

Median Replace Hard

Input file: **standard input**
Output file: **standard output**
Time limit: **3 seconds**
Memory limit: **1024 megabytes**

Do you know this problem(https://atcoder.jp/contests/agc022/tasks/agc022_e)? We generalize it a bit.

You got a binary string $P = P_0P_1P_2P_3P_4P_5P_6P_7$ of length 8.

You think a binary string X of odd length N is beautiful if it is possible to apply the following operation $\frac{N-1}{2}$ times so that the only character of the resulting string is '1' :

- Choose three consecutive bits of X , (X_i, X_{i+1}, X_{i+2}) , and replace them by the $(X_i + 2X_{i+1} + 4X_{i+2})$ -th bit of P .

Note that, when $P = 00010111$, this definition is the same as the original AGC problem.

You have a string S consisting of characters '0', '1', and '?'. You want to know the number of ways to replace the question marks with '1' or '0' so that the resulting string is beautiful, modulo $10^9 + 7$.

Note that there are T tests in one input file.

Input

Input is given from Standard Input in the following format:

T

$P S$

$P S$

⋮

$P S$

Constraints:

- $1 \leq T \leq 256$
- $|P| = 8$
- $1 \leq |S|$ and $\sum |S| \leq 300,000$
- $|S|$ is odd.
- All characters of P are either '0' or '1'.
- All characters of S are either '0', '1', or '?'.

Output

For each case, print the answer in a line.

Example

standard input	standard output
7	2
00010111 1??00	1
00010111 ?	402589311
00010111 ?0101???10???00?1?????????????????10????????????????1????0	
01010101 1????	0
01010101 0????	8
00001111 1????	8
00001111 0????	