

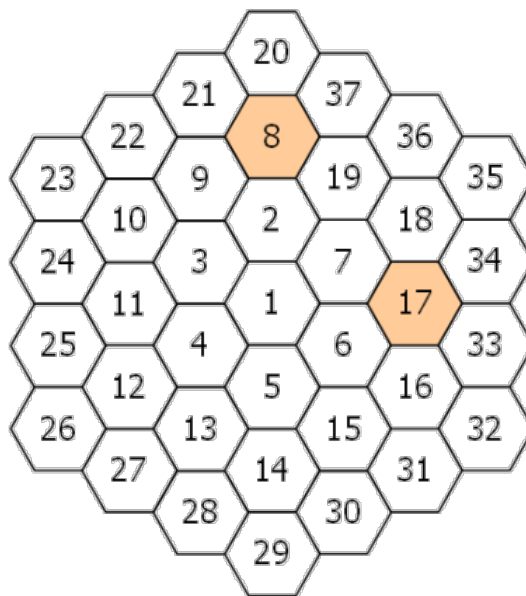
Project Euler #128: Hexagonal tile differences



This problem is a programming version of [Problem 128](#) from [projecteuler.net](#)

A hexagonal tile with number 1 is surrounded by a ring of six hexagonal tiles, starting at "12 o'clock" and numbering the tiles 2 to 7 in an anti-clockwise direction.

New rings are added in the same fashion, with the next rings being numbered 8 to 19, 20 to 37, 38 to 61, and so on. The diagram below shows the first three rings.



By finding the difference between tile n and each its six neighbours we shall define $\mathbf{PD}(n)$ to be the number of those differences which are prime.

For example, working clockwise around tile 8 the differences are 12, 29, 11, 6, 1, and 13. So $\mathbf{PD}(8) = 3$.

In the same way, the differences around tile 17 are 1, 17, 16, 1, 11, and 10, hence $\mathbf{PD}(17) = 2$.

It can be shown that the maximum value of $\mathbf{PD}(n)$ is 3.

If all of the tiles for which $\mathbf{PD}(n) = 3$ are listed in ascending order to form a sequence, the 10th tile would be 271.

Find the k th tile in this sequence.

Input Format

The first line of input contains T , the number of test cases.

Each test case consists of a single line containing a single integer, k .

Constraints

Excluding the sample input, there are 8 test files.

For $1 \leq i \leq 8$, the i th test file satisfies:

$$1 \leq T, k \leq 10000 \cdot i$$

Output Format

For each test case, output a single line containing a single integer, the requested tile.

Sample Input

```
1
10
```

Sample Output

```
271
```

Explanation

As mentioned in the problem statement, the **10**th tile is **271**.