Problem 8: Radiation Irritation
29 Points

Problem ID: `microwave`

Rank: 3

Introduction

Your dorm room kitchen has the worst microwave you've ever seen. The inside is filthy and sticky, the door hinge is creaky, and the noise it makes when heating could wake everyone on your floor. However, the worst part about this microwave, by far, is its number pad. The buttons jam constantly, and you need to press them with a force so great that you're probably denting the exterior with every push. To make things worse, your microwave is ridiculously weak, meaning you need to compensate with extra-long cook times. One day, you've had enough. You vow to use as few button presses as humanly possible—never again cramping your fingers more than necessary.

Your task is to create a program that will output the shortest sequence of button presses needed to set a microwave timer.

Program Input

The first line of the input from STDIN will contain a positive integer `T` denoting the number of test cases that follow. Each test case will have the following input:

- A single line consisting of two numbers separated by a space. The numbers are as follows:
  - A positive integer `n` denoting the time duration you want to set on the microwave, in seconds.
  - A positive integer `m` denoting the how much the microwave's "Add" button adds to the timer, in seconds.

Example Input:

```
5
15 3
1359 453
300 30
12222223 1111111
23 17
```

Program Output

For each test case, your program should correctly output the shortest sequence of buttons needed according to the following criteria:

- There are two types of buttons on your microwave. They are as follows:
  - Number buttons, represented by a single 0-9 digit. Pressing a number button appends its digit to the end of the current timer duration. Pressing 0 when the current timer duration is zero will have no effect on the timer.
  - The "Add" button, represented by the word `Add`. Pressing the "Add" button adds m seconds to the current timer duration.
- Your output should be in the format: `<BUTTON>-<BUTTON>-<...>`
  - The leftmost `<BUTTON>` represents the first button pressed, and the rightmost `<BUTTON>` represents the last button pressed.
- All button presses must occur before the microwave begins cooking.
- If multiple button sequences share the shortest length, your program should output the sequence that presses the least unique buttons. If multiple button sequences of the same length press the same number of unique buttons, your program should output the sequence that comes first in alphanumeric order. The "Add" button should be considered as last in alphanumeric order.

Example Output:

```
1-5
Add-Add-Add
Add-0
Add-2-Add
6-Add
```

Problem Constraints

Test Set #1:

T ≤ 1.0×10^5

$1 \le n, m \le 1.0 \times 10^{10}$

Test Set #2:

T ≤ 150

$1 \le n, m \le 1.0 \times 10^{19}$

Assume n is not preceded by a zero.

Note: If you are a Java or C/C++ programmer, be aware that the `int` variable type is too small to contain values n and m! Java programmers should use variable type `long`, and likewise `long long` for C/C++.

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