Problem 3

Input file: Problem3.txt

There is a war going on in the world. Allied troops are fighting valiantly on the front lines. The only problem is that they will soon be short of supplies. The Soviets are intercepting every conversation regarding the drop zone of the supplies. The American Secret Service has devised a new encoding mechanism which encodes the latitude and longitude of the drop zone.

The Soviets are looking to cut off the supply of Allied troops given that they know the location of the drop zone. Your job as an American Agent is to decode the messages sent by the Head Quarters and locate the exact drop zone of the supplies.

The following rules have been used to encode a number:

- Represent the number as a pair of length and offset.

- Offset is the number in binary, with the leading bit chopped off. For example 13 → 1101 → 101

- Length is the length of offset. For 13 (offset 101), this is 3.

- Encode length in unary code: e.g the unary code of 3 is 1110. See table for examples.

- The encoded value of 13 is the concatenation of length and offset: 1110101

Your task is to write a program, which takes encoded secret-message as input and calculates the latitude and longitude of the drop zone.

Number	Unary Code
0	0
1	10
2	110
3	1110
4	11110

Input

The input consists of multiple test cases. The first line of input is the number of test cases N (1≤N≤100). Each of the following N lines contains a latitude and longitude of the drop zone encoded using the rules stated above.

Output

For each test case, print a single line that says "Case #n: " where n is the test case number followed by a space and the latitude and longitude position of the drop zone.

Sample Input

```
2
111101111 111101101
11111000000 111101111
```

Sample Output

```
Case #1: 31, 29
Case #2: 32, 31
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