



4 – Lazy Security Guard

Your security guard friend recently got a new job at a new security company. The company requires him to patrol an area of the city encompassing exactly N city blocks, but they let him choose which blocks. That is, your friend must walk the perimeter of a region whose area is exactly N blocks. Your friend is quite lazy and would like your help to find the shortest possible route that meets the requirements. The city is laid out in a square grid pattern, and is large enough that for the sake of the problem it can be considered infinite.

The input is the number N of city blocks, calculate the minimum perimeter that can be achieved.

Input

First line contains an integer T ($1 \leq T \leq 100$) denoting the number of test cases. Each case is a single integer N ($1 \leq N \leq 106$), the number of city blocks that must be enclosed by the route.

Output

For each test case, print: "Case #", the number of the case, ":", and the minimum perimeter.

Sample input

```
3
4
11
22
```

Sample output

```
Case #1: 8
Case #2: 14
Case #3: 20
```

Note: here are some possible shapes for the examples:

