Problem M. Matrix 4

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

Matrix 4 is coming! There are rumors that one of the main plot twists of this ongoing epic movie will be Neo searching for Trinity in a 4-dimensional labyrinth.

Each point of the labyrinth may be seen as a matrix 2×2. Neo is standing at the matrix $S = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$.

Trinity is held captive at the matrix $F = \begin{pmatrix} p & q \\ r & s \end{pmatrix}$.

From each matrix of labyrinth you can go to one of 4 directions which are denoted by letters a, A, b, B. When taking direction $c \in \{a, A, b, B\}$ from the matrix X, you reach matrix XM_c (matrix product of X and M_c) with M_c defined as follows:

$$M_a = \begin{pmatrix} 1 & 2 \\ 0 & 1 \end{pmatrix} \quad M_A = \begin{pmatrix} 1 & -2 \\ 0 & 1 \end{pmatrix} \quad M_b = \begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix} \quad M_B = \begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$$

Your task is to help Neo go from S to F or to decide that it is impossible. If it is possible, you should also provide Neo with a description of the route which should be taken in order to reach F. Route should be expressed as a sequence of steps; steps may be *repetition groups* that look like a sequence of steps repeated arbitrary positive integer number of times; repetition groups may possibly include other repetition groups.

Formally, route is defined using the following grammar:

```
<route> := <empty> | <step><route>;
<step> := a | A | b | B | (<route>)<count>;
```

where `<empty>` is an empty string and `<count>` is a positive integer.

To follow the route means to follow each step of the route from left to right. To follow the step means either take corresponding direction or follow the inner route `<count>` times.

Input

The first line of the input contains T ($1 \le T \le 10\,000$), the number of test cases.

Each of the following T lines contains four integers p, q, r, s ($-1\,000\,000 \le p, q, r, s \le 1\,000\,000$) defining the components of the matrix $F = \begin{pmatrix} p & q \\ r & s \end{pmatrix}$ in which Trinity is held captive.

Output

For each test case either print word "`Impossible`" or print a route from S to F. Do not print any extra spaces, strictly follow the formal grammar above. Empty route is allowed.

Number of repetitions in any step that is a repetition group should not exceed 10^9.

Route length should not exceed one KiB (1024 bytes), i.e. the length of the line with route description should not exceed 1024.

Checking program will evaluate your route using fast matrix exponentiation. If at any moment any intermediate matrix has component with absolute value greater than 10^9, you get Wrong Answer verdict for the test.

Example

standard input	standard output
3 -7 4 -2 1 25 12 -48 -23 -1 0 0 1	aaB (B(a)3b)2 Impossible

Note

In the first case, route takes Neo through the following sequence of matrices:

$$\begin{pmatrix}1 & 0\\0 & 1\end{pmatrix} \to \begin{pmatrix}1 & 2\\0 & 1\end{pmatrix} \to \begin{pmatrix}1 & 4\\0 & 1\end{pmatrix} \to \begin{pmatrix}-7 & 4\\-2 & 1\end{pmatrix}$$

Route from the second case is equivalent to the following route: `BaaabBaaab`.