# 4207 - Line Chart

## Asia - Dhaka - 2008/2009

ACRush is very famous in Supercoder. Supercoder is a professional company which arranges online algorithmic contests and rates peoples based on those contests. In Supercoder algorithm contest ranklist, ACRush is ranked third. Now a days he is doing some analysis on his rating history in Supercoder algorithm contest. In Supercoder, an algorithm contest is termed as a Single Round Tournament (SRT). After each SRT is finished, rating of a contestant is updated according to his/her relative performance. ACRush collected all these rating information, and using those he created a line chart.

To make things more clear, let us consider the following table as his rating info.

| SRT | Rating |
|-----|--------|
| 320 | 3 |
| 306 | 1 |
| 401 | 3 |
| 325 | 4 |
| 393 | 5 |
| 380 | 2 |

From this table, we see that his first SRT was SRT#306, and rating after that SRT was 1, so he

marked point (1, 1) as $r_1$ in graph paper, his second SRT was SRT#320 and rating after that SRT was 3, so he marked (2, 3) as $r_2$, then he add $r_1$ with $r_2$ by a straight line and so on.

In general for his $i^{th}$ SRT he marked point (i, rating after $i^{th}$ SRT) by $r_i$.

After marking all the points he will add point $r_i$ with $r_{i-1}$ by straight lines, for all $1 < i <=N$, Where N is the total number of SRTs he played. For better idea look at figure 1:
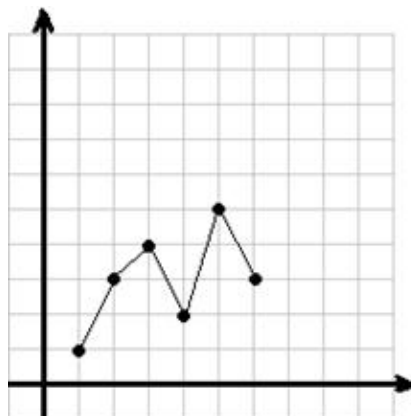


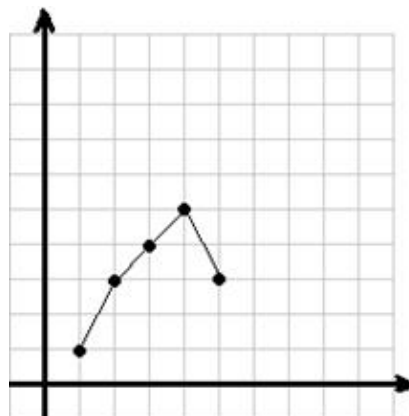Fig 1: Line chart cosidering all SRTs          Fig 2: Line chart ignoring SRT #380

After drawing line chart, he became very interested about the number of peaks. There are two kinds of peaks in a line chart, 1) Upper Peak and 2) Lower Peak. Upper Peak is that point in a line chart whose previous and next point has smaller y coordinates and lower peak is that points in a line chart whose previous and next point has greater y coordinates. For example total number of peak in figure 1 is 3. Two of them upper peak, which are (3, 4) and (5, 5), and one of them is lower peak which is (4, 2).

ACRush observed that by ignoring SRT#380, his line chart will become like figure 2, in which number of peak is only 1. By observing this he became more curious. Now he wants to know, by ignoring 0 or more SRTs how many distinct line charts having K peaks is possible. ACRush calls these line charts ‟K-peak Line charts", in a K-peak line chart he doesn't allow two consecutive points to have same y coordinate.

### Input

Input will start with an integer T ( T ≤ 12 ), which indicates the number of test cases. Each case starts with a line having two integers N (1 ≤N ≤ 10000) and K ( 0 ≤ K ≤ 50 ). Each of the next N lines will contain two integers SRT ( 1 ≤ SRT ≤ 1000000000) and Rating ( 1 ≤ Rating ≤ 1000000000 ). All the SRT numbers will be distinct.

### Output

For Each test case output a single Line "Case #: W", here # will be replaced by case number and W will be replaced by the number of distinct K-peak line charts modulo 1000000.

# Sample Input

# Output for Sample Input

| Sample Input | Output for Sample Input |
|---|---|
| 3 | Case 1: 20 |
| 6 1 | Case 2: 1 |
| 320 3 | Case 3: 8 |
| 306 1 | |
| 401 3 | |
| 325 4 | |
| 393 5 | |
| 380 2 | |
| 4 1 | |
| 101 3 | |

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102 2

103 2

104 4

3 0

102 2

101 1

103 3
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