A complex system that works is invariably found to have evolved from a simple system that works.

John Gaule

Everyone knows about base-2 (binary) integers and base-10 (decimal) integers, but what about base $\mathbf{i}-\mathbf{1}$? A complex integer n has the form $n = a + b\mathbf{i}$, where a and b are integers, and $\mathbf{i}$ is the square root of -1 (which means that $\mathbf{i}^2 = -1$). A complex integer n written in base $(\mathbf{i}-\mathbf{1})$ is a sequence of digits (b_i), writen right-to-left, each of which is either 0 or 1 (no negative or imaginary digits!), and the following equality must hold.

$$n = b_0 + b_1(\mathbf{i}-\mathbf{1}) + b_2(\mathbf{i}-\mathbf{1})^2 + b_3(\mathbf{i}-\mathbf{1})^3 + \ldots$$

The cool thing is that every complex integer has a unique base-(**i-1**) representation, with no minus sign required. Your task is to find this representation.

Input

The first line of input gives the number of cases, N (at most 20000). N test cases follow. Each one is a line containing a complex integer $a + bi$ as a pair of integers, a and b. Both a and b will be in the range from -1,000,000 to 1,000,000.

Output

For each test case, output one line containing '`Case #`x`:`' followed by the same complex integer, written in base $\mathbf{i}-\mathbf{1}$ with no leading zeros.

Sample Input

```
4
1 0
2 3
11 0
0 0
```

Sample Output

```
Case #1: 1
Case #2: 1011
Case #3: 111001101
Case #4: 0
```