Problem G. Giant Gorilla's Gift

Time limit: 8 seconds

One day you met a giant gorilla who gave you an array of n integers $a_1, a_2, \ldots, a_n$. 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 gorilla(l, r, k) (defined below);
2. i, x — perform the assignment $a_i := x$;
3. l, r, c, b — for all indices i ($l \le i \le r$) for which the inequality $c \cdot a_i \le b$ holds, perform the assignment $a_i := c \cdot a_i$.

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

Input

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

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

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

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

Output

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

Example

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