# Problem D. Protection War

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|---|---|
| Input file: | `standard input` |
| Output file: | `standard output` |
| Time limit: | 7 seconds |
| Memory limit: | 1024 megabytes |

The city of Country X is under attack by Country Y! To defend itself, Country X has set up $n$ rows of fortifications, numbered consecutively from $1, 2, \ldots, n$. The military strength of the fortification numbered $i$ is $a_i$. A fortification is considered **defeated** if its military strength is zero. Initially, no fortifications are **defeated**.

The battle lasts for a total of $q$ days, and each morning, one of the following events occurs:

- Troop Movement: Given parameters $x, y$, the military strength of the fortification numbered $x$ is set to $y$.
- Reinforcement: Given parameters $l, r, v$, the military strength of the fortifications numbered $l, l+1, \ldots, r$ is increased by $v$ (including fortifications that are already **defeated**).
- Recruitment: The military strength of all fortifications that are not **defeated** is increased by 1.
- Training: Let $b_i = \max\{r - l + 1 \mid 1 \le l \le i \le r \le n, \text{s.t.} \forall l \le j \le r, a_j > 0\}$, which is the length of the longest continuous segment containing fortification $i$ that has not been **defeated**. For all $1 \le i \le n$, set $a_i := a_i + b_i$.
- Parade: Given parameters $l, r$, inquire about the total military strength of the fortifications numbered $l, l+1, \ldots, r$.

Every evening, a rout event occurs: For the fortification numbered $i$, if $i < n$ and the fortification numbered $i+1$ has already been **defeated** by noon that day, then this fortification will also be **defeated** (i.e., its military strength becomes zero).

As the commander-in-chief of Country X, you need to provide the correct result for each "parade" operation.

## Input

The first line contains two integers, $n$ and $q$, representing the number of fortifications and the number of days, respectively.

The second line contains $n$ integers, representing $a_1, \ldots, a_n$, the initial military strength of each fortification.

The next $q$ lines describe the events that occur each morning for $q$ days. In the $i$-th line, the first integer $op$ indicates what event occurs on the $i$-th day:

- If $op = 1$, a troop movement occurs, and the parameters $x, y$ are given next.
- If $op = 2$, a reinforcement occurs, and the parameters $l, r, v$ are given next.
- If $op = 3$, a recruitment occurs.
- If $op = 4$, a training occurs.
- If $op = 5$, a parade occurs, and the parameters $l, r$ are given next.

It is guaranteed that $1 \le n, q \le 3 \times 10^5$ and $1 \le a_i \le 10^5$. For the troop movement event, it is guaranteed that $1 \le x \le n$ and $0 \le y \le 10^5$. For the reinforcement event, it is guaranteed that $1 \le l \le r \le n$ and $1 \le v \le 10^5$. For the parade event, it is guaranteed that $1 \le l \le r \le n$.

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## Output

For each "parade" event, output one integer per line representing the answer.

## Example

| standard input | standard output |
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| 10 8<br>1 2 3 4 5 6 7 8 9 10<br>1 5 0<br>4<br>5 1 10<br>2 1 7 10<br>5 1 7<br>1 5 0<br>3<br>5 1 7 | 74<br>97<br>71 |