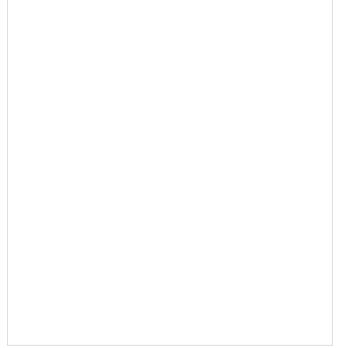
## Project Euler #128: Hexagonal tile differences

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 \$\text{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  $\text{Ntext}\{PD\}(8)$  = 3\$.

In the same way, the differences around tile 17 are 1, 17, 16, 1, 11, and 10, hence text(D)(17) = 2.

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

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

Find the \$k\$th tile in this sequence.

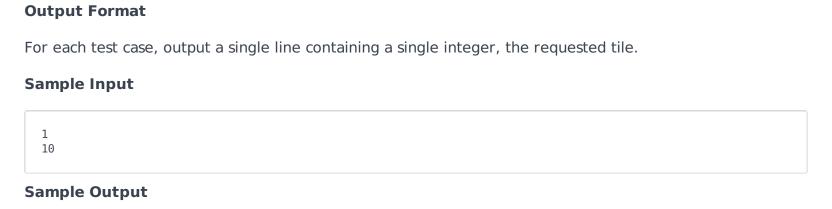
## **Input Format**

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

Each test case consists of a single line containing a single integer, \$N\$.

## **Constraints**

Excluding the sample input, there are \$8\$ test files.



## Explanation

271

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

For  $1 \le i \le 8$ , the  $i \le 8$ , the  $i \le 8$ 

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