Sum of subsequences

Given an positive integer n and a sequence a_1 ... a_n. There are q queries. Each query has one of two formats:

- Format 0 l r k: you need to output the k-th smallest positive integer that can't be partition into a sum of any subsequence of a_l ... a_r.
- Format 1 l r x: you need to output the numbers of ways to partition x into a sum of a subseqence of a_l ... a_r (or the numbers of subsequence that sum of all its elements equal to x) (modulo 2^{32}).

Input

- First line: two positive n and q ($1 \le n \le 100$, $1 \le q \le 10000$)
- Second line: n positive $a_1 \ldots a_n$ ($0 \le a_i \le 100$)
- Next q lines: each line denotes a query with one of two format listed above ($1 \le l \le r \le n$, $1 \le k \le 10^9$, $0 \le x \le 10^9$)

Output

- q lines: the i-th line is the answer of i-th query.

Sample

Input:
5 3
1 0 2 4 1
0 2 3 2
1 1 4 0
1 2 5 3

Output:
3
1
2