It is known that Sheffer stroke function (NOT-AND) can be used to construct any Boolean function. The truth table for this function is given below:

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
<th>x — y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Consider the problem of adding two binary numbers $A$ and $B$, each containing $N$ bits. The individual bits of $A$ and $B$ are numbered from 0 (the least significant) to $N-1$ (the most significant). The sum of $A$ and $B$ can always be represented by $N+1$ bits. Let’s call most significant bit of the sum (bit number $N$) the **overflow** bit.

Your task is to construct a logical expression using the Sheffer stroke function that computes the value of the overflow bit for arbitrary values of $A$ and $B$. Your expression shall be constructed according to the following rules:

1. $A_i$ is an expression that denotes value of $i$-th bit of number $A$.
2. $B_i$ is an expression that denotes value of $i$-th bit of number $B$.
3. $(x|y)$ is an expression that denotes the result of Sheffer stroke function for $x$ and $y$, where $x$ and $y$ are expressions.

When writing the index, $i$, for bits in $A$ and $B$, the index shall be written as a decimal number without leading zeros. For example, bit number 12 of $A$ must be written as ‘$A_{12}$’. The expression should be completely parenthesized (according to the 3rd rule). No blanks are allowed inside the expression.

### Input

The first line of the input contains an integer indicating the number of test cases in the input. After that there is a blank line and the test cases separated by a blank line.

Each test case consists of a single integer $N$ ($1 \leq N \leq 100$), on a line by itself.

### Output

For each test case, write to the output file an expression for calculating overflow bit of the addition of two $N$-bit numbers $A$ and $B$ according to the rules given in the problem statement.

Print a blank line between test cases.

**Note:** The stroke symbol (|) is an ASCII character with code 124 (decimal).

### Sample Input

```
1
2
```

### Sample Output

```
((A1|B1)|(((A0|B0)|(A0|B0))|((A1|A1)|(B1|B1))))
```