Given the following details of a matrix with n columns and 2 rows :

* The matrix is a binary matrix, which means each element in the matrix can be 0 or 1.
* The sum of elements of the 0-th(upper) row is given as upper.
* The sum of elements of the 1-st(lower) row is given as lower.
* The sum of elements in the i-th column(0-indexed) is colsum[i], where colsum is given as an integer array with length n.

Your task is to reconstruct the matrix with upper, lower and colsum.

Return it as a 2-D integer array.

If there are more than one valid solution, any of them will be accepted.

If no valid solution exists, return an empty 2-D array.

**Example 1:**

**Input:** upper = 2, lower = 1, colsum = [1,1,1]

**Output:** [[1,1,0],[0,0,1]]

**Explanation:** [[1,0,1],[0,1,0]], and [[0,1,1],[1,0,0]] are also correct answers.

**Example 2:**

**Input:** upper = 2, lower = 3, colsum = [2,2,1,1]

**Output:** []

**Example 3:**

**Input:** upper = 5, lower = 5, colsum = [2,1,2,0,1,0,1,2,0,1]

**Output:** [[1,1,1,0,1,0,0,1,0,0],[1,0,1,0,0,0,1,1,0,1]]

**Constraints:**

* 1 <= colsum.length <= 10^5
* 0 <= upper, lower <= colsum.length
* 0 <= colsum[i] <= 2