

Split the Bill

Max. score: 100

This problem is no longer available for practice. Apology for any inconvenience!

ShopeePay is introducing a new split bill feature (hypothetically).

Your task is to create a simple version of this feature. Let's say there are N people in a group of friends U . Each person in this group is represented by a username u , each consisting only of lowercase Latin characters. They shared B bills, where each bill b_i ($1 \leq i \leq B$) consists of M_i items. Each item in the bill has a corresponding price p_{ij} ($1 \leq j \leq M_i$) on which the cost is equally shared among s_{ij} people (it's possible that $s_{ij} = 1$). For ease of payment, the total cost of bill b_i is **paid by one person** u_{b_i} .

Find an optimal transfer plan that resolves each person's debts. This plan is only considered optimal iff:

- the total amount of money exchanged between everyone is minimized, and that;
- there's as little number of transfers as possible.

Input

The first line contains two numbers N and B ($2 \leq N \leq 6, 1 \leq B \leq 1000$). The next N following lines are all the usernames u in U ($1 \leq |u| \leq 10$). Following that are B inputs, each starting with a line containing M_i ($1 \leq M_i \leq 10$) and a username u_{b_i} ($u_{b_i} \in U$). This is then followed by M_i items, each represented by a line containing two integers p_{ij} ($1 \leq p_{ij} \leq 50, 1 \leq j \leq M_i$) and s_{ij} ($1 \leq s_{ij} \leq N, s_{ij}$ divides p_{ij}), plus s_{ij} names u_{ij} ($u_{ij} \in U$).

Output

Output the total amount of exchanged money and the number of transfers in the optimal plan.

It is guaranteed that the total amount of money that any person sends/receives in the optimal transfer plan is no greater than 50.

SAMPLE INPUT

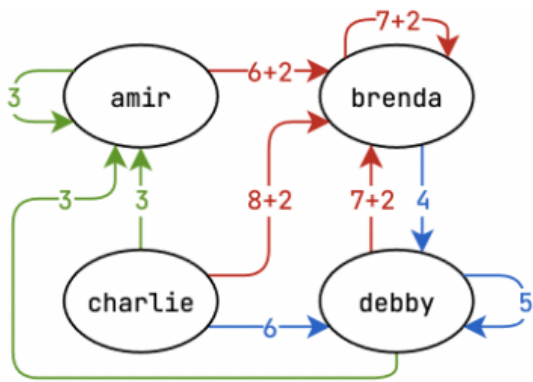
```
4 3
amir
brenda
charlie
debby
5 brenda
6 1 amir
7 1 brenda
8 1 charlie
7 1 debby
8 4 amir brenda charlie debby
2 amir
3 1 amir
6 2 charlie debby
3 debby
4 1 brenda
6 1 charlie
5 1 debby
```

SAMPLE OUTPUT

```
23 3
```

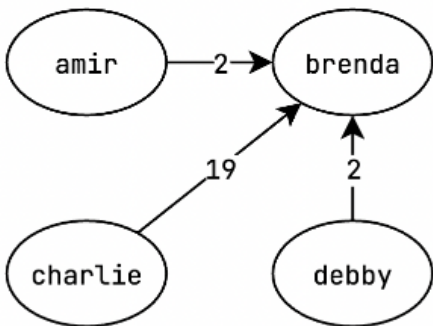
Explanation

Below is the group's debt graph. Red arrows are from the first bill, green for the 2nd, and blue for the 3rd.



There are too many unnecessary transfers in the debt graph. Minus the self-loops, there are **7** transfers, with the total amount of money exchanged being $(6 + 2 + 8 + 2 + 7 + 2) + (3 + 3) + (6 + 4) = 43$.

In contrast, the optimal plan is as shown below:



There were **3** transfers in total, where the total amount of money being exchanged is $2 + 19 + 2 = 23$.

Time Limit:	2.0 sec(s) for each input file.
Memory Limit:	256 MB
Source Limit:	1024 KB
Marking Scheme:	Score is assigned when all the testcases pass.
Allowed Languages:	Bash, C, C++, C++14, C++17, Clojure, C#, D, Erlang, F#, Go, Groovy, Haskell, Java, Java 8, Java 14, JavaScript(Rhino), JavaScript(Node.js), Julia, Kotlin, Lisp, Lisp (SBCL), Lua, Objective-C, OCaml, Octave, Pascal, Perl, PHP, Python, Python 3, Python 3.8, Racket, Ruby, Rust, Scala, Swift-4.1, Swift, TypeScript, Visual Basic