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## Leetcode May Challenge DAY: 29

## 1. Python

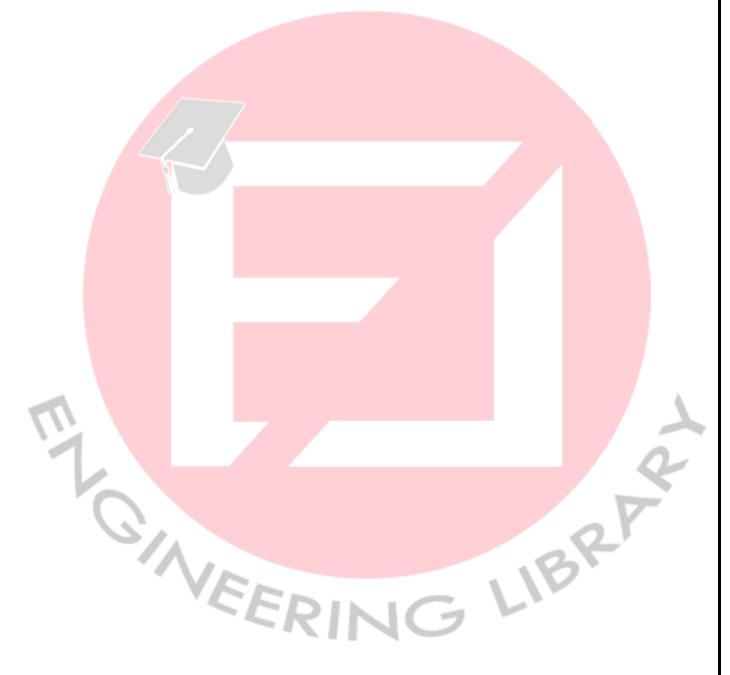
This is a classical problem showing how topological sort works. Topological sort can be implemented by a queue, and it's kind of BFS. Everytime we enqueue the vertices with indegree 0, keep a counter to count how many vertices have been sorted, if there's no cycle, the counter should be equal to be total number of courses.

```
class Solution:
```

```
def canFinish(self, numCourses: int, prerequisites: List[List[int]]) -> bool:
    # construct a graph, using adjacency list
    g = collections.defaultdict(list)
    indeg = collections.defaultdict(int)
    tot = numCourses
    for i in range(tot):
       indeg[i] = 0
    for i in range(len(prerequisites)):
       cur, pre = prerequisites[i]
       g[pre].append(cur)
       indeg[cur] += 1
     q = []
               # then do topological sort
    cnt = 0
    for k in indeg:
                       cur)
       if indeg[k] == 0:
         q.append(k)
    while q:
       cnt += 1
       for vertex in g[cur]:
         indeg[vertex] -= 1
         if indeg[vertex] == 0:
1 | Page Follow me for more interesting programming questions and RAW Code visit my GitHub
profile : https://www.github.com/shubhamthrills
                                            https://www.linkedin.com/in/shubhamsagar
```

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# keep a counter during sorting, if counter < #vertices, there's a cycle
return True if (cnt == tot) else False</pre>



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## 2. C++

```
bool canFinish( int numCourses, vector<vector<int>>& prerequisites )
     /* Create adjacency list and indegree array for each course*/
     vector<int> indegree( numCourses, 0 );
     unordered_map<int, set<int> > adjList;
     for( auto prereq : prerequisites ) {
           adjList[ prereq[1] ].insert( prereq[0] );
           indegree[ prereq[0] ]++;
     /* Add all the sources with indegree zero to queue for
processing */
     queue<int> sources;
     for( int i=0; i < indegree.size(); i++ )</pre>
           if( indegree[i] == 0 )
                 sources.push( i );
     /* For each source visit all neighbours and reduce their
indegrees */
     int noOfCoursesTaken = 0;
     while( !sources.empty() ) {
           ++noOfCoursesTaken;
           int curr = sources.front(); sources.pop();
           for( auto nbr : adjList[curr] ) {
                 --indegree[nbr];
                 if( indegree[nbr] == 0 )
                      sources.push(nbr);
           }
     }
     return noOfCoursesTaken == numCourses;
}
```

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## 3. JAVA

```
class Solution {
  public boolean canFinish(int numCourses, int[][] prerequisites) {
     //An array conating the list of nodes each node is connected to.
     ArrayList<Integer>[] map=new ArrayList[numCourses];
     for(int i=0;i<numCourses;i++){</pre>
       map[i]=new ArrayList();
     }
     //An array containing the indegree of each nodes
     int[] indegree=new int[numCourses];
     Arrays.fill(indegree,0);
     for(int[] p:prerequisites){
       indegree[p[0]]++;
       map[p[1]].add(p[0]);
     //variable to store total number of edges
     int total_edge=prerequisites.length;
     //queue to push nodes with 0 in-degrees.
     Queue<Integer> q=new LinkedList();
     for(int i=0;i<numCourses;i++){</pre>
       if(indegree[i]==0){
          q.offer(i);
       }
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```

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```
int removed=0;
  //keep looping and remove edges with help of nodes having 0 in-degrees.
  //keep a count of number of edges removed. This gives a topological sorted order.
  while(!q.isEmpty()){
    int s=q.size();
    for(int i=0;i<s;i++){
      int x=q.poll();
      for(int next:map[x]){
         indegree[next]--;
         removed++;
        if(indegree[next]==0){
           q.offer(next);
         }
  //check if we are able to remove all the edges or not.
                 EERING LIBRA
  if(removed==total_edge){
    return true;
  else{
    return false;
  }
}
```

}