UVa Online Judge

12505 Searching in sqrt(n)

In binary, the square root of 2, denoted by $sqrt(2)$, is an infinite number 1.0110101000001001111...

Given an integer n and a binary string (i.e. a string consisting of 0 and 1) S, your task is to find the first occurrence of S in the fraction part (i.e. the part after the decimal point) of $sqrt(n)$. In case $sqrt(n)$ is an integer, the fraction part is an infinite sequence of zeros.

Input

The first line contains T ($T \leq 100$), the number of test cases. Each of the following lines contains an integer n ($2 \leq n \leq 1,000,000$) and a binary string S with at most 20 characters.

Output

For each case, print the position of the first character in the first occurrence of S. The first digit after the dot is at position 0. The answer is guaranteed to be no greater than 100.

Sample Input

```
2
2 101
1202 110011
```

Sample Output

```
2
58
```