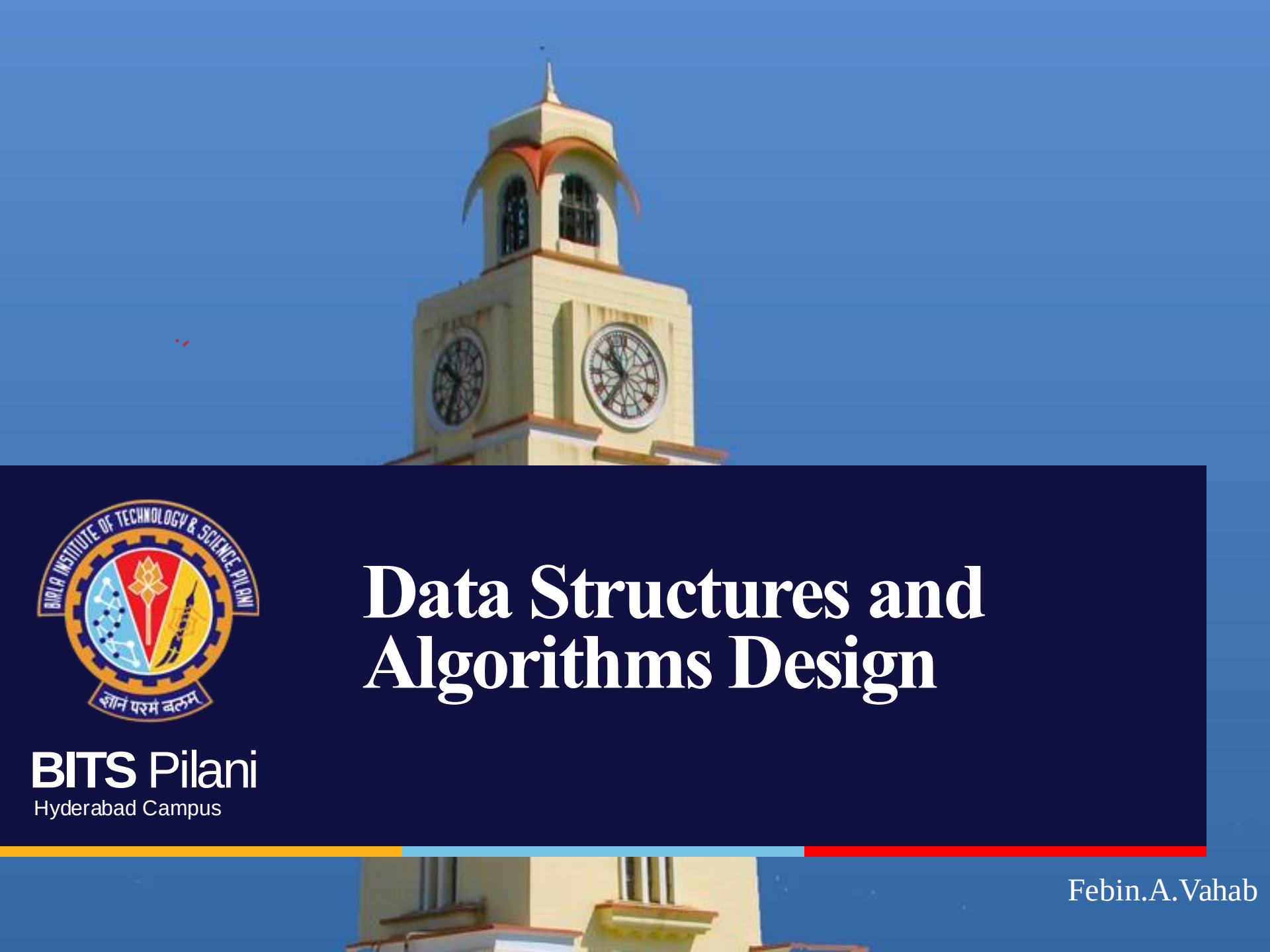


Data Structures and Algorithms Design

BITS Pilani
Hyderabad Campus

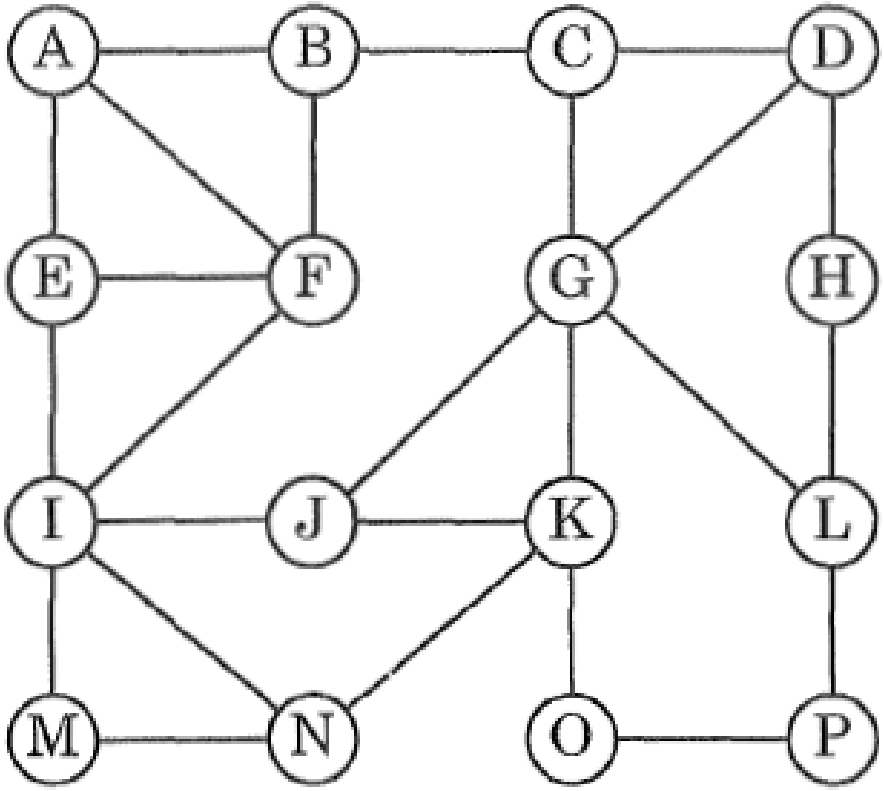
Febin.A.Vahab

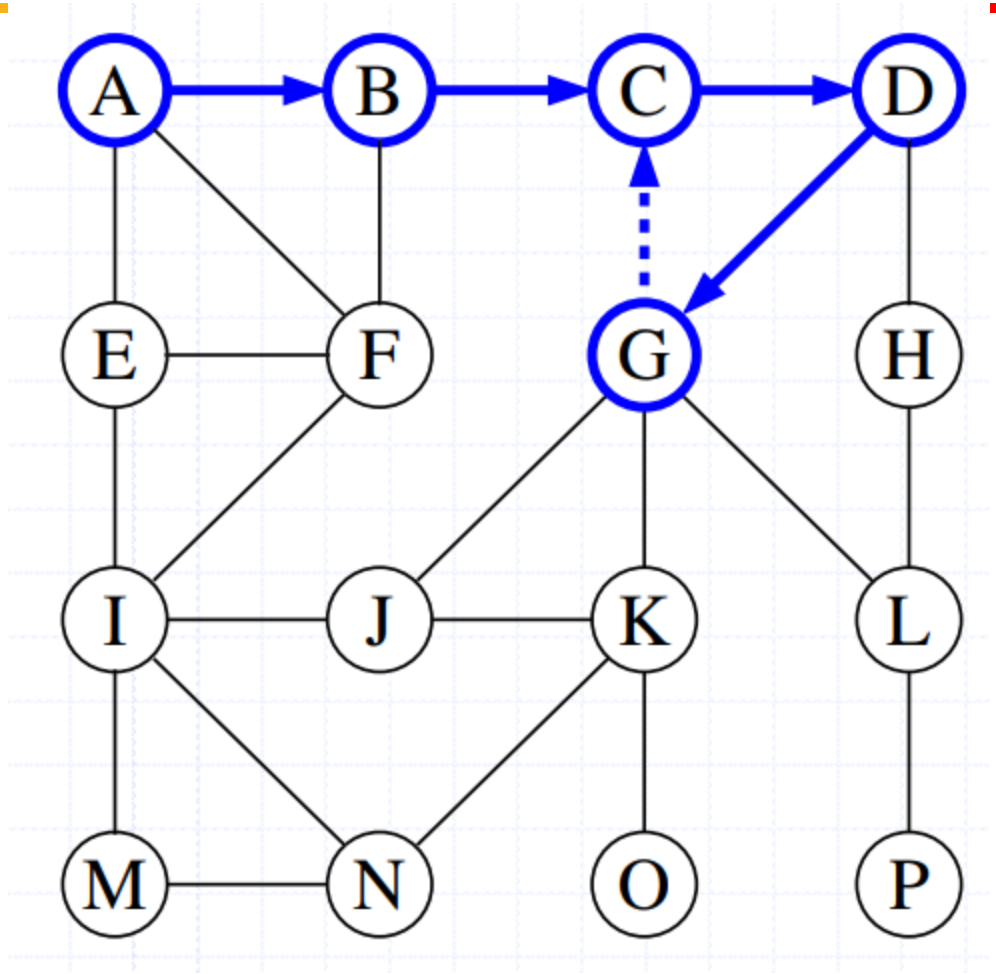
Depth-First Search

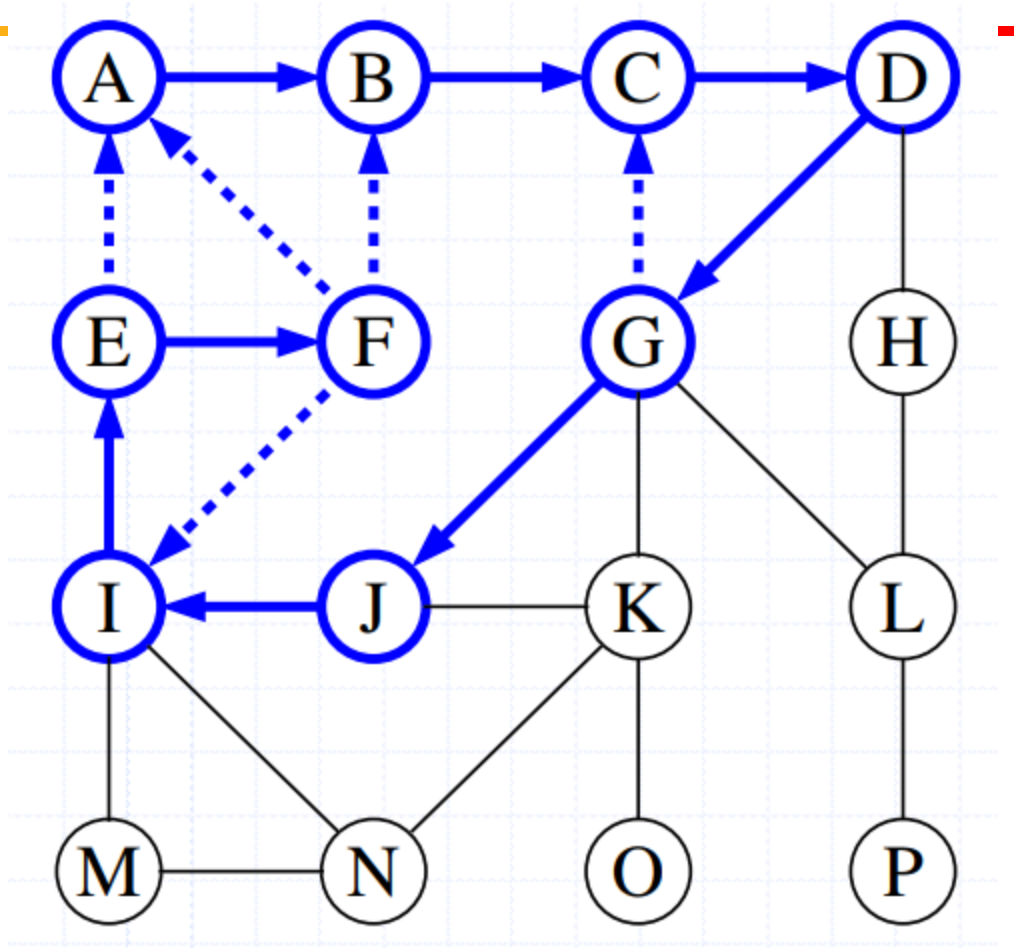
```
Algorithm DFS(G)
    Input graph G
    Output labeling of the edges of G
        as discovery edges and
        back edges
  for all u ∈ G.vertices()
    setLabel(u, UNEXPLORED)
  for all e ∈ G.edges()
    setLabel(e, UNEXPLORED)
  for all v ∈ G.vertices()
    if getLabel(v) = UNEXPLORED
        DFS(G, v)
```

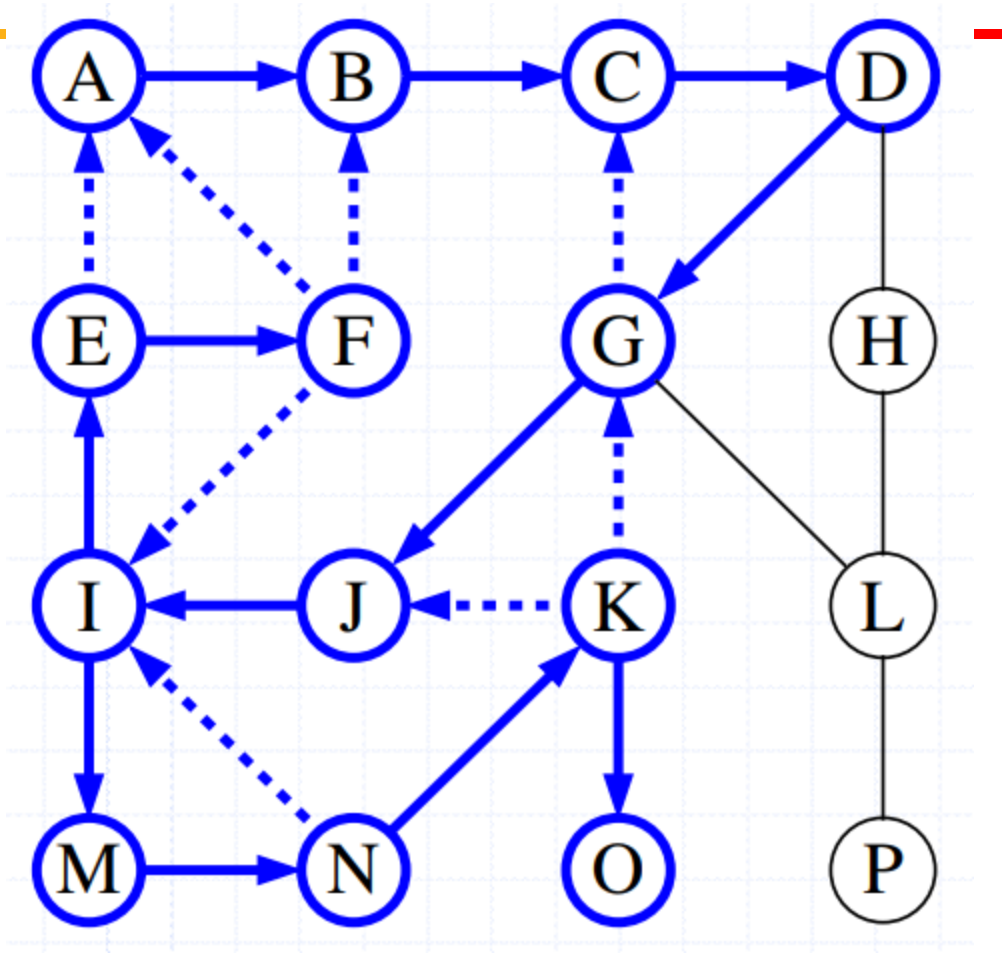
```
Algorithm DFS(G, v)
    Input graph G and a start vertex v of G
    Output labeling of the edges of G
        in the connected component of v
        as discovery edges and back edges
  setLabel(v, VISITED)
  for all e ∈ G.incidentEdges(v)
    if getLabel(e) = UNEXPLORED
        w ← opposite(v,e)
        if getLabel(w) = UNEXPLORED
            setLabel(e, DISCOVERY)
            DFS(G, w)
        else
            setLabel(e, BACK)
```

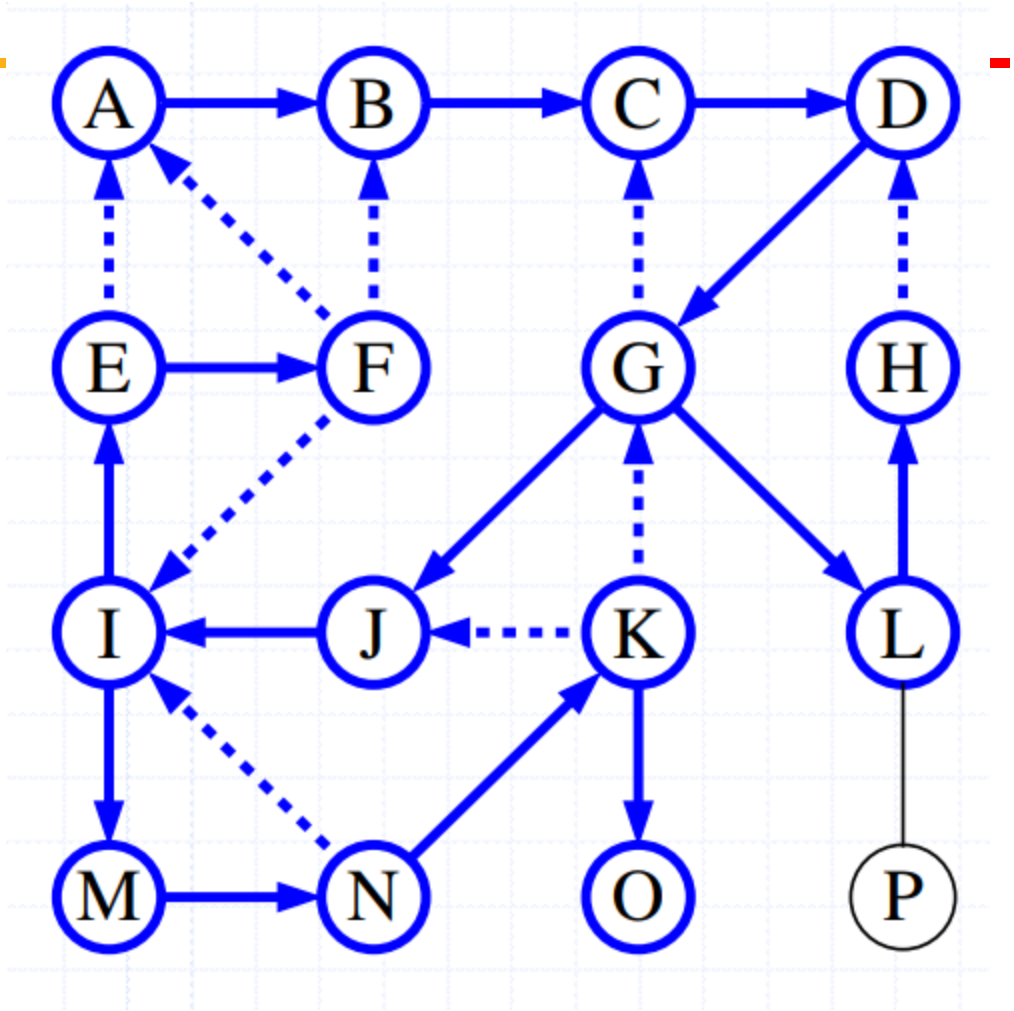
Example 1-Solved

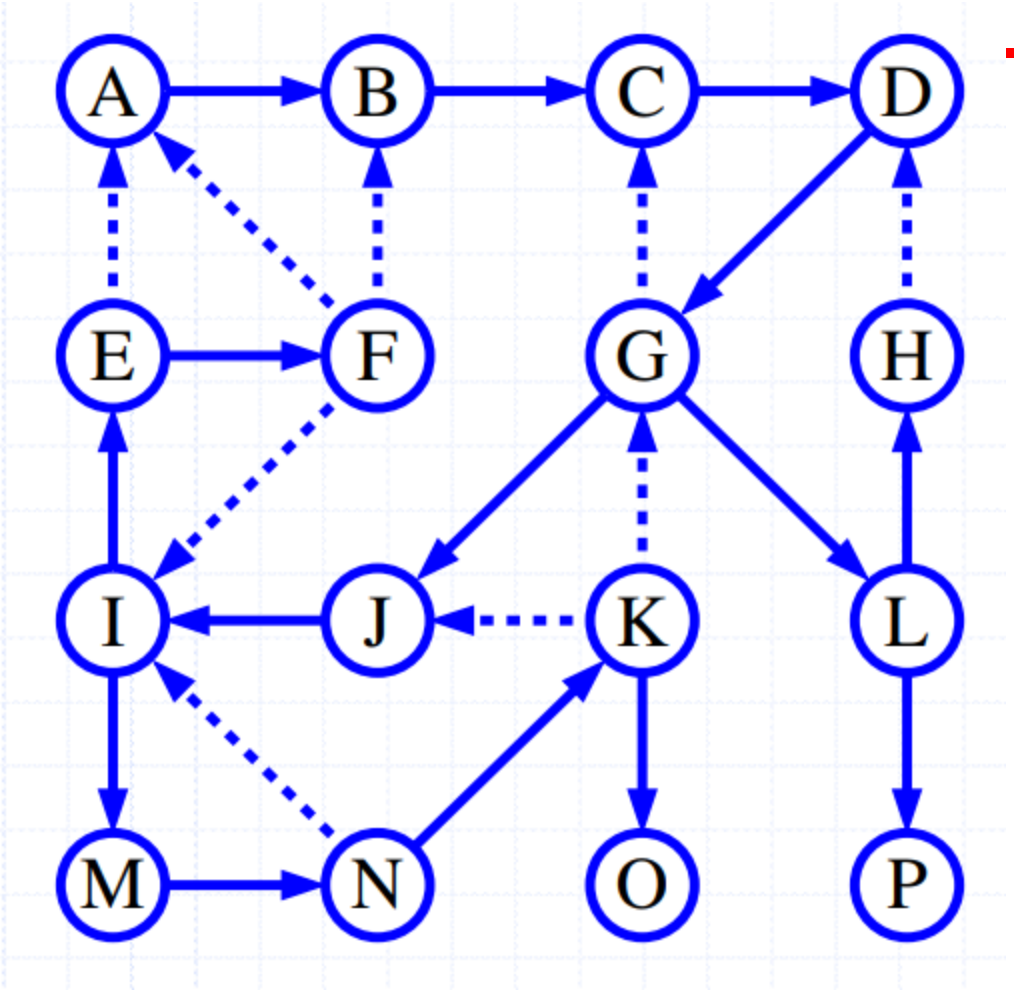



A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

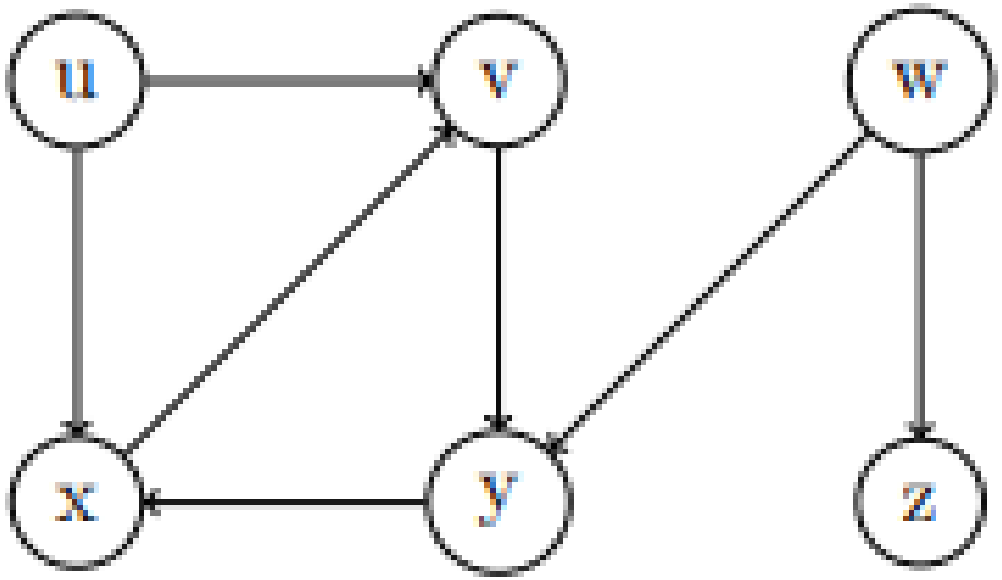

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P


A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

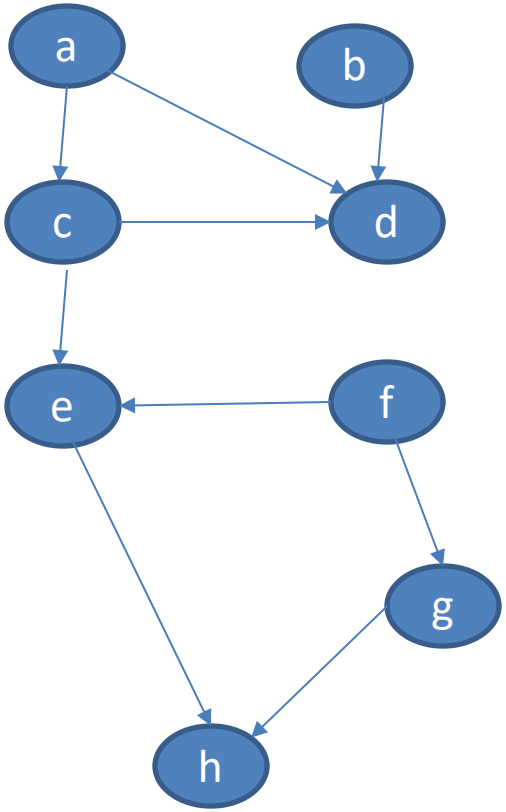

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P


A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

Example 2-Directed graph-Find the DFS tree-Discuss in Canvas



Example 3-Directed graph-Find the connected Components-Discuss in Canvas



THANK YOU!

BITS Pilani
Hyderabad Campus