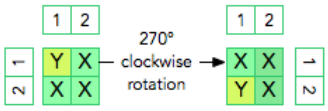
Hackonacci Matrix Rotations

We define a $hackonacci$ series as follows:

- $hackonacci(n) = 1 \cdot hackonacci(n-1) + 2 \cdot hackonacci(n-2) + 3 \cdot hackonacci(n-3)$
- $hackonacci(1) = 1$
- $hackonacci(2) = 2$
- $hackonacci(3) = 3$

We define a *Hackonacci Matrix* to be an $n \times n$ matrix where the rows and columns are indexed from 1 to n, and the top-left cell is $(1, 1)$. Each cell (i, j) must contains either the character `X` or the character `Y`. If $hackonacci((i \cdot j)^2)$ is *even*, it's `X`; otherwise, it's `Y`.

Next, we want to perform q queries where each query i consists of an integer, $angle_i$. Each $angle_i$ is a multiple of 90 degrees and describes the angle by which you must rotate the matrix in the *clockwise* direction. For each $angle_i$, we want to count the number of cells that are different after the rotation. For example, the diagram below depicts the 270° rotation of a Hackonacci Matrix when $n = 2$:



As you can see, there are two cells whose values change after the rotation. Note that we filled each initial cell using the Hackonacci formula given above:

- $(1, 1)$: $hackonacci((1 \cdot 1)^2) = hackonacci(1) = 1$
  Because this is an odd number, we mark this cell with a `Y`.
- $(1, 2)$: $hackonacci((1 \cdot 2)^2) = hackonacci(4)$
  $\Rightarrow 1 \cdot hackonacci(3) + 2 \cdot hackonacci(2) + 3 \cdot hackonacci(1)$
  $\Rightarrow 1 \cdot 3 + 2 \cdot 2 + 3 \cdot 1 = 3 + 4 + 3 = 10$
  Because this is an even number, we mark this cell with an `X`.
- $(2, 1)$: $hackonacci((2 \cdot 1)^2) = hackonacci(4) \Rightarrow 10$
  Because this is an even number, we mark this cell with an `X`.
- $(2, 2)$: $hackonacci((2 \cdot 2)^2) = hackonacci(16) \Rightarrow 296578$
  Because this is an even number, we mark this cell with an `X`.

Given the value of n and q queries, construct a Hackonacci Matrix and answer the queries. For each query i, print an integer on a new line denoting the number of cells whose values differ from the initial Hackonacci Matrix when it's rotated by $angle_i$ degrees in the clockwise direction.

Input Format

The first line contains two space-separated integers describing the respective values of n and q.
Each line i of the q subsequent lines contains an integer denoting $angle_i$.

Constraints

- $1 \leq n \leq 2000$
- $1 \leq q \leq 10^4$

- $0 \leq angle_i \leq 10^5$
- It is guaranteed that each $angle_i$ is multiple of 90 degrees.

Output Format

For each $angle_i$, print a single integer on a new line denoting the number of different cells that differ between the initial matrix and the matrix rotated by $angle_i$ degrees.

Sample Input 0

```
4 3
90
180
270
```

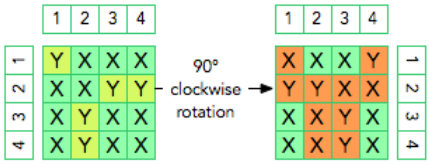
Sample Output 0

```
10
6
10
```

Explanation 0

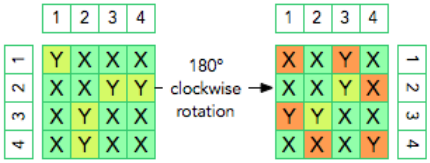
Because $n = 4$, we must build a 4×4 Hackonacci matrix and then perform $q = 3$ queries, shown below. The following diagrams depict each query rotation, and cells whose values changed after performing a rotation are highlighted in orange:

1. When we perform a 90° rotation on the matrix, there are 10 cells whose values change:



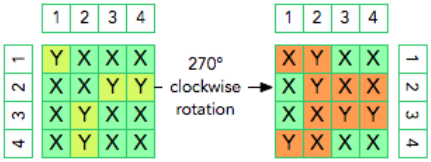
   Thus, we print 10 on a new line.

2. When we perform a 180° rotation on the matrix, there are 6 cells whose values change:



   Thus, we print 6 on a new line.

3. When we perform a 270° rotation on the matrix, there are 10 cells whose values change:



   Thus, we print 10 on a new line.