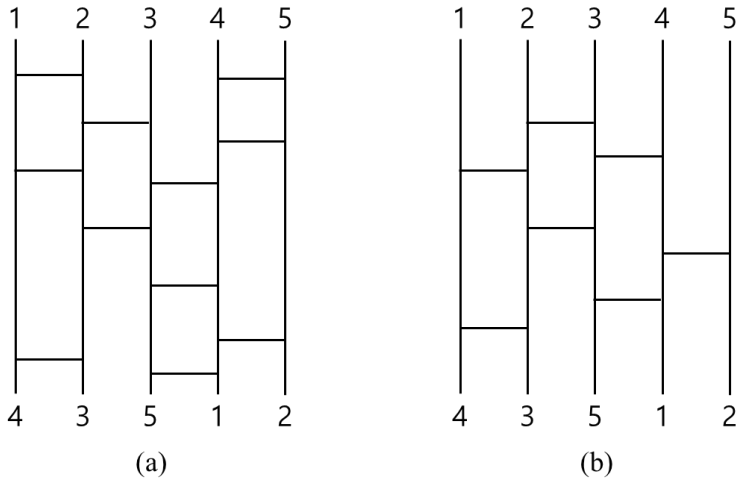
Shuffle Sadari

The software development team of LG group loves to use the shuffle sadari (called ghostlegs in China) to decide the restaurant for team dinner. Every team member is allowed to add as many shuffle bars as he/she wants. And this can be a problem since it takes too much time to follow the shuffle sadari.

However, for a given shuffle sadari, there can be other one with fewer shuffle bars producing the same result. For example, take a look of the following two sadaries: the left one (a) with eleven shuffle bars by Mr. L and the right one (b) with seven ones by Mr. G. Though the numbers of shuffle bars are different, they produce the same result.



The result of a shuffle sadari can be defined by the permutation π produced. In the above figure, the permutations produced by the shuffle sadaries by Mr. L and Mr. G, π_L and π_G, are same to (4, 3, 5, 1, 2).

For the given sadari A, you are to produce the shuffle sadari B containing the minimum number of shuffle bars, namely *minimum sadari*, and producing the same permutation to A. The shuffle bars of B do not have to exist in the same position in A. For example, you can produce sadari (b) given (a). Acutally, sadari (b) contains the minimum number of shuffle bars producing the same result to (a), i.e. (b) is a minimum sadari of (a). Generally, there can be multiple minimum sadaries for a given sadari. In this problem, you just count the number of shuffle bars of a minimum sadari for the input sadari.

To simplify the problem, assume rectangular-shaped sadaries only. The vertical bars of a sadari are all parallel one another, and all the horizontal shuffle bars are perpendicular to vertical bars. In other words, assume the sadari placed on the 1st quadrant of the two-dimensional Cartesian plain, where all the vertical bars are parallel to y-axis and the horizontal ones, to x-axis. Further, assume that the vertical positions (the y-coordinates) of shuffle bars are unique and that a shuffle bar connects the adjacent vertical bars only.

[Input]
The number of cases T ($T \leq 100$) is given in the first line of the input file. In the first line of each case contains two positive integers, N and M, separated by space, denoting the number of vertical and horizontal bars, respectively ($1 < N \leq 300{,}000$ and $1 < M \leq 500{,}000$). From the second line of each case, the positions of horizontal bars are given from top to bottom, one per line. The vertical bars are indexed from left to right starting from 1 to N. The position of a horizontal shuffle bar is the index of the left vertical bar on which the horizontal bar is connected.

The input is given from the following three sets:

- Set 1: $N \leq 8$ and $M \leq 15$,
- Set 2: $N \leq 3{,}000$ and $M \leq 10{,}000$,
- Set 3: $N \leq 300{,}000$ and $M \leq 500{,}000$.

[Output]
Print the difference, $M - M'$, in a single line for each input case, where M and M' are the numbers of horizontal bars of the input sadari and the minimum sadari, respectively.

[I/O example]

Input

```
3
5 11
1
4
2
4
3
1
2
3
4
3
1
3 10
1
2
1
```

```
2
1
2
2
1
2
1
7 21
3
6
5
1
2
4
3
6
1
2
5
6
4
2
3
6
5
1
2
4
6
```

Output

```
4
8
10
```