School of Engineering
Jawaharlal Nehru University
B. Tech. (2nd Semester)
Subject: Data Structure

Instructions:

1. **You are advised to use Google Document to write your program.**
2. **Write your document name as (Branch_RollNumber_Lab_1) [Example: CS_01_Lab_1]**
3. **Each program should start with new page.**
4. **At least four Test Cases should be provided with each program.**
5. **Plagiarised content (program) will be penalised.**
6. **Submit the assignment on time (request for date extension will not be entertained)**
7. **Check the linked Sample Copy for further clarification. https://docs.google.com/document/d/1TfnEi_MgEwByxG_9Ez_s51Ss_GYh_5G6FBA0KoFh_j8/edit?usp=sharing**

Lab Assignment No. 7

1. Professor XYZ is teaching a course. There are N students attending the course, numbered 1 through N. Before each lesson, Prof has to take attendance, i.e. call out the names of students one by one and mark which students are present. Each student has a first name and a last name. In order to save time, Prof wants to call out only the first names of students. However, whenever there are multiple students with the same first name, Prof has to call out the full names (both first and last names) of all these students. For each student that does not share the first name with any other student, Prof may still call out only this student's first name.
Help Prof decide, for each student, whether he will call out this student's full name or only the first name.

Input

- The first line contains a single integer N.
- N lines follow (For each valid i, the i-th of the following N lines contains two space-separated strings denoting the first and last name of student i)

Sample Input
```
4
Amit Kumar
Amit Garg
Sunil Yadav
Ravi Sharma
```
Output
```
Amit Kumar
Amit Garg
Sunil
Ravi
```

2. A shopkeeper is always trying to find patterns of balls. Balls have some numbers written on it. Today shopkeeper has 3 balls with numbers written on it and he wonders if any one of them can be written as the sum of the other two integers.

Input:

- First line will contain the number of test cases (N). Then the testcases follow.
- Each testcase contains a single line of input, with three space-separated positive integers x, y, and z.

Output:
For each testcase, output in a single line, "YES" if it's possible to represent any integer among the three integers as the sum of the other two integers, and "NO" if not.

Sample Input
5
1 1 2
1 3 2
2 2 2
100 100 201
11 22 33

Sample Output:
YES
YES
NO
NO
YES

3. Farmer Alice has three fields with potatoes planted in them. He harvested x potatoes from the first field, y potatoes from the second field and is yet to harvest potatoes from the third field. Alice is very superstitious and believes that if the sum of potatoes he harvests from the three fields is a prime number, he'll make a huge profit. Please help him by calculating for him the minimum number of potatoes that if harvested from the third field will make the sum of potatoes prime. At least one potato should be harvested from the third field. (Least number should be answer)

Input
The first line of the input contains an integer T denoting the number of test cases. Each of the next T lines contain 2 integers separated by single space: x and y.

Output
For each test case, output a single line containing the answer

Sample Input:
2
1 3
4 3

Output:
1
4

Explanation

In sample input: the farmer harvested a potato from the first field and 3 potatoes from the second field. The sum is 4. If he is able to harvest a potato from the third field, that will make the sum 5, which is prime. Hence the answer is 1(he needs one more potato to make the sum of harvested potatoes prime.)

4. A and B play the following game. A eats 1 candy, then B eats 2 candies, then A eats 3 candies, then B eats 4 candies, and so on. Once someone can't eat what he is supposed to eat, he loses.
A can eat at most M candies in total (otherwise he would become sick), while B can eat at most N candies in total. Who will win the game? Print "A" or "B" accordingly.

Input
The only line contains two integers M and N denoting the maximum possible number of candies A can eat and the maximum possible number of candies B can eat respectively.

Output
For each test case, output a single line containing one string — the name of the winner ("A" or "B" without the quotes).

Sample Input:
```
3 2
```
Output:
```
B
```

Explanation:
We have M = 3 and N = 2. A eats 1 candy first, and then B eats 2 candies. Then A is supposed to eat 3 candies but that would mean 1 + 3 = 4 candies in total. It's impossible because he can eat at most M candies, so he loses. B wins, and so we print "B".

5. Joe has just found a recipe book, where every dish consists of exactly four ingredients. He is going to choose some two dishes and prepare them for dinner. Of course, he likes diversity and wants to know whether the two dishes are similar.
Two dishes are called similar if at least half of their ingredients are the same. In other words, at least two of four ingredients of the first dish should also be present in the second dish. The order of ingredients doesn't matter.
Your task is to examine pair of dishes. Check if the two dishes are similar and print "similar" or "dissimilar" accordingly.

Input
The first line contains four distinct strings, denoting ingredients needed for the first dish. Each ingredient is represented by a string of length between 2 and 10 inclusive, consisting of lowercase English letters.
The second line of each test case describes the second dish in the same format.

Output
For each test case, output a single line containing the answer — "similar" if at least half of the ingredients are same, and "dissimilar" otherwise (without the quotes).

Sample Input:
```
eggs sugar flour salt
sugar eggs milk flour
```

Output:
```
similar
```

Explanation:

The first dish consists of ingredients: eggs, sugar, flour, salt, while the second dish consists of: sugar, eggs, milk, flour. Three of four ingredients are present in both dishes (eggs, sugar, flour) so the two dishes are similar.

6. You have been recently hired as a developer in a software company. Your first mission is to implement a feature that will determine the number of submissions that were judged late in a contest.
There are N submissions, numbered 1 through N. For each valid i, the i-th submission was submitted at time Si and judged at time Ji (in minutes). Submitting and judging both take zero time. Please determine how many submissions received their verdicts after a delay of more than 5 minutes.

Input
The first line of the input contains a single integer N.
N lines follow. For each valid i, the i-th of these lines contains two space separated integers Si and Ji.

Output
Print a single line containing one integer — the number of submissions for which the judging was delayed by more than 5 minutes.

Sample Input:
```
5
1 3
4 4
4 10
1 11
2 7
```

Output
```
2
```

Explanation
The delays of the respective submissions are 2 minutes, 0 minutes, 6 minutes, 10 minutes and 5 minutes. Only submissions 3 and 4 are delayed by more than 5 minutes, hence the answer is 2.