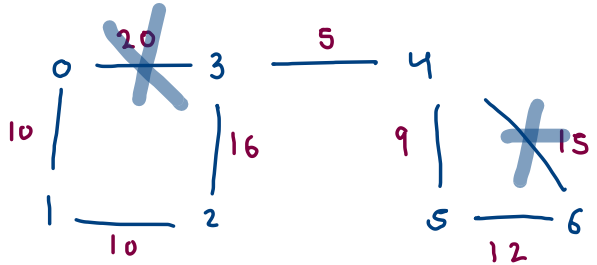
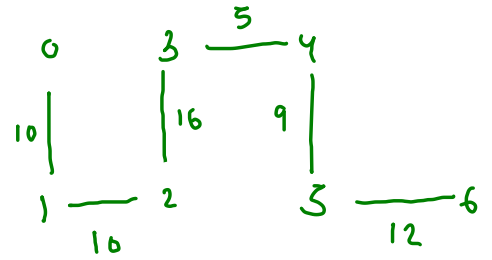
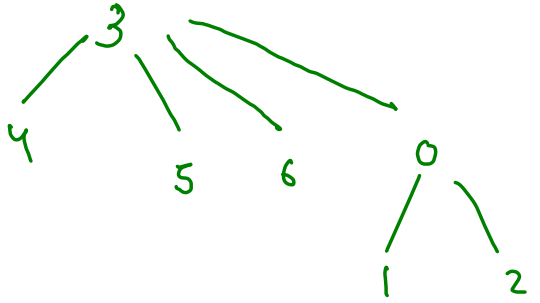
Kruskal Algorithm → Min. spanning tree

DSU







3 - 4 - 5 ✓

4 - 5 - 9 ✓

0 - 1 - 10 ✓

1 - 2 - 10 ✓

5 - 6 - 12 ✓

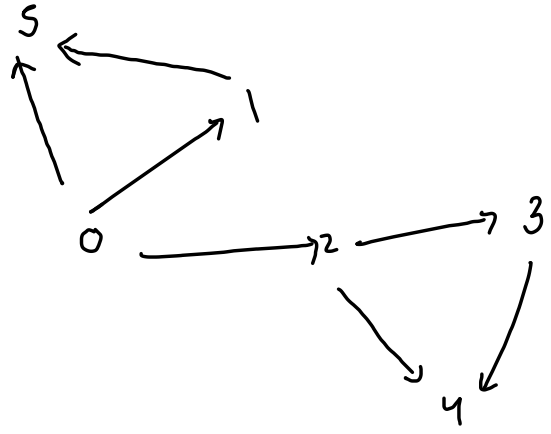
4 - 6 - 15 ✗

2 - 3 - 16 ✓

0 - 3 - 20 ✗

207. Course Schedule

Kahn' algorithm : It gives topological sort, if directed graph is acyclic.
If the directed graph is cyclic, it detects the cycle and stops the algo.



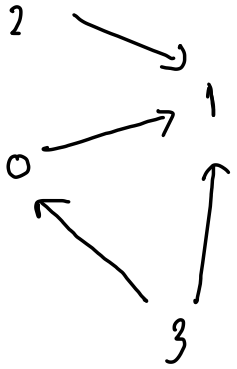
u -> v

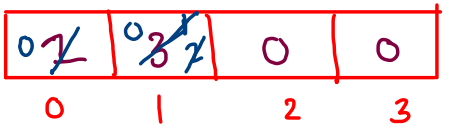
0	1	2	3	4	5
0	1	1	1	2	2

u is dependent on v.

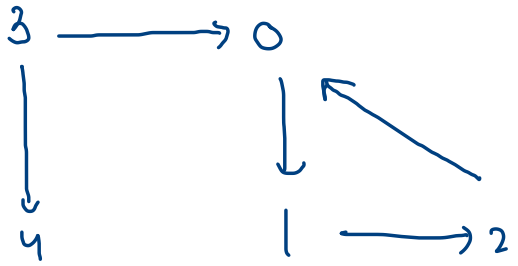
0	1	2	3	4	5
~~0~~	~~1~~	~~2~~	~~5~~	~~3~~	~~4~~

ts: 0 1 2 5 3 4


2
1
0
3


0
0
0
0
0
1
2
3

cycle detection in directed graph (kahn's algo)

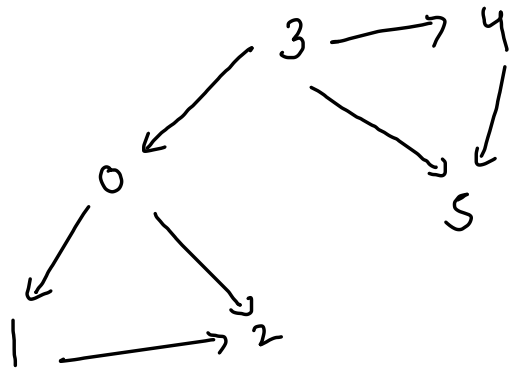


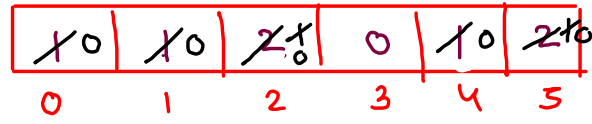
0	1	2	3	4
~~2~~ 1	1	1	0	~~1~~ 0

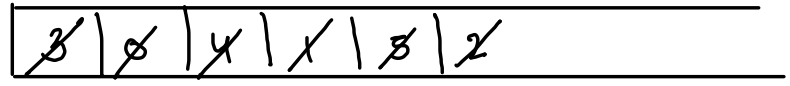
~~3~~ ~~4~~

3 4

```java
for(int i = 0; i < graph.length;i++) {
    for(int nbr : graph[i]) {
        indegree[nbr]++;
    }
}


ArrayDeque<Integer>q = new ArrayDeque<>();

for(int i=0; i < n;i++) {
    if(indegree[i] == 0) {
        q.add(i);
    }
}

ArrayList<Integer>list = new ArrayList<>();

while(q.size() > 0) {
    int rem = q.remove();
    list.add(rem);

    for(int nbr : graph[rem]) {
        indegree[nbr]--;

        if(indegree[nbr] == 0) {
            q.add(nbr);
        }
    }
}
```







list: 3 0 4 1 5 2