



## Problem B

### Popular Searches

Erick, a young computer science student, has just graduated from his undergraduate study and is planning to build his own technology-based company. After months of doing market surveys combined with years of aspiring dreams while still in college, Erick decided to build an e-commerce platform with a mission to democratize Indonesia's commerce through technology.

One of the challenges in such a platform is, of course, the recommender system. It is a system that can advise the user about items that are popular among other users. In this problem, we are going to work on a very simple recommender system, i.e. finding the most popular searches.

Given  $N$  users where each user has  $M_i$  searches and each search is a string/keyword. Note that a user might search for the same keyword repeatedly. Your task is to determine the top-5 most popular keywords. A keyword KEY-1 is more popular than a keyword KEY-2 if and only if:

- KEY-1 is searched by more users than KEY-2, or
- KEY-1 is searched by the same number of users as KEY-2, but the search occurrences of KEY-1 is more than the search occurrences of KEY-2, or
- KEY-1 is searched by the same number of users and has the same number of search occurrences as KEY-2, but KEY-1 is lexicographically smaller than KEY-2.

For example, let there be 4 users with the following searched keywords:

- smartphone, casing, smartphone, protector, cheap
- cheap, smartphone, cool, antiglare, antiglare, antiglare
- cheap, smartphone
- cheap, casing, smartphone, protector

There are 6 different keywords in this example. The keyword "smartphone" is searched by all 4 users with the first user searched it twice (causing a total search occurrence of 5). The following table contains the searches summary.



Keyword	Search by User	Occurrences
smartphone	4	5
cheap	4	4
casing	2	2
protector	2	2
antiglare	1	3
cool	1	1

Search by User: number of unique users searching for this keyword

Occurrences: number of searches

Therefore, the top-5 keywords in this example are in this order: smartphone, cheap, casing, protector, antiglare.

### Input

Input begins with an integer  $T$  ( $1 \leq T \leq 20$ ) representing the number of cases.

Each case begins with an integer  $N$  ( $1 \leq N \leq 10\,000$ ) representing the number of users. The next  $N$  lines, each begins with an integer  $M_i$  ( $1 \leq M_i \leq 50\,000$ ) representing the number of searches by the  $i^{th}$  user, followed by  $M_i$  string  $S_{ij}$  ( $|S_{ij}| \leq 10$ ;  $S_{ij}$  contains only lowercase alphabets) representing the  $j^{th}$  keyword searched by the  $i^{th}$  user.

The sum of all  $M_i$  in each case is no more than 200 000.

### Output

For each case, output in a line "Case #X: Y" (without quotes) where X is the case number (starts from 1) and Y is the output for the respective case. Y contains top-5 keywords each separated by a single space. If there are fewer than 5 keywords appear in the user searches, then output all keywords while still being in the correct order (most popular first).



### Sample Input #1

```
3
4
5 smartphone casing smartphone protector cheap
6 cheap smartphone cool antiglare antiglare antiglare
2 cheap smartphone
4 cheap casing smartphone protector
2
3 book robot superman
2 batman superman
5
3 chess puzzle boardgame
2 puzzle boardgame
3 boardgame chess boardgame
1 milktea
3 shoe printer sticker
```

### Sample Output #1

```
Case #1: smartphone cheap casing protector antiglare
Case #2: superman batman book robot
Case #3: boardgame chess puzzle milktea printer
```

#### *Explanation for the sample input/output #1*

For the 2<sup>nd</sup> case, there are only 4 different keywords.