Code Jam 2019 - World Finals

Won't sum? Must now

Problem

In 2016, it was shown that every positive integer can be written as the sum of three or fewer palindromic terms. For the purposes of this problem, a palindromic term is a string of digits (with no leading zeroes) that represents a positive integer and reads the same forward and backward.

Given a positive integer **S**, find K palindromic terms that sum to **S**, such that K is minimized.

Input

The first line of input gives the number of test cases, **T**. **T** lines follow, each containing a positive integer **S**.

Output

For each test case, output one line of the form `Case #x:` A_1 (if only one term is needed), `Case #x:` A_1 A_2 (if only two terms are needed), or `Case #x:` A_1 A_2 A_3 (if three terms are needed), where `x` is the case number (counting starting from 1), each A_i is a palindromic term (as described above), and the sum of the A_is equals **S**.

Limits

Time limit: 20 seconds per test set.
Memory limit: 1GB.
1 ≤ **T** ≤ 100.

Test set 1 (Visible)

1 ≤ **S** ≤ 10^{10}.

Test set 2 (Hidden)

1 ≤ **S** ≤ 10^{40}.

Sample

Sample Input

```
3
1
198
1234567890
```

Sample Output

```
Case #1: 1
Case #2: 191 7
Case #3: 672787276 94449
561686165
```

In Sample Case #1, the input is already a palindrome.

In Sample Case #2, note that `99 99`, for example, would also be an acceptable answer. Even though there are multiple instances of `99`, they count as separate terms, so this solution uses the same number of terms as `191 7`.

Also note that `191 07`, `181 8 9`, `0110 88`, `101 97`, `7.0 191.0`, and `-202 4`, for example, would not be acceptable answers.