Problem I

Item Crafting

Time Limit: 2 seconds

The *Item-Crafting Prowess Competition* is a fun event that players of MyCraft can challenge each other to, in order to flex their knowledge of the game's rich crafting system! There are m different items in MyCraft, with internal ID numbers 1 to m. Only some of these items can be found in the overworld; let's call them *raw materials*.

Every other item has to be made using the game's crafting system. Each item that is not a raw material has some *recipe*, which is some list of other items. In order to craft this item, you have to consume **one** of each item listed in its recipe.

It may then be possible that this product could be included as an ingredient in the recipe of some other item. That's what makes this crafting system so rich and multi-layered! In order to ensure there are no impossible recipes, you are guaranteed that all ingredients in the recipe of some item will always have a *greater* ID number than that of the final product.

The first n items are guaranteed to not be included in the recipes of any other items. Let's call these the *legendary final products*. The goal of the game is to craft *as many possible different legendary final products as possible* (i.e. making the same legendary final product multiple times will only count once towards your score).

Suppose you were able to acquire some number of raw materials, and no other items. What is the maximum number of different types of legendary final products that can be made?

Input Format

The first line of input contains two space-separated integers n and m.

The following m lines each represent an item. The ith line, describing the item with internal ID i, will start with an integer c_i, followed by a space.

- If $c_i = 0$, then this item is a raw material. A single integer p_i follows, the amount of this material that you have.
- Otherwise, if $c_i > 0$, then c_i space-separated integers follow, listing the IDs of the ingredients in the recipe for this item.

The legendary final products will always just be the first n items.

Constraints

- $1 \leq n \leq 15$
- There are at most 10 raw materials (items with $c_i = 0$).
- $n < m \leq 2 \cdot 10^5$
- $0 \leq c_i \leq 2 \cdot 10^5$, and the sum of c_i over all items i will not exceed $5 \cdot 10^5$.
- $0 \leq p_i \leq 10^8$ for each raw material
- $c_i > 0$ for each legendary final product (i.e. if $1 \leq i \leq n$)

- Each recipe consists of distinct ingredients.
- For the ith item's recipe (if it has one), the IDs of all its ingredients are strictly greater than i and n.
- All IDs are between 1 and m (inclusive)

Output Format

Output a single integer, the maximum number of different final products that can be made.

Sample Input 1

```
2 6
2 3 4
3 4 5 6
0 1
0 1
0 1
0 1
```

Sample Output 1

```
1
```

Sample Input 2

```
2 6
2 3 4
3 4 5 6
0 1
0 2
0 1
0 1
```

Sample Output 2

```
2
```

Sample Input 3

```
1 5
2 2 3
2 3 4
2 4 5
0 3
0 2
```

Sample Output 3

```
1
```

Sample Input 4

```
1 4
3 2 3 4
0 2
1 4
0 1
```

Sample Output 4

```
0
```

Explanation

In the first sample test case, there are two final products: one requires items 3 and 4 in its recipe, and the other one requires items 4 and 5 and 6 in its recipe. We can make one or the other, but not both, therefore the answer is 1.

The second sample test case is similar to the first one, except we have two of item 4. This allows us to make both legendary final products, and so the answer is 2.

In the third sample test, we need to do the following:

- Make two of item 3.
- Make one of item 2. This consumes the remaining item 4, as well as one of the item 3 that we just made.
- We have one of item 2 and one of item 3, so we can use them to make item 1.