

N-athlon

Lea is a very active person. Whenever she is bored, she finds something new to do. This time, she invited all her friends over for a grand tournament. She devises many exciting (or sometimes just silly but fun to watch) team games, in which her friends have to compete and whoever is part of a winning team gets a point. Of course, most games need a different number of players on each team, so for every game, new teams are formed.

Nevertheless, the event is a big success and many of Lea's friends compete in suspense-packed matches of real competition sports like Soccer, Volleyball, First Person Shooters, Real Time Strategy, Hockey and some newly invented events like "Extreme Spaghetti Knitting" or "Plants vs Zombies - An Adaption" (where the contestants roleplay on Lea's front lawn and the audience votes on whoever gave the best impression).

In the evening, Lea is really tired but happy. But before she is able to sleep, she wants to determine who won the grand tournament. But in all the chaos, she realizes she doesn't even have any idea of how many people participated.

At least, she recalls the following facts: For every event she organized, she divided all the participants into teams of equal size. Since she is a math enthusiast, she thought it would be a cool idea that every team size would be a prime number, but not many people even noticed. And since she oversaw the building of those teams, for each event she thinks she remembers the amount of people that were left over and had to watch from the sidelines. She also knows how many people she invited and that almost everyone she invited was there. Can you tell her how many people participated? (Please also tell her if her memories are inconsistent and no number of friends satisfy her memorized numbers)

Input

The first line of the input contains an integer t . t test cases follow, each of them separated by a blank line.

Each test case begins with a line containing two integers n, k , where n is the number of different games Lea organized and k is the number of friends that were invited. n lines follow, each consisting of two integers $size_i, rest_i$, where $size_i$ is the team size for game i and $rest_i$ is the amount of people that remained after dividing the amount of participants into teams of size $size_i$.

Output

For each test case, output one line containing "Case # i : x " where i is its number, starting at 1, and x being the people that participated in Lea's contest satisfying the constraints on team sizes and being the largest such number less or equal to k or "impossible" if Lea has made a counting error and there is no x that satisfies these constraints. Each line of the output should end with a line break.

Constraints

- $1 \leq t \leq 20$
- $0 \leq n \leq 15$
- $0 \leq k < 10^{12}$
- $0 \leq rest_i < size_i < 10^8$
- $size_i$ is prime for all i
- The number of total participants x does not change between games
- $\prod_{i=1}^n size_i < 10^{18}$

Sample Input 1

```
3
2 20
3 1
5 2
```

```
1 5
2 1
```

```
2 20
11 1
17 2
```

Sample Output 1

```
Case #1: 7
Case #2: 5
Case #3: impossible
```

Sample Input 2

```
6
3 29
19 5
43 8
47 13
```

```
1 29
43 22
```

```
1 20
11 9
```

```
2 13
5 1
3 1
```

```
4 43499412
11 2
73 53
17 12
79 32
```

```
3 10497640
29 24
17 11
37 35
```

Sample Output 2

```
Case #1: impossible
Case #2: 22
Case #3: 20
Case #4: 1
Case #5: 43457537
Case #6: 10492717
```