Kamui

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

There is a graph with a total of $2N$ vertices. There are no edges between the 1st and N-th vertices, and there are no edges between the $(N+1)$-th and $2N$-th vertices. That is, the given graph is a bipartite graph.

A sequence of positive integers $a_1, a_2, \cdots, a_N$ is given. For any (i, j) pair with $1 \leq i, j \leq N$, the necessary and sufficient condition for vertices i and $N+j$ to be connected is that $j \leq a_i$.

A total of Q queries are given. Each query is represented by two integers v and x, indicating that the value of a_v will be changed to $a_v + x$. It is guaranteed that $x = 1$ or $x = -1$. For each query, you must count the number of cycles of length 4 in the given graph. Since the count may be large, output the remainder when divided by 998 244 353. Two cycles are considered different if the sets of edges composing them are different.

Input

The first line contains two positive integers N and Q, separated by a space.

The second line contains a total of N integers $a_1, a_2, \cdots, a_N$, separated by spaces.

The next Q lines each contain two integers v and x separated by a space. The input on the ith line indicates that a_v will be changed to $a_v + x$.

Output

After each query is executed, output the remainder when the number of cycles of length 4 is divided by 998 244 353 on each line.

Scoring

- $2 \leq N \leq 5 \cdot 10^5$, $1 \leq Q \leq 5 \cdot 10^5$
- For each queries, $1 \leq v \leq N$ and $x \in \{-1, 1\}$.
- After each queries, it is guaranteed that $0 \leq a_i \leq N$ for all $1 \leq i \leq N$.

Example

standard input	standard output
10 10 8 6 1 3 0 0 6 9 6 1 6 1 10 -1 5 1 7 -1 7 -1 9 -1 8 -1 7 -1 7 -1 5 -1	178 178 178 158 142 127 127 115 105 105

Note

The set of four edges $\{xy, yz, zw, wx\}$ in a graph is considered to be a cycle of length 4.