

## Problem B - The Good Side ~ Part 2

While there was much debate in the National Assembly regarding minutiae such as logistics and financing, it did not take very long for the members to come to the conclusion that the Kingdom had no choice but to go to war. Once that was decided, the ACM immediately made its move...

Although research seems slow moving at times, especially from the point of view of a single researcher, when you take a step back and see the big picture, the progress has been astounding. The ACM has achieved this progress through conducting hundreds of research projects in parallel. Now that the need has arisen, it is time to accelerate some of these projects to completion.

Remember Origin Events? It turns out that Raunak's research into the history of magic was not just some academic curiosity. When Origin Events occur, powerful magic is often involved and these leave a trail of breadcrumbs if you know where to look. Raunak believes he has followed the breadcrumbs to the source.

Raunak has obtained unequivocal evidence of a hidden ancient fortress in the Integral Domain – a desolate area presently devoid of civilization, located far beyond the Frontier Domain. It is under a particular section of the Integral Mountains – the towering mountain range that rips through the heart of the Domain.

Furthermore, he has determined the exact *shape* of the mountain range above the fortress and has pinned down a couple of highly probable locations. He has done this by mapping the height of each 1 km segment of the Integral Mountains to the nearest centimeter and compared them to a pattern he meticulously reconstructed from the (very faint) magical signatures of the Event. Unfortunately he could not determine the absolute height of each segment in the pattern, so instead he tried to find matches allowing both horizontal and vertical translation of the pattern.

Raunak needs your help to confirm that he did not miss any candidates.

### Input

The first line contains  $T$ , the number of test cases.

Each test case starts with a line containing two integers  $n$  and  $w$  ( $1 \leq n, w \leq 200,000$ ), denoting the length of the Integral Mountains and the length of the pattern that Raunak has elucidated.

The second line contains  $n$  integers  $a_i$  ( $1 \leq a_i \leq 10^9$ ) describing the height of each 1km segment of the Integral Mountains.

The third line contains  $w$  integers  $b_i$  ( $1 \leq b_i \leq 10^9$ ) describing the height of each 1km segment of the mountain range pattern.

### Output

The number of matches of the mountain range pattern in the Integral Mountains, allowing for horizontal and vertical translation. Matches are allowed to overlap.

### Sample Input

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

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### Sample Output

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```
2
```

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## Sample Input Explanation

In the sample test case, the pattern  $[3, 4, 3, 2]$  can be translated to match segment  $[4, 5, 4, 3]$  at position 0 and segment  $[2, 3, 2, 1]$  at position 7, for a total of 2 matches.

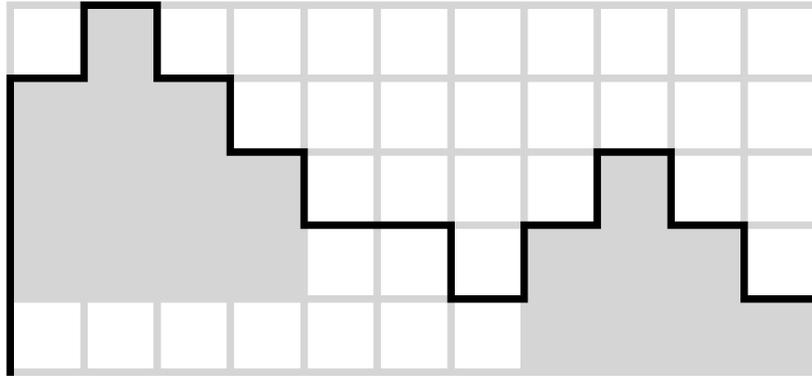


Figure 1: Illustration of sample test case