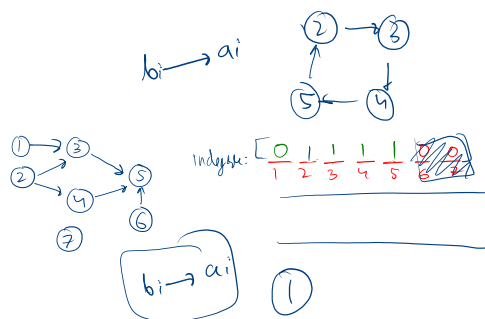
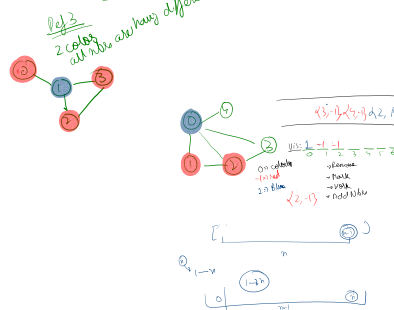
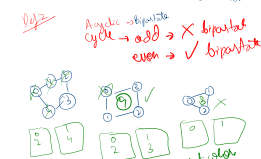
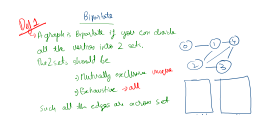
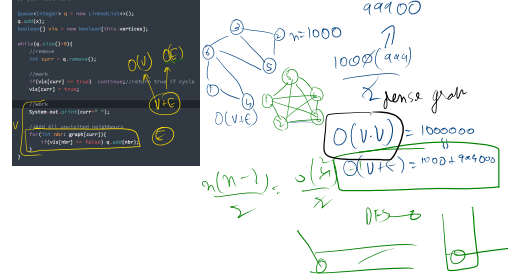


Kahn's algo
→ only nodes with
indeg = 0



- 1) indegree array
 - 2) push all nodes whose indegree is zero
 - 3) start BFS
 - remove
 - ~~find~~
 - length
 - add nbr
- indegree[nbr]--
if (indegree == 0) add(q)

① ⑥ ⑦ ② ③ ④ ⑤

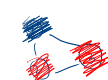


```

q.add(new Pair(1,1));

while(q.size() > 0){
    //remove
    Pair curr = q.remove();
    int node = curr.node;
    int color = curr.color;
    //mark
    if(vis[node] == 0) continue;
    vis[node] = color;
    //mark
    //add nbr
    int oppColor = (color == 1 ? -1 : 1);
    for(int nbr : graph.get(node)){
        if(vis[nbr] == 0) q.add(new Pair(nbr, oppColor));
        else if(vis[nbr] == oppColor) continue;
        else if(vis[nbr] == color) return 0;
    }
}

```

 $\{3, 13\}$  $\{3, -1\}$
$$\frac{1}{1} \quad \frac{-1}{2} \quad \frac{-1}{3}$$