Transformation

You are given two short sequences of numbers, X and Y. Try to determine the minimum number of steps of transformation required to convert sequence X into sequence Y, or determine that such a conversion is impossible.

In every step of transformation of a sequence, you are allowed to replace exactly one occerunce of one of its elements by a sequence of 2 or 3 numbers inserted in its place, according to a rule specified in the input file.

Input

The input begins with the integer t, the number of test cases. Then t test cases follow.

For each test case, the first line of input contains four integers - N, M, U, V (1<=N,M<=50). The next two lines of input contain sequences X and Y, consisting of N and M integers respectively. The next U lines contain three integers: *a b c* each, signifying that integer *a* can be converted to the sequence *b c* in one step of transformation. The next V-U lines contain four integers: *a b c d* each, signifying that integer *a* can be converted to the sequence *b c d* in one step of transformation. With the exception of N and M, all integers provided at input are positive and do not exceed 30.

The format of one set of input data is illustrated below.

$N\ M\ U\ V$
$x_1\ x_2\ \ldots\ x_N$
$y_1\ y_2\ \ldots\ y_M$
$a_1\ b_1\ c_1$
$\vdots$
$a_U\ b_U\ c_U$
$a_{U+1}\ b_{U+1}\ c_{U+1}\ d_{U+1}$
$\vdots$
$a_V\ b_V\ c_V\ d_V$

Output

For each test case output -1 if it is impossible to convert sequence X into sequence Y, or the minimum number of steps required to achieve this conversion otherwise.

Example

Sample input:

```
1
3 10 2 3
2 3 1
2 1 1 2 2 1 2 1 2 1
3 1 2
3 3 3
3 1 3 2
```

Sample output:

```
6
```