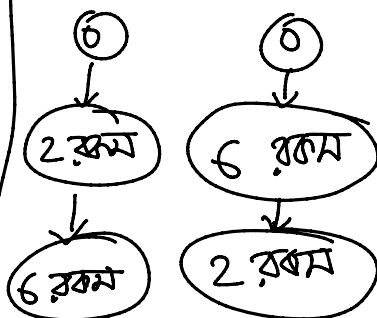
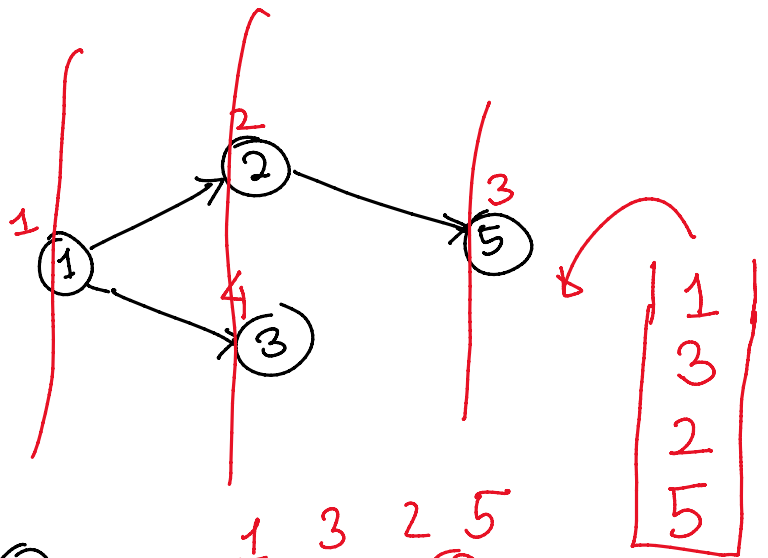
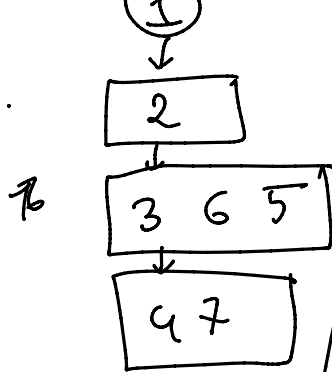
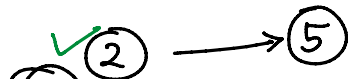
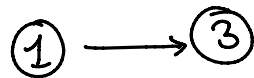
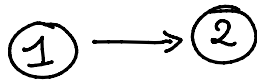
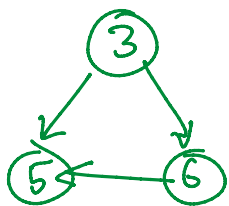
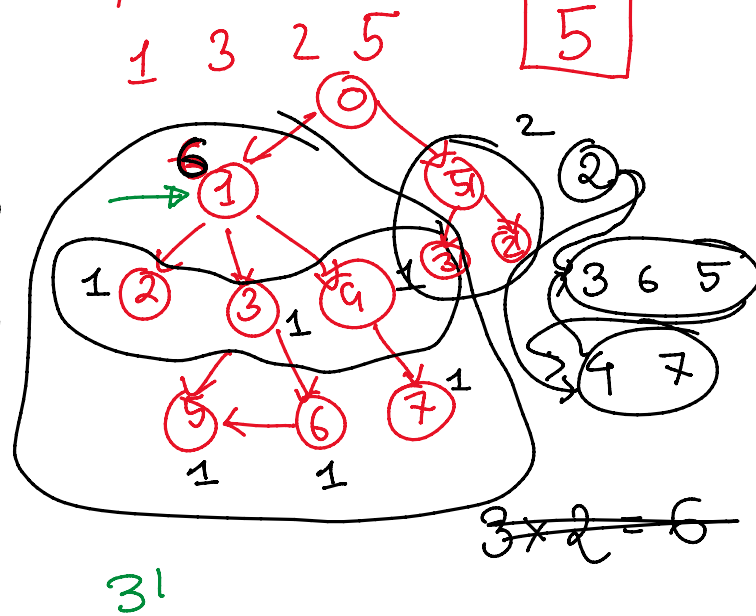


Topological Sort  $\prod_{i=0}^L \text{cnt}[i]$



$$2 \times 6 = 12 \times 2! = 24$$



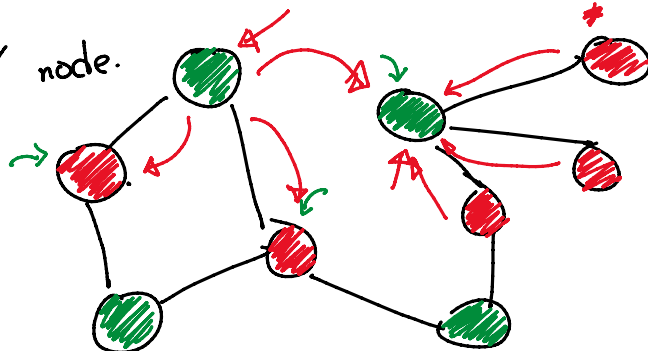
→ 3, 6, 5

$$\prod_{v \in \text{adj}[u]} \text{dp}[v] \times \text{fact}[\text{adj}[u].\text{size}()]$$

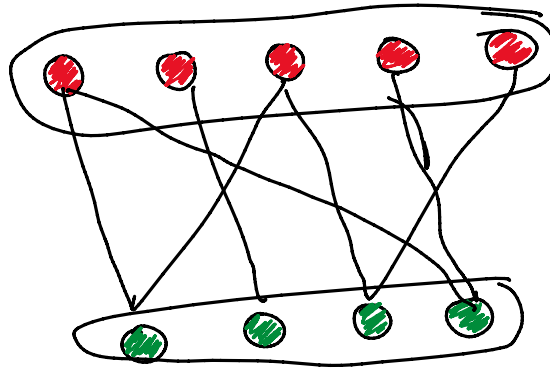
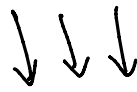
$$\frac{e}{1} \rightarrow \frac{1-e}{1} \rightarrow 1$$

Bipartite Graph / Graph bicoloring

- 1) We can start from ANY node.
- 2) Different adj color



dfs(u, c):  
vis[u]=1  
col[u]=c  
for (v : gr[u])  
if (!vis[v])  
dfs(v, c^1)



if (col[u] == col[v])  
→ JHAMELA

dist

1 → 0

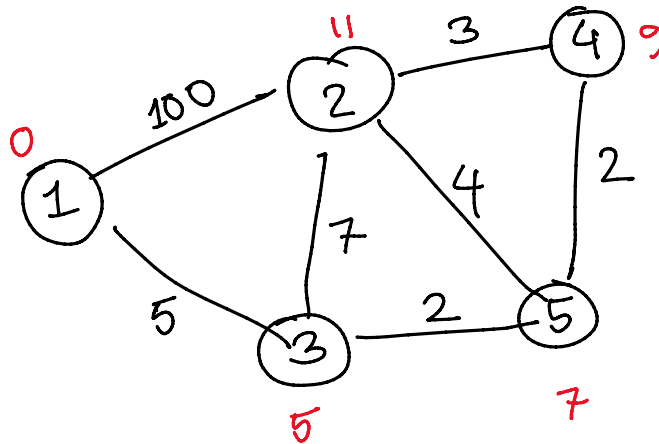
2 → 11

3 → 5

4 → 9

5 → 7

u=2



Dijkstra

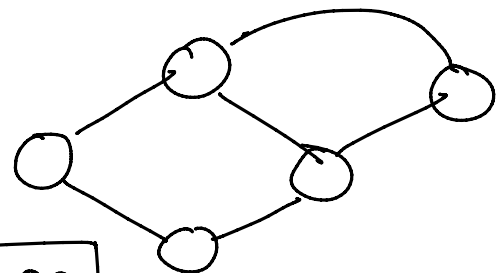
Shortest path → weighted

~~(1,0), (2,100), (3,5), (2,11), (3,7), (2,17), (4,9)~~

$$V + E \log V \approx N \log N$$

✓  
dfs/bfs

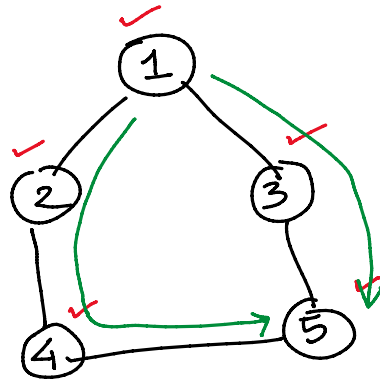
Dijkstra



0/1 BFS

1, 2

BFS



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

$v \neq \text{parc}$

↪ visited

↪ cycle!

$[L, R]$

1, 4, 4, 1, 4

$x=1$

↑  
L

↑  
R

1, 4, 2, 3, 7, 4, 9

↑

↑

1, 4, 4, 1, 4

↑

↑

↘

↘

$(1, 4, 4, 1, 4) x=1$

$(1, 4, 4, 1, 4) x=9$