Chef And The Hiring Event

Problem Code: **CHEARMY**

All submissions for this problem are available.

Read problems statements in Mandarin Chinese, Russian and Vietnamese as well.

The Head Chef is receiving a lot of orders for cooking the best of the problems lately. For this, he organized an hiring event to hire some talented Chefs. He gave the following problem to test the skills of the participating Chefs. Can you solve this problem and be eligible for getting hired by Head Chef.

A non-negative number **n** is said to be *magical* if it satisfies the following property. Let **S** denote the multi-set of numbers corresponding to the non-empty subsequences of the digits of the number **n** in decimal representation. Please note that the numbers in the set **S** can have **leading zeros**. Let us take an element **s** of the multi-set **S**, **prod(s)** denotes the product of all the digits of number **s** in decimal representation.
The number **n** will be called magical if sum of **prod(s)** for all elements **s** in **S**, is even.

For example, consider a number 246, its all possible non-empty subsequence will be **S = {2, 4, 6, 24, 46, 26, 246}**. Products of digits of these subsequences will be **{prod(2) = 2, prod(4) = 4, prod(6) = 6, prod(24) = 8, prod(46) = 24, prod(26) = 12, prod(246) = 48**, i.e. **{2, 4, 6, 8, 24, 12, 48}**. Sum of all of these is 104, which is even. Hence 246 is a *magical* number.

Please note that multi-set **S** can contain repeated elements, e.g. if number is 55, then **S = {5, 5, 55}**. Products of digits of these subsequences will be **{prod(5) = 5, prod(5) = 5, prod(55) = 25}**, i.e. **{5, 5, 25}**. Sum of all of these is 35 which is odd. Hence 55 is not a *magical* number.

Consider a number 204, then **S = {2, 0, 4, 20, 04, 24, 204}**. Products of digits of these subsequences will be **{2, 0, 4, 0, 0, 8, 0}**. Sum of all these elements will be 14 which is even. So 204 is a *magical* number.

The task was to simply find the **K**th *magical* number.

Input

Output

All Submissions

Successful Submissions +

For each test case, print a single integer corresponding to the K^{th} magical number.

Constraints

- $1 \leq T \leq 10^5$
- $1 \leq K \leq 10^{12}$.

Subtasks

Subtask #1 : (20 points)

- $1 \leq T \leq 100$
- $1 \leq K \leq 10^4$.

Subtask 2 : (80 points)

Original Constraints

Example

Input:
2
2
5

Output:
2
8

Explanation

Example case 1.

2 is the 2^{nd} magical number, since it satisfies the property of the magical number. The first magical number will be of course 0.

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Comments

CodeChef - A Platform for Aspiring Programmers

CodeChef was created as a platform to help programmers make it big in the world of algorithms, **computer programming** and **programming contests**. At CodeChef we work hard to revive the geek in you by hosting a **programming contest** at the start of the month and another smaller programming challenge in the middle of the month. We also aim to have training sessions and discussions related to **algorithms**, **binary search**, technicalities like **array size** and the likes. Apart from providing a platform for **programming competitions**, CodeChef also has various algorithm tutorials and forum discussions to help those who are new to the world of **computer programming**.

Practice Section - A Place to hone your 'Computer Programming Skills'

Try your hand at one of our many practice problems and submit your solution in a language of your choice. Our **programming contest** judge accepts solutions in over 35+ programming languages. Preparing for coding contests were never this much fun! Receive points, and move up through the CodeChef ranks. Use our practice section to better prepare yourself for the multiple **programming challenges** that take place through-out the month on CodeChef.

Compete - Monthly Programming Contests and Cook-offs

Here is where you can show off your **computer programming skills**. Take part in our 10 day long monthly coding contest and the shorter format Cook-off **coding contest**. Put yourself up for recognition and win great prizes. Our **programming contests** have prizes worth up to INR 20,000 (for Indian Community), $700 (for Global Community) and lots more CodeChef goodies up for grabs.

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