Problem C. Sequence

Input file:	*standard input*
Output file:	*standard output*
Time limit:	7 seconds
Memory limit:	512 mebibytes

Yuta has an array $A_1, A_2, \ldots, A_n$ with n integers, and he keeps a copy of the initial contents of array A as A' (initially, $A'_i = A_i$). Then he executes m operations on the array A.

There are three types of operations:

- "`1` l r": Yuta wants to find the sum of A_i for all i in $[l, r]$.
- "`2` l r k": Yuta runs the following pseudocode on the sequence A:

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for (int i = l; i <= r; i++) A[i] = A[i - k];
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- "`3` l r": For all $i \in [l, r]$, Yuta changes A_i back to A'_i.

Help Yuta execute all the given operations.

Input

The first line of the input contains two integers n and m ($1 \le n, m \le 2 \cdot 10^5$).

The second line contains n integers A_i ($0 \le A_i \le 10^9$).

Then m lines follow, each line describes an operation in the format shown above. It is guaranteed that $1 \le l \le r \le n$ and $1 \le k < l$.

Output

For each operation of the first type, print a single line with a single integer: the required sum.

Example

standard input	standard output
5 7 1 2 3 4 5 1 1 5 2 3 4 1 1 1 5 2 3 4 2 1 1 5 3 1 5 1 1 5	15 12 11 15