Heap

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

DreamGrid is learning the insertion operation of a heap in the data structure course.

In the following description, we denote $i/2$ to be the maximum integer x that $2x \leq i$. Recall that

- A heap of size n is an array $a_1, a_2, \ldots, a_n$ which satisfies one of the following two conditions:
  - For all $2 \leq i \leq n$, $a_{i/2} \leq a_i$. This is called a min heap.
  - For all $2 \leq i \leq n$, $a_{i/2} \geq a_i$. This is called a max heap.
- The insertion operation can be described by the following pseudo-code:

```
procedure insert(
  v: value to insert,
  a: heap array,
  is_max: if a is a max heap)
{Let n be the length of the heap array after insertion}
a_n := v
i := n
while i > 1
  if is_max is false and a_{i/2} ≤ a_i
    {The heap array now satisfies the condition to be a min heap}
    break
  else if is_max is true and a_{i/2} ≥ a_i
    {The heap array now satisfies the condition to be a max heap}
    break
  swap a_{i/2} and a_i
  i := i/2
{Insertion ends}
```

DreamGrid has prepared an initially empty array a as the heap array and n integers $v_1, v_2, \ldots, v_n$. He is just about to insert these n integers into the heap array in order when his cellphone rings, so he leaves this work to his roommate BaoBao.

Unfortunately, BaoBao doesn't understand what the argument is_max means in the insertion function (but for our dear contestants, we hope that you've understood the meaning of this argument), so he generates a binary string (a string which only contains '0' and '1') $b = b_1 b_2 \ldots b_n$ of length n, where b_i indicates the i-th character in the string, and decides the value of is_max according to the string. When inserting v_i into a, if b_i equals to '0', then is_max **during this insertion** will be false; otherwise if b_i equals to '1', then is_max **during this insertion** will be true.

When DreamGrid comes back, he finds with dismay that the final "heap" array $a_1, a_2 \ldots, a_n$ does not seem to be a valid heap! Given the n inserted integers $v_1, v_2, \ldots, v_n$, the final array and given that BaoBao has inserted $v_1, v_2, \ldots, v_n$ in order, please help DreamGrid restore the binary string b BaoBao generates.

Input

There are multiple test cases. The first line of the input contains an integer T, indicating the number of test cases. For each test case:

The first line contains an integer n ($1 \leq n \leq 10^5$), indicating the size of the final array.

The second line contains n integers $v_1, v_2, \ldots, v_n$ ($1 \le v_i \le 10^9$), indicating the integers in the order they are inserted.

The third line contains n integers $a_1, a_2, \ldots, a_n$, which is a permutation of $v_1, v_2, \ldots, v_n$, indicating the final "heap" array.

It's guaranteed that the sum of n of all test cases will not exceed 10^6.

Output

For each test case output one line containing one binary string, indicating the string BaoBao generates for inserting the integers. If there are multiple valid answers, output the one with the smallest lexicographic order. If the binary string does not exist, output "Impossible" (without quotes) instead.

Recall that, for two binary strings s and t of length n, we say s is lexicographically smaller than t, if there exists an integer k satisfying all the following constraints:

- $1 \le k \le n$.
- For all $1 \le i < k$, $s_i = t_i$.
- $s_k =$ '0' and $t_k =$ '1'.

Example

standard input	standard output
3 4 2 3 1 4 4 1 3 2 5 4 5 1 2 3 3 4 1 5 2 3 1 1 2 2 1 1	0101 Impossible 001

Note

We now explain the first sample test case.

i	v_i	b_i	**"Heap" Array after Insertion**
1	2	0	{2}
2	3	1	{3, 2}
3	1	0	{1, 2, 3}
4	4	1	{4, 1, 3, 2}