Task: PRZ
Algorithm speedup

XVI OI, Stage I. Available memory: 64 MB. *20.10–17.11.2008*

As a punishment for misbehaving, Byteasar is to calculate a certain mysterious and nasty Boolean-valued function $\mathbf{F}(x, y)$, which is defined for a pair of positive integer sequences $x = (x_1, \ldots, x_n)$, $y = (y_1, \ldots, y_m)$ as follows:

boolean $\mathbf{F}(x, y)$
  if $\mathbf{W}(x) \neq \mathbf{W}(y)$ **then return 0**
  else if $|\mathbf{W}(x)| = |\mathbf{W}(y)| = 1$ **then return 1**
  else return $\mathbf{F}(\mathbf{p}(x), \mathbf{p}(y)) \wedge \mathbf{F}(\mathbf{s}(x), \mathbf{s}(y))$.

Where:

- $\mathbf{W}(x)$ denotes the set of members of the sequence x (order and repetitions of elements are insignificant),
- $\mathbf{p}(x)$ denotes the longest prefix (initial part of any length) of the sequence x, such that $\mathbf{W}(x) \neq \mathbf{W}(\mathbf{p}(x))$,
- $\mathbf{s}(x)$ denotes the longest suffix (final part of any length) of the sequence x, such that $\mathbf{W}(x) \neq \mathbf{W}(\mathbf{s}(x))$,
- $\wedge$ denotes the logical conjunction, 1 — true, 0 — false, and $|Z|$ — cardinality of set Z.

For example, for the sequence $x = (2, 3, 7, 2, 7, 4, 7, 2, 4)$ we have:

$$\mathbf{W}(x) = \{2, 3, 4, 7\}, \quad \mathbf{p}(x) = (2, 3, 7, 2, 7), \quad \mathbf{s}(x) = (7, 2, 7, 4, 7, 2, 4).$$

For very large data a programme calculating values of the function $\mathbf{F}$ directly from definition is too slow by any standards. Therefore you are to make these calculations as fast as possible.

Write a programme that reads several pairs of sequences (x, y) from the standard input and prints out the values $\mathbf{F}(x, y)$ on the standard output for every input pair.

Input

The first line of the standard input contains one integer k ($1 \leqslant k \leqslant 13$) denoting the number of sequence pairs to analyse. Next $3k$ line hold descriptions of test cases. The first line of each description contains two integers n and m ($1 \leqslant n, m \leqslant 100\,000$) separated by a single space and denoting the lengths of the first and second sequence, respectively. The second line holds n integers x_i ($1 \leqslant x_i \leqslant 100$) that form the sequence x, separated by single spaces. The third line holds m integers y_i ($1 \leqslant y_i \leqslant 100$), that form the sequence y, separated by single spaces.

Output

The output should consist of exactly k lines; the i-th line (for $1 \leqslant i \leqslant k$) should contain a single integer — 0 or 1 — the value of $\mathbf{F}(x, y)$ for i-th test case.

Example

For the input data:

```
2
4 5
3 1 2 1
1 3 1 2 1
7 7
1 1 2 1 2 1 3
1 1 2 1 3 1 3
```

the correct result is:

```
0
1
```