Problem J
Finding Treasure

Morgan is designing a treasury for a treasure hunt event. The treasury can be represented as one dimensional grid with $N + 2$ cells, numbered from 0 to $N + 1$. Each cell can be empty or contain a treasure. At first, cell 0 and cell $N + 1$ contain a treasure, while the other cells are currently empty.

While experimenting with the treasury design, Morgan does Q updates, numbered from 1 to Q, to his treasury. In update i, he wants to change cell A_i. If cell A_i is empty, he will put a treasure on cell A_i. If cell A_i contains a treasure, he will remove the treasure from cell A_i and the cell becomes empty. It is guaranteed that $1 \leq A_i \leq N$ for all $1 \leq i \leq Q$, which implies cell 0 and cell $N + 1$ always contain a treasure.

After each change, Morgan wonders how difficult his treasure hunt is. He defines the *difficulty level* of standing on cell x as the multiplication of two values:

- the distance from x to the closest treasure on cell $y \leq x$, and
- the distance from x to the closest treasure on cell $y \geq x$.

The distance between two cells can be calculated as the absolute difference between the cell numbers. Then, the *total difficulty level* of his treasure hunt is defined as the sum of difficulty level of standing on cell x for all $0 \leq x \leq N + 1$.

Help Morgan to determine the total difficulty level of his treasure hunt after each update.

Input

Input begins with two integers N Q ($1 \leq N \leq 100\,000$; $1 \leq Q \leq 100\,000$) representing the size of the treasury room and the number of updates, respectively. Each of the next Q lines contains an integer A_i ($1 \leq A_i \leq N$) representing the cell that Morgan wants to change in update i.

Output

After each update that Morgan makes, output an integer in a single line representing the total difficulty level of his treasure hunts at that time.

Sample Input #1

```
3 3
1
3
1
```

Sample Output #1

```
4
1
```

```
4
```

Explanation for the sample input/output #1

For each cell that contains a treasure, the difficulty level of standing on that cell is 0.

After the first update, the difficulty level of standing on cell 2 and 3 are $|2-1|\times|2-4| = 2$ and $|3-1|\times|3-4| = 2$, respectively.

After the second update, the difficulty level of standing on cell 2 is $|2-1| \times |2-3| = 1$.

After the third update, the difficulty level of standing on cell 1 and 2 are $|1-3|\times|1-0| = 2$ and $|2-3|\times|2-0| = 2$, respectively.

Sample Input #2

```
10 14
7
2
9
5
2
9
6
7
5
8
6
8
7
10
```

Sample Output #2

```
66
31
23
8
23
31
30
40
55
40
88
220
66
60
```