

Giant Gorilla's Gift

Input file: *standard input*
Output file: *standard output*
Time limit: 8 seconds
Memory limit: 1024 mebibytes

One day you met a giant gorilla who gave you an array of n integers a_1, a_2, \dots, a_n . You don't know what to do with this gift, so you want to refuse it, but unfortunately the giant gorilla insisted that you have to answer m queries. There are three types of queries:

1. l, r, k — compute the value of the function $\text{gorilla}(l, r, k)$ (defined below);
2. i, x — perform the assignment $a_i := x$;
3. l, r, c, b — for all indices i ($l \leq i \leq r$) for which the inequality $c \cdot a_i \leq b$ holds, perform the assignment $a_i := c \cdot a_i$.

The function $\text{gorilla}(l, r, k)$ is defined as follows. First, all numbers from a_l, a_{l+1}, \dots, a_r that have **at most** k distinct **prime** divisors are written down **in the same order**. Let the resulting sequence be y_1, y_2, \dots, y_s (here, s is the number of obtained numbers, $0 \leq s \leq r - l + 1$). Then the value of $\text{gorilla}(l, r, k)$ is the alternating sum of the obtained numbers: $y_1 - y_2 + \dots + (-1)^{s+1} \cdot y_s$. If $s = 0$, this sum is assumed to be 0.

Input

The first line contains integers n and m ($1 \leq n, m \leq 2 \cdot 10^5$) — the number of elements in the array and the number of queries.

The second line contains n integers a_1, a_2, \dots, a_n ($1 \leq a_i \leq 10^6$) — the elements of the array.

The next m lines describe the queries (all parameters are integers):

- “1 l r k ” ($1 \leq l \leq r \leq n, 1 \leq k \leq 10^6$) — a query of the first type;
- “2 i x ” ($1 \leq i \leq n, 1 \leq x \leq 10^6$) — a query of the second type;
- “3 l r c b ” ($1 \leq l \leq r \leq n, 1 \leq c, b \leq 10^6$) — a query of the third type.

Output

Output the answer to each query of the first type on a separate line.

Example

<i>standard input</i>	<i>standard output</i>
10 5	-21
5 14 62 36 9 1911 10 12 13 35	13
1 2 6 2	1736
2 5 120	
1 3 9 1	
3 4 6 7 993	
1 1 10 3	