Searching in sqrt(n)

Input: Standard Input
Output: Standard Output

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<=100), the number of test cases. Each of the following lines contains an integer n (2<=n<=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

Sample Input	Output for Sample Input
2	2
2 101	58
1202 110011	

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