Sereja and Inversions

Problem code: SEAINVS

Read problems statements in Mandarin Chinese, Russian and Vietnamese as well.

SUCCESSFUL SUBMISSIONS ⊞

Sereja has a permutation **P** of the **N** numbers in the range **1** to **N**. You have to answer **M** queries over it, where each query is given four numbers l_1, r_1, l_2, r_2 ($1 \le l_1 \le r_1 < l_2 \le r_2 \le N, r_1 - l_1 = r_2 - l_2$). Your task is to calculate number of permutations **Q** of the **S** integers in the range **1** to **S**, such that $S = r_1 - l_1 + 1$, and for each **i** from **1** to **S**, the condition $P_{Q_i + l_1 - 1} < P_{i + l_2 - 1}$ is satisfied.

Please help Sereja in providing the answer for each query modulo $10^9 + 7$.

Input

The first line of the input contains an integer **T** denoting the number of test cases. The description of **T** test cases follows.

First line of each test case contains two space separated integers **N, M**.

Next line contains numbers $P_1, P_2, ..., P_N$.

Each of next **M** lines contains numbers l_1, r_1, l_2, r_2 - denoting the query.

Output

For each query, output the corresponding answer in single line.

Constraints

- $1 \le T \le 10$
- 1 ≤ sum of all **N** over all test cases ≤ 10^5
- 1 ≤ sum of all **M** over all test cases ≤ 10^5
- 0 ≤ number of pairs **i, j** ($1 \le i < j \le N, P_i > P_j$) over all test cases ≤ 10^5

Subtasks

- **Subtask #1: (10 points)** $1 \le N \le 10$
- **Subtask #2: (20 points)** $1 \le N \le 1000$
- **Subtask #3: (70 points)** original constraints

Example

Input:
```
3
4 1
1 2 3 4
1 2 3 4
4 2
1 3 2 4
1 1 2 2
1 2 3 4
10 1
1 4 3 2 9 5 6 7 10 8
1 5 6 10
```

Output:
```
2
1
1
24
```

Author:	sereja
Tester:	mgch
Date Added:	16-10-2016
Time Limit:	2 sec
Source Limit:	50000 Bytes
Languages:	ADA, ASM, BASH, BF, C, C99 strict, CAML, CLOJ, CLPS, CPP 4.3.2, CPP 4.9.2, CPP14, CS2, D, ERL, FORT, FS, GO, HASK, ICK, ICON, JAVA, JS, LISP clisp, LISP sbcl, LUA, NEM, NICE, NODEJS, PAS fpc, PAS gpc, PERL, PERL6, PHP, PIKE, PRLG, PYPY, PYTH, PYTH 3.4, RUBY, SCALA, SCM chicken, SCM guile, SCM qobi, ST, TCL, TEXT, WSPC

SUBMIT

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