pokerchips: (100 points - 1 second timelimit)

You regularly meet with your friends at the HPI *Spieletreff* at Tuesday for poker night. Three hours into the evening, and slightly unconcentrated because of all the food, stuffy air and the sound of the mice in the walls, you get bored of the game and start stacking up the chips in various ways. This gets you thinking. What if you played a solitaire game with the chips?

The rules are as follows. First distribute the chips randomly into several stacks. Then repeat until no chips are left:

- For any subset (of your choosing) of stacks remove the topmost chip from each of its stacks, *provided these chips all have the same color*.

- If you removed $k > 1$ chips, award yourself 2^{k-2} points. If you only removed one chip, 0 points.

Your score is the sum of points gained in each step. The goal, of course, is to score the maximum possible number of points.

On the next morning, feeling better again, you decide to solve the problem once and for all with a program.

Input   The first line of the input contains the number of test cases $t \leq 20$. Each of the following t test cases describes a starting arrangement of the game as follows.

- It starts with a line that contains one integer $n \leq 5$, the number of stacks you formed.

- The next line contains n integers $m_1, \ldots, m_n$ (bounded by the product: $\prod_i (m_i + 1) < 2^{19}$) separated by spaces. m_i is the number of chips in the i-th stack.

- The following n lines list the chips in the stacks. The i-th such line contains integers $c_{i1}, \ldots, c_{im_i}$ separated by spaces. Each c_{ij} ($1 \leq c_{ij} \leq 2^{10}$) represents the color of one chip. c_{im_i} is the chip at the top of the stack (removed first) and c_{i1} is the chip at the bottom (removed last).

Output   For every test case the corresponding output appears on a separate line. Each output consists of one integer p: the maximum number of points you can score in the game according to the rules above.

Points   There are three groups of test sets, worth 100 points in total.

(a) For the first group of test sets, worth 30 points, you may assume $n \leq 2$.

(b) For the second group of test sets, worth 30 points, you may assume $\prod_i(m_i + 1) < 2^{16}$ and $m_i \leq 12$ for all $i \in \{1, \ldots, n\}$.

(c) For the third group of test sets, worth 40 points, you may assume $\prod_i(m_i+1) < 2^{16}$.

Sample Input

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

Sample Output

```
2
2
```