Problem 150: Reschedule It!

Difficulty: Hard

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Problem Background

The Lockheed Martin F-35 Lightning II is a versatile stealth fighter currently in use by air forces around the world. With three primary variants to allow the fighter jet to be deployed from land or aircraft carriers, the F-35 stands to be the dominant force in the air for decades to come.

Lockheed Martin manufactures the F-35 in its production facility outside of Fort Worth, Texas. With high demand for the aircraft from multiple branches of the US military, not to mention the armed forces of other countries, it's important that the production lines move smoothly. At the same time, Lockheed Martin can't afford to have a bunch of extra aircraft just sitting around; the cost to store, secure, and maintain them can quickly add up over time. A great deal of planning and management is needed to ensure that production proceeds at exactly the right pace.

Problem Description

You're working in production management at Lockheed Martin Aeronautics on the F-35 manufacturing line. Your task is to make sure that production is proceeding at the correct pace, or if changes need to be made to the schedule. You are working primarily with two sets of data: the production schedule, which tells you how many aircraft will come off the production line on which days; and purchase orders, which tell you how many aircraft need to be delivered on which days.

You need to ensure that you have enough aircraft on hand to fulfill every purchase order, but that you aren't producing extra aircraft that nobody wants. There are also two more restrictions that you have to keep track of:

- Once an aircraft comes off the production line, it cannot be sold until at least the next day. This allows time for US Air Force pilots to conduct test flights on the new aircraft.
- Aircraft must be sold within four weeks (28 days) after they come off the production line. Beyond this point, the aircraft would be due for routine maintenance, which would cut into Lockheed Martin's profits.

If at any point you do not have enough aircraft to fulfill a purchase order, or an aircraft is left in a hangar for more than 4 weeks, your production schedule has failed. Your team must write a program to analyze the production and order schedules and highlight these problems before they have a chance to occur.

Sample Input

The first line of your program's input, received from the standard input channel, will contain a positive integer representing the number of test cases. Each test case will include:

- A line containing two positive integers, separated by spaces:
  - P, representing the number of entries in the production schedule
  - O, representing the number of purchase orders
- P lines containing information about the production schedule. Production schedule information is presented in chronological order. Each line will contain the following information, separated by spaces:
  - A date, in YYYY-MM-DD format, showing the date on which one or more aircraft will be completed
  - A positive integer representing the number of aircraft to be completed on that date
- O lines containing information about purchase orders. Purchase orders are presented in chronological order. Each line will contain the following information, separated by spaces:
  - A date, in YYYY-MM-DD format, showing the date on which one or more aircraft must be delivered
  - A positive integer representing the number of aircraft to be delivered on that date

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3
2 3
2020-06-15 5
2020-06-25 4
2020-06-16 3
2020-06-26 3
2020-07-02 3
3 2
2020-06-15 2
2020-06-24 2
2020-06-25 2
2020-06-26 3
2020-07-25 3
2 2
2020-06-15 2
2020-06-24 3
2020-06-26 2
2020-06-25 2
```

Sample Output

For each test case, your program must determine if the given production and order schedule has problems. If the schedule is free of issues, print "OK". If the schedule has one or more problems, print "NOT OK".

```
OK
NOT OK
NOT OK
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