

Kick Start 2019 - Round G

Shifts

Problem

Aninda and Boon-Nam are security guards at a small art museum. Their job consists of N shifts. During each shift, at least one of the two guards must work.

The two guards have different preferences for each shift. For the i -th shift, Aninda will gain A_i happiness points if he works, while Boon-Nam will gain B_i happiness points if she works.

The two guards will be happy if both of them receive at least H happiness points. How many different assignments of shifts are there where the guards will be happy?

Two assignments are considered different if there is a shift where Aninda works in one assignment but not in the other, or there is a shift where Boon-Nam works in one assignment but not in the other.

Input

The first line of the input gives the number of test cases, T . T test cases follow. Each test case begins with a line containing the two integers N and H , the number of shifts and the minimum happiness points required, respectively. The second line contains N integers. The i -th of these integers is A_i , the amount of happiness points Aninda gets if he works during the i -th shift. The third line contains N integers. The i -th of these integers is B_i , the amount of happiness points Boon-Nam gets if she works during the i -th shift.

Output

For each test case, output one line containing `Case #x: y`, where x is the test case number (starting from 1) and y is the number of different assignments of shifts where the guards will be happy.

Limits

Time limit: 40 seconds per test set.

Memory limit: 1GB.

$1 \leq T \leq 100$.

$0 \leq H \leq 10^9$.

$0 \leq A_i \leq 10^9$.

$0 \leq B_i \leq 10^9$.

Test set 1 (Visible)

$1 \leq N \leq 12$.

Test set 2 (Hidden)

$1 \leq N \leq 20$.

Sample

Sample Input

```
2
2 3
1 2
3 3
2 5
2 2
10 30
```

Sample Output

```
Case #1: 3
Case #2: 0
```

In Sample Case #1, there are **N** = 2 shifts and **H** = 3. There are three possible ways for both Aninda and Boon-Nam to be happy:

- Only Aninda works on the first shift, while both Aninda and Boon-Nam work on the second shift.
- Aninda and Boon-Nam work on the first shift, while only Aninda works on the second shift.
- Both security guards work on both shifts.

In Sample Case #2, there are **N** = 2 shifts and **H** = 5. It is impossible for both Aninda and Boon-Nam to be happy, so the answer is 0.