



## Problem B

### The Fun Number System

In a  $k$  bit 2's complement number, where the bits are indexed from 0 to  $k-1$ , the weight of the most significant bit (i.e., in position  $k-1$ ), is  $-2^{k-1}$ , and the weight of a bit in any position  $i$  ( $0 \leq i < k-1$ ) is  $2^i$ . For example, a 3 bit number 101 is evaluated as  $-2^2 + 0 + 2^0 = -3$ , and 011 as  $-0 + 2^1 + 2^0 = 3$ . A negatively weighted bit is called a *negabit* (such as the most significant bit in a 2's complement number), and a positively weighted bit is called a *posibit*.

A Fun number system is a positional binary number system, where each bit can be either a negabit, or a posibit. For example consider a 3-bit fun number system Fun3, where bits in positions 0, and 2 are posibits, and the bit in position 1 is a negabit.  $(110)_{\text{Fun3}}$  is evaluated as  $2^2 - 2^1 + 0 = 3$ . Now you are going to have fun with the Fun number systems! You are given the description of a  $k$ -bit Fun number system Fun $k$ , and an integer  $N$  (possibly negative). You should determine the  $k$  bits of a representation of  $N$  in Fun $k$ , or report that it is not possible to represent the given  $N$  in the given Fun $k$ . For example, a representation of  $-1$  in the Fun3 number system (defined above), is 011 (evaluated as  $0 - 2^1 + 2^0$ ), and representing 6 in Fun3 is impossible.

#### Input (filename: B.IN)

The first line of the input file contains a single integer  $t$  ( $1 \leq t \leq 10$ ), the number of test cases, followed by the input data for each test case. Each test case is given in three consecutive lines. In the first line there is a positive integer  $k$  ( $1 \leq k \leq 64$ ). In the second line of a test data there is a string of length  $k$ , composed only of letters n, and p, describing the Fun number system for that test data, where each n (p) indicates that the bit in that position is a negabit (posibit). The third line of each test data contains an integer  $N$  ( $-2^{63} \leq N < 2^{63}$ ), the number to be represented in the Fun $k$  number system by your program.

#### Output (filename: B.OUT)

For each test data, you should print one line containing either a  $k$ -bit string representing the given number  $N$  in the Fun $k$  number system, or the word `Impossible`, when it is impossible to represent the given number.

#### Sample Input

```
2
3
pnp
6
4
ppnn
10
```

#### Sample Output

```
Impossible
1110
```