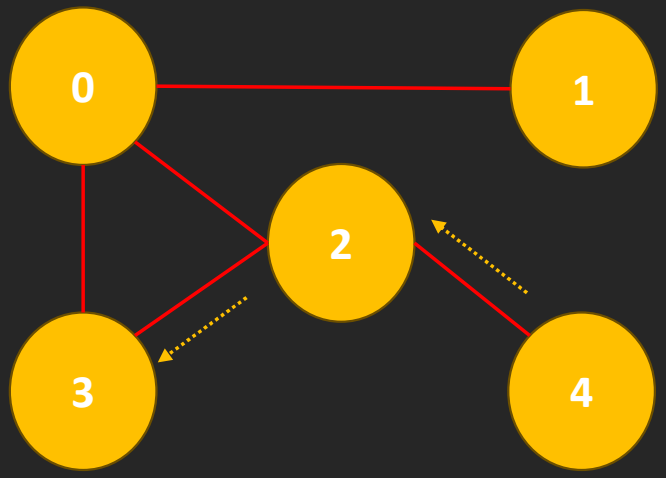

Visited:

0	1	2	3	4

DFS:

0	1	2	4	3

Stack:

Now the stack is empty Which means that we visited all nodes, and DFS ends.

DFS On Graph

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