GRAPHS...↑

"let's make it easy too" →

→Topological.

HARD

Leetcode -1203

If you have tried my Graph Concepts & Qns playlist, these Qns, will seem very easy. Do try it once ¡¡

Sort Items by

Groups Respecting

Dependencies

codestorywithMIK

Pre-requisite for this video :-

Topological Sorting

"Playlist → Graph Concepts & Qns"

(Link in the Description)

$, m$

$0, (n-1)$ $0, 1, \ldots (m-1)$

1203. Sort Items by Groups Respecting Dependencies

Hard   👍 987   👎 157   ♡ Add to List   🔗 Share

There are `n` items each belonging to zero or one of `m` groups where `group[i]` is the group that the `i` -th item belongs to and it's equal to `-1` if the `i` -th item belongs to no group. The items and the groups are zero indexed. A group can have no item belonging to it.

Return a sorted list of the items such that:

- The items that belong to the same group are next to each other in the sorted list. ←
- There are some relations between these items where `beforeItems[i]` is a list containing all the items that should come before the `i` -th item in the sorted array (to the left of the `i` -th item).
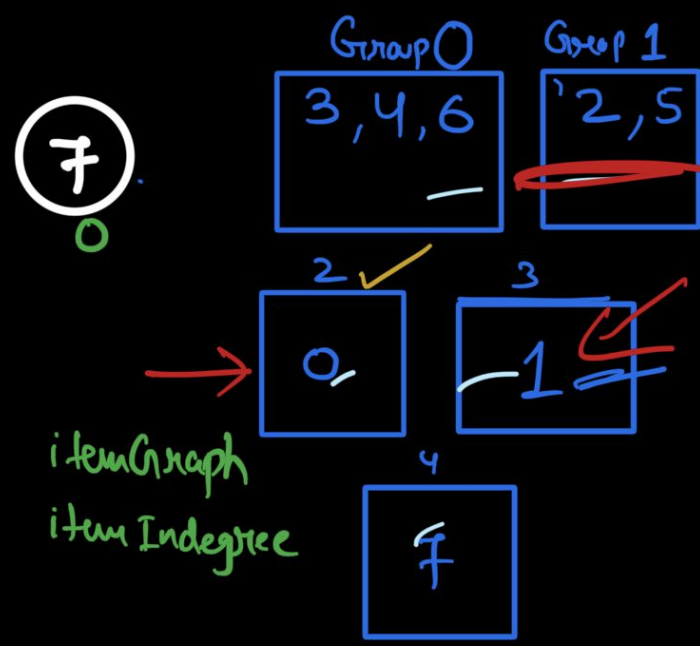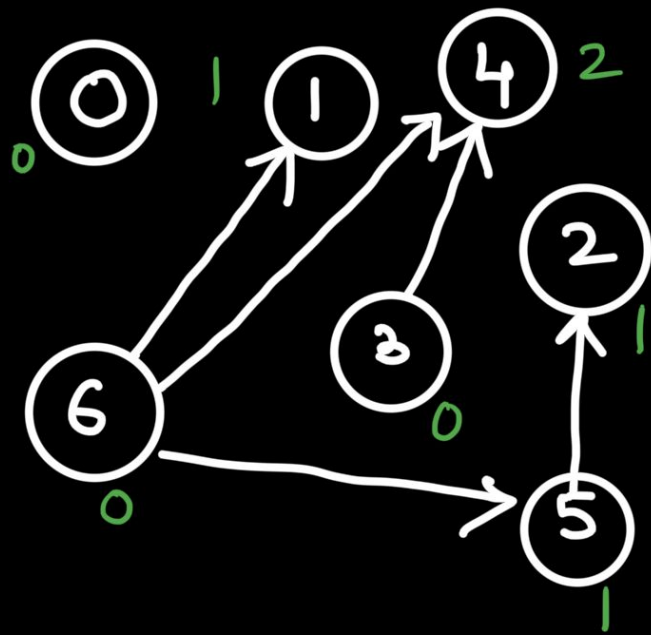
Return any solution if there is more than one solution and return an **empty list** if there is no solution.

$n = items \qquad (0, 1, 2 \ldots \ldots n-1)$

$m = groups \qquad (0, 1, 2 \ldots \ldots m-1)$

$$group = \{\overset{0}{-1}, \overset{1}{-1}, \overset{2}{1}, \overset{3}{0}, \overset{4}{0}, \overset{5}{1}, \overset{6}{0}, \overset{7}{-1}\}$$

$m = 2$

$0, 1$

$$\text{beforeItems} = \left[\underset{0}{\{\}}, \underset{1}{\{6\}}, \underset{2}{\{5\}}, \underset{3}{\{6\}}, \underset{4}{\{3,6\}}, \underset{5}{\{6\}}, \underset{6}{\{\}}, \underset{7}{\{\}}\right]$$

Group 0: 3, 4, 6

Group 1: 2, 5

itemGraph
item Indegree

$\{0, 6, 3, 7, 5, 1, 4, 2\}$ = Topological (itemGraph, itemIndegree)

itemOrder

= TOP₁ (groupGraph, grindn),

$$\text{beforeItems} = \left[\overset{0}{\{\ \}}, \overset{1}{\{6\}}, \overset{2}{\{5\}}, \overset{3}{\{6\}}, \overset{4}{\{3,6\}}, \overset{5}{\{6\}}, \overset{6}{\{\ \}}, \overset{7}{\{\ \}} \right]$$

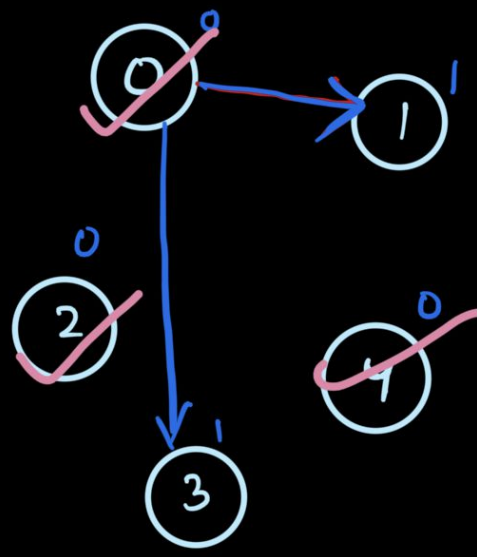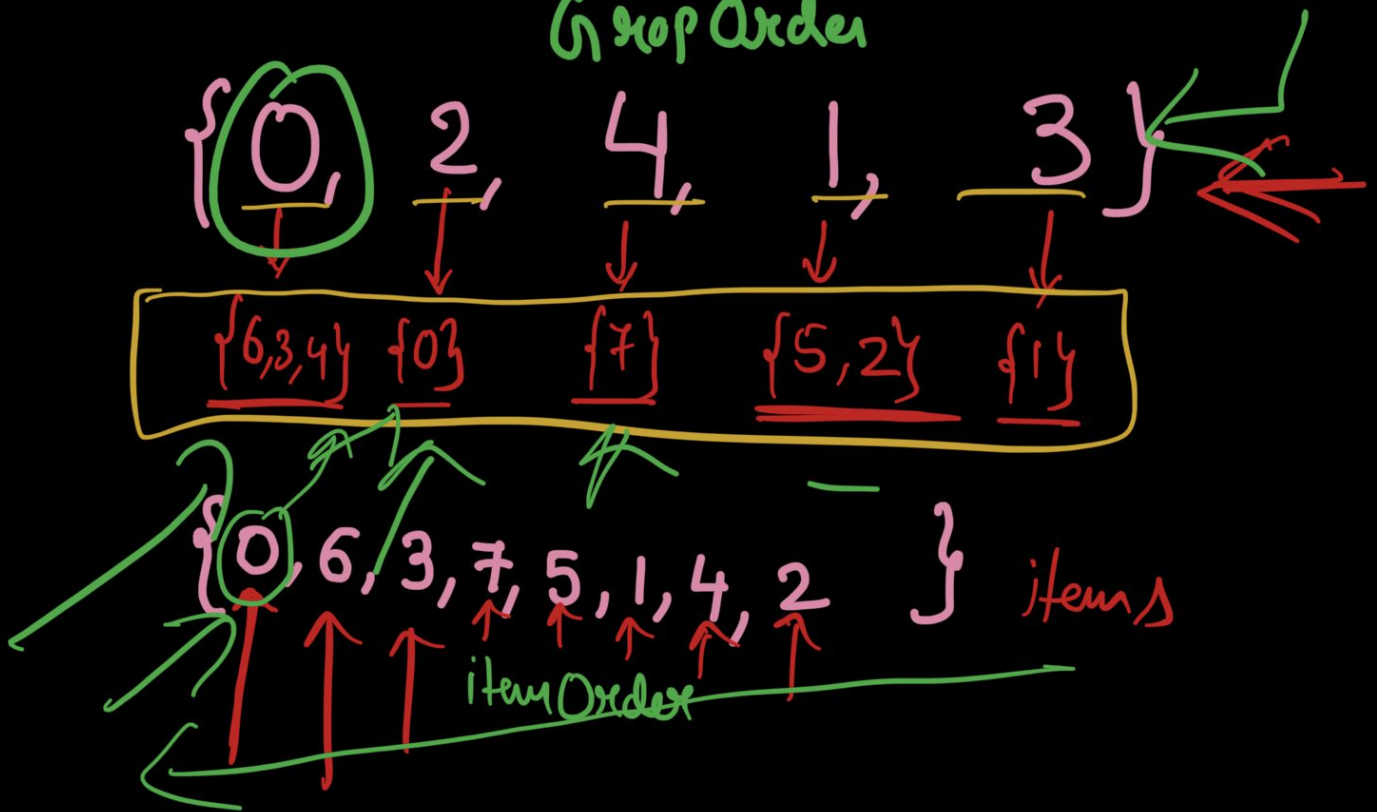| item	before	Group
0	{ }	2
1	{6}	3
2	{5}	1
3	{6}	0
4	{3,6}	0
5	{6}	1
6	{ }	0
7	{ }	4

GroupGraph

group Indegree

$$\{0,2,4,1,3\} = \text{Topological (groupGraph, group Indegree)}$$

Group order.

Group Order

$$\{0, 2, 4, 1, 3\}$$

| {6,3,4} | {0} | {7} | {5,2} | {1} |

Group Order

{ (0), 2, 4, 1, 3 }

| {6,3,4} | {0} | {7} | {5,2} | {1} |

{ (0), 6, 3, 7, 5, 1, 4, 2 } items
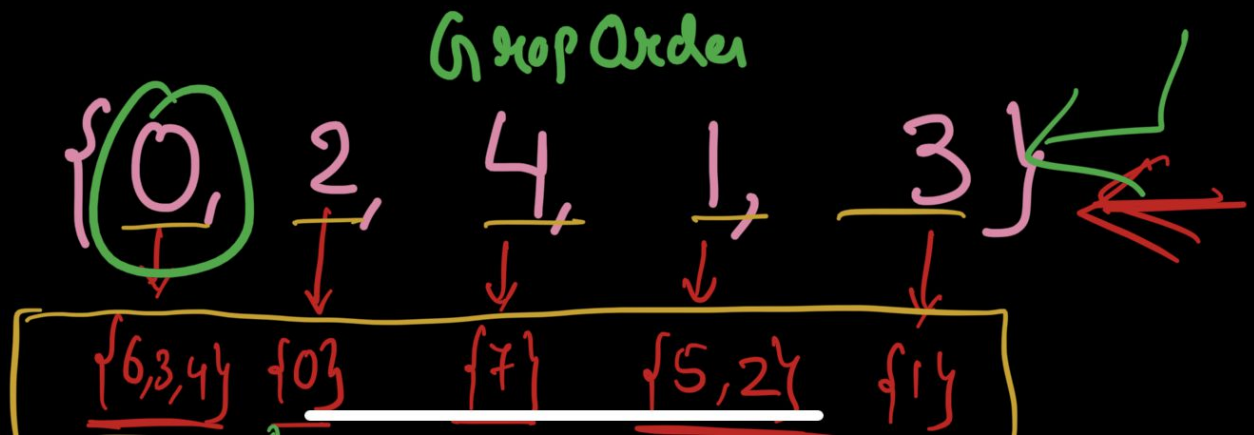
item Order

{ 6, 3, 4, 0, 7, 5, 2, 1 }

Steps:-

① item Graph, item Indegree.

② Group Graph, group Indegree.

③ item Order } → TOPO Sort

Steps:-

① item Graph, item Indegree.

② groupGraph, group Indegree.

③ item Order } → (TOPO Sort)
   group Order

④ iterate on item Order
   & append in order.