Problem C
Happy Birthday

Time limit: **3 seconds**
Memory limit: **1024 megabytes**

Problem Description

Wenci loves saying "Happy Birthday" to people. She hopes that others can feel happy from her wishes not only on their birthdays but also on any ordinary day. As a computer science major in college, her goal is to create a Birthday Happiness Machine for her 2028 graduation project. The machine calculates how many days away today is from each friend's birthday and sends them a cheerful message.

The robot sends different messages depending on the situation. If the friend's birthday hasn't arrived yet this year, it says "`Happy {X} days before birthday, {friend's name}`" If the birthday has already passed, it says "`Happy {X} days after birthday, {friend's name}`". And if it happens to be their birthday today, it joyfully says "`Happy Birthday, {friend's name}`"

When Wenci tested the robot, she used her friends Lynn, Sally, and Sean as examples. Lynn's birthday is on December 24, Sally's on April 17, and Sean's on November 12. Since today is November 12, the system would send:
"`Happy 25 days after birthday, Lynn`"
"`Happy 209 days before birthday, Sally`"
"`Happy Birthday, Sean`"

You love this project so much that you decided to make one for your own friends too.

Input Format

The input may contain multiple test cases. Each test case begins with a line containing a date D, representing today's date. The second line contains a positive integer N, indicating the number of people whose names and birthdays will be entered. The following N lines each contain a name M and a date H, separated by a space, meaning that M's birthday is on H. You may assume that all dates fall within the year 2028. Two consecutive test cases are separated by a blank line. Please see the sample input.

Output Format

For each test case, output one line for each person, containing the appropriate birthday message. Print a blank line between outputs of two consecutive test cases. Please see the sample output.

Technical Specification

- $1 \leq N \leq 100$
- You may assume that all dates fall within the year 2028.

- 2028 is a leap year.

Sample Input 1

```
4/1
3
Zoey 4/14
Eva 4/17
Hannah 4/29

11/12
3
Lynn 12/24
Sally 4/17
Sean 11/12
```

Sample Output 1

```
Happy 13 days before birthday, Zoey
Happy 16 days before birthday, Eva
Happy 28 days before birthday, Hannah

Happy 42 days before birthday, Lynn
Happy 209 days after birthday, Sally
Happy Birthday, Sean
```