

Sydney - Graduate 2018 Develo...

30m: 40s to test end



A Very Special Multiple



Charlie and Johnny play the following game:

- For every integer *X* Charlie gives, Johnny has to find the smallest positive integer *Y*, such that *X* x *Y* (*X* multiplied by *Y*) consists of a series of one or more 4's followed by zero or more 0's. For instance, 404 would be an invalid answer, but 4400, 440, and 444
- are all valid.
- 4

Your program will read the value of X and deduce the number Z = 2a + b, where a is the number of 4's and b is the number of 0's in the answer $X \times Y$.



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Input Format

- The first line contains an integer T.
 - T lines follow, each line containing an integer to be used as X in one turn of the game described above.

Output Format

For every X, print the output $2\mathbf{a} + \mathbf{b}$ on a separate line so that the string of \mathbf{a} 4's followed by \mathbf{b} 0's is the answer to the problem described above.

Constraints

$$1 <= X <= 10^{10}$$

Sample Input

- 3
- 4
- 5
- 80

Sample Output

- 2
- 3
- 4

Explanation

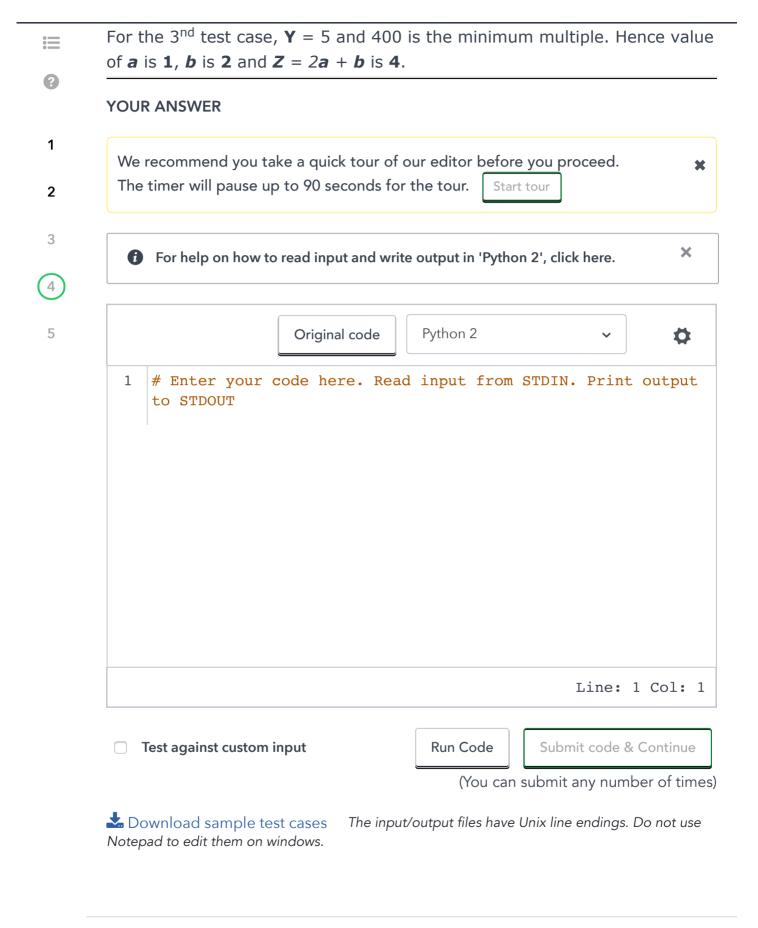
For the 1st test case, the smallest such multiple of **4** is **4** itself. Hence **Y** is **1**, **a** is **1** and **b** is **0**.

The required value Z = 2a + b is 2.



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