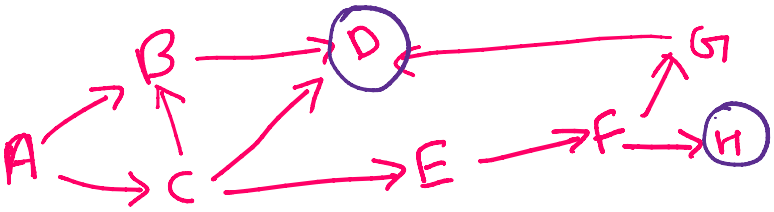
Lecture 4

04 August 2022 15:51

Topological Sort:



Order will be

(a) H, D, G, F, E, B, C, A

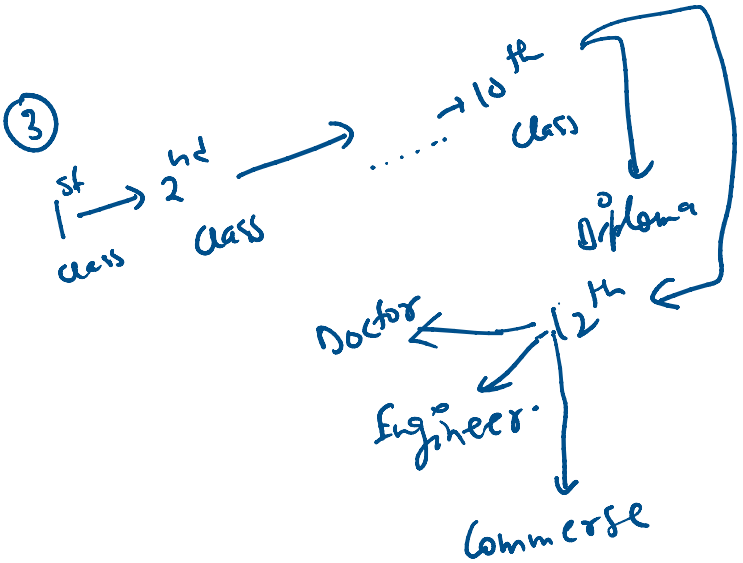
(b) H, D, G, B, F, E, C, A

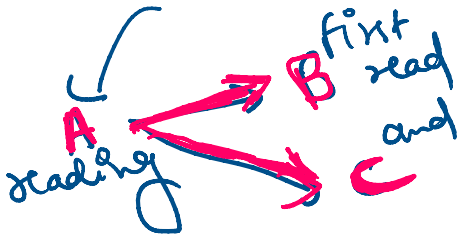
(c) H, D, B, G, F, E, C, A.

all are correct.

e.g. → ① function execution of C++, ...

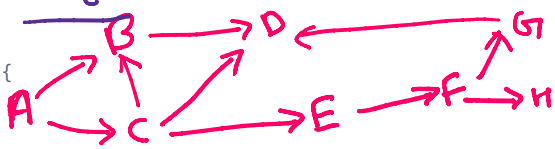
② reading book.



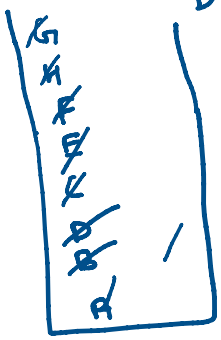


```cpp
void dfs(vector<vector<int>> &Graph,int src,vector<bool>
&visited){
    visited[src] = true;
    for(int i = 0 ; i < Graph[src].size() ; i++){
        if(!visited[Graph[src][i]]){
            dfs(Graph,Graph[src][i],visited);
        }
    }
    cout<<src<<" ";
}
vector<int> topologicalSort(vector<vector<int>> &Graph){
    int n = Graph.size();
    vector<bool> visited(n,false);
    for(int i = 0 ; i < n ; i++){
        if(!visited[i])
            dfs(Graph,i,visited);
    }
}
```

e.g. 1.



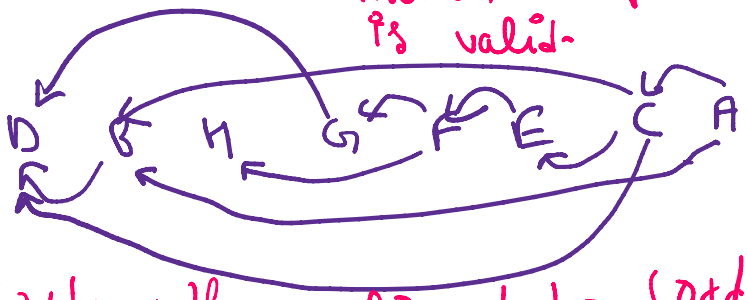
A ✓ F ✓
B ✓ G
C ✓ H ✓
D ✓
E ✓



O/P → D B H G F E C A

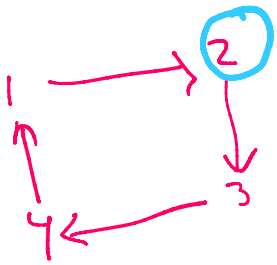
How to check one i/p right or not!.

if every edge in topo sort in one direction, than topo sort is valid.

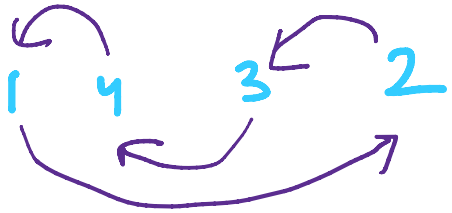


that's why valid topo sort

e.g. 2



X

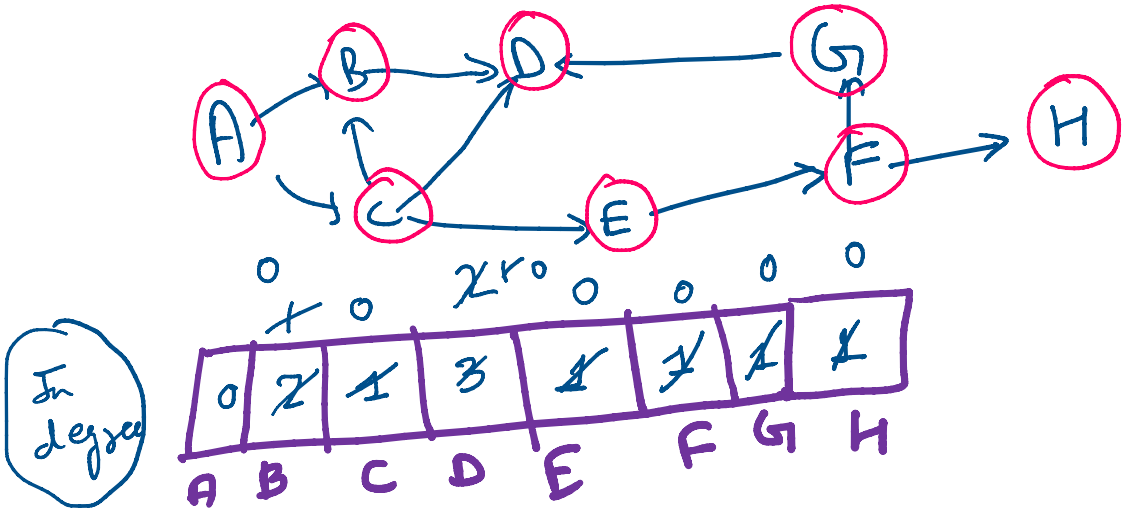


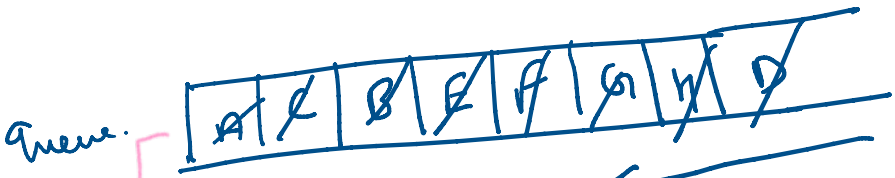
X

[Not valid topo as there are cycles.

Now How to Know Given Order is Correct Or NOT !!!.

→ use Khan's Algorithem.





if its size is not equal to number of vertices, there is a cycle in the Graph