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## Greetings From Globussoft

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- ❖ Given below are 5 Programming questions, you have to solve any 3 out of 5 questions.
- ❖ These 5 questions you can attempt in any technology like C/C++, java, .Net, PHP
- ❖ To solve these 3 questions you've max. 3 hours.
- ❖ While Solving these questions you are not allowed to use any Search Engine like Google, Yahoo, Bing ...

All the best for your test

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## QUESTION - 1

Linearians are peculiar creatures. They are odd in several ways:

1. Every Linearian is either red or blue.
2. A Linearian colony is a straight line, aligned N-S with the magnetic field.
3. A colony starts with single red Linearian.
4. Every year, each Linearian produces an offspring of the opposite color. After birth, the parent moves just south of the offspring. (Since everyone is born at once, this does make for a lot of jostling, but everyone stays in order.)

So a colony grows as follows:

N ----- S

Year 0: R  
Year 1: BR  
Year 2: RBBR  
Year 3: BRRBRBBR  
Year 4: RBBRBRBBRBBRBBR

Given a year and a position along the N-S axis, determine what the color of the Linearian there will be.

### Input

The first line is the year  $Y$  ( $0 \leq Y \leq 51$ ). The second line is the position  $P$  from north to south, 0-indexed ( $0 \leq P < 2^Y$ ).

### Output

The color of the Linearian, either red or blue.

Input	Input
3	51
6	123456789012345
Output	Output
blue	red

## QUESTION – 2

Rafael Nadal vs Novak Djokovic is probably the fiercest rivalry in tennis right now. Now your task is very simple.

You are given a string containing the scores of a single set (A set consists of many games) between these two stalwarts.

N denotes Nadal and D denoted Djokovic.

For those who are new to tennis, have a look of the rules online.

Anyway small description about the rules:

Now how a player wins a single game?

In a game scores are incremented as follows:

15,30,40

A player wins if scores are like 40-0,40-15,40-30.

If tied at 40-40., it is called Deuce.

If N wins next he has an Advantage and if he loses the next volley he comes back to Deuce.

After Advantage if the player wins the immediate volley he wins that game.

Simply put the player who wins 6 games first (provided he has won two games more than his opponent) wins the set.

For eg., 6-1,6-2,6-3,6-4 are all valid.

If 1 player has won 6 games and the other has won 5 games the match continues.(7-5 is also a valid scoreline)

If both the players are deadlocked at 6-6, then we have a tiebreaker.

In the tiebreaker the scores are counted normally (1,2,3,...)

The person who reaches 7 points first and is atleast 2 more than his opponent wins the set.

Eg: 7-0,7-1,7-2.....7-5 are valid.

If the scenario is 7-6 the match proceeds until one of the players scores two points more than the other.

Eg: Even 10-8 is valid.

### **Input:**

1st line - No. of test cases

Next T lines consist of strings denoting who won a volley.

### **Output:**

Winner Score (tie breaker score if any)

Loser Score

### **Example:**

Input:

2

N N N N N N N N N N N N N N N N N N N D D D D D D D D N N N N

D D D D N N N N D D D D N N N N D D D D N N N N D D D D N N N N D D D D N N N N

D D D D N N N N D D D D D D N N N N N D

Output:

N 6

D 2

D 7 (7-5)  
N 6

## QUESTION – 3

After teaching guitar to Jimmy Page (Led Zeppelin Band Guitarist), Sir Jadeja has decided to do something new. Sir Jadeja took out his guitar and started playing a melody he composed when he was 2 months old.

The guitar as usual has 6 strings denoted by numbers through 1 to 6. Each string is divided into P frets denoted by numbers 1 to P. A melody is a sequence of tones, where each tone is produced by picking a string pressed on a specific fret (for example: 4th string pressed on 8th fret). If a string is pressed on several frets, the produced tone will be the one corresponding to the highest of those frets. For instance, if the 3rd string is already pressed on the 5th fret, and the tone which corresponds to the 7th fret is to be produced, the string can be pressed on the 7th fret and picked without releasing the 5th fret. If a tone that corresponds to the 2nd fret on the same string is to be produced next, it is necessary to release both 5th and 7th frets and only then press 2nd.

Sir Jadeja feeling tired wants to play the melody with minimum number of finger movements. Note that press or release a single fret counts as one finger move. String picking is not a finger move, but rather a guitar pick move and should not be counted. Remember that picking a string with not affect frets being pressed on other string. You can assume that Sir Jadeja has enough fingers to press all the frets on all string at the same time (yes, that many).

### Input:

First line contains two integers: N ( $N \leq 500000$ ) and P ( $2 \leq P \leq 300000$ ). N denotes number of tones in the melody and P denotes number of frets. The next N lines describe the fields for the corresponding tones: the number of the string and the number of the fret, respectively. Tones must be played in the order they are described.

### Output:

Print a single integer: minimum number of finger movements that need to be made.

### Samples

INPUT 1:  
5 15  
2 8  
2 10  
2 12  
2 10  
2 5

OUTPUT 1 :

7

INPUT 2 :

8 15

2 8

2 10

2 12

3 7

2 10

3 5

2 5

3 3

OUTPUT 2 :

12

## QUESTION – 4

Black Widow has a collection of **N**(numbered 1 to N) Rings. She uses the rings to attack the enemies. She has decided to use one ring for distraction. She will first throw the distraction ring and then all the other rings will be thrown through it (one at a time). Each ring has an inner and outer radius.

A ring R1 will pass through ring R2 only if the outer radius of R1 is less than the inner radius of R2.

If she can choose a distraction ring from the given collection print the index of the ring (1-based), else print -1.

### Input

The first line of the input contains an integer **T** denoting the number of test cases.

The first line of each test case contains a single integer **N** denoting the number of Rings.

Next **N** lines consist of Inner and Outer Radius of the *i*th Ring - **r, R**.

- $1 \leq T \leq 100$
- $2 \leq N \leq 1000$
- $1 \leq r, R \leq 10^7$

### Output

For each test case print the desired result in separate line.

### Example

**Input :**

```
2
3
2 3
6 8
3 5
3
4 5
5 8
3 10
```

**Output :**

```
2
-1
```

## QUESTION – 5

Operation bits - A new operation conducted by the secret team currently working on a project on security enhancement. Mr.Abay, the team head, has found a new pattern on the perfect squares. This can be used as a outer cover for his project as its securing power is low. So he assign you this problem to find the key based on the given conditions:

"An two adjacent perfect squares have their absolute difference as an odd number except when a and b are equal. Your task is to find the key which is deined as:

key(a,b) where a and b are perfect squares is ( ( AND( absolute difference between every adjacent perfect squares in [a,b]) ) AND ( XOR( absolute difference between every adjacent perfect squares in [a,b]) ) )"

Find the key for the given inputs :)

**Input**

The input begins with a number T ( $1 \leq T \leq 1000$ ) where T is the number of testcases.

T lines follow

Each line has two numbers a and b ( $0 < a \leq b \leq 10^6$ )

It is assured that a and b are perfect squares.

**Output**

For each test case print the corresponding key

**Example**

**Input:**

2

1 4

25 49

**Output:**

3

0