Pizza Hawaii

You are travelling in a foreign country. Although you are also open to eat some regional food, you just cannot resist after you have found an Italian restaurant which offers pizza. Unfortunately, the menu is written in the foreign language, so the list of ingredients of the pizzas are incomprehensible to you. What will you do?

One thing that you notice is that each pizza has an Italian name, which sounds quite familiar to you. You even remember for each named pizza what the ingredients of this pizza usually are. You want to use that information to figure out what the possible meaning of each word on the list of ingredients is. You consider a pair (w_1, w_2), where w_1 is an ingredient in the foreign language and w_2 an ingredient in your language, to possible have the same meaning, if w_1 and w_2 appear on the same set of pizzas.

Input

The first line of the input contains an integer t. t test cases follow, each of them separated by a blank line.

The first line of each input gives the number n of pizzas on the menu. The following $3 \cdot n$ lines describe the pizzas on the menu.

Each pizza description starts with one line containing a string $name$, the name of the pizza. The remaining two lines each start with an integer m_i (resp. k_i) followed by m_i (resp. k_i) strings, separated by spaces. The first of those two lines describes the m_i ingredients of the pizza on the menu. The second of those two lines describes the k_i ingredients in your native language.

Note that the number of ingredients may differ, because each restaurant may use slightly different ingredients for pizzas with the same name, so the ingredients you remember for a pizza with that name may not match the actual ingredients.

Output

For each test case, print a line containing "Case #i:" where i is its number, starting at 1. Print another line for each pair (w_1, w_2) where w_1 is an ingredient in the foreign language that could be the same ingredient as w_2 because w_1 and w_2 appear on the same set of pizzas. Sort the pairs in increasing lexicographical order by w_1, and in case of a tie in increasing lexicographical order by w_2. Each line of the output should end with a line break.

Constraints

- $1 \leq t \leq 20$
- $1 \leq n \leq 60$
- The name of the pizza consists of between 3 and 20 uppercase and lowercase letters.
- $1 \leq m_i, k_i \leq 20$
- Each ingredient is a word consisting of between 2 and 20 lowercase letters.

Sample Input 1	Sample Output 1
2 3 Hawaii 4 tomaten schinken ananas kaese 4 pineapple tomatoes ham cheese QuattroStagioni 6 tomaten kaese salami thunfisch spinat champignons 6 mushrooms tomatoes cheese peppers ham salami Capricciosa 6 champignons kaese tomaten artischocken oliven schinken 5 cheese tomatoes mushrooms ham artichoke 1 Funghi 3 tomaten kaese champignons 3 cheese tomatoes mushrooms	Case #1: (ananas, pineapple) (artischocken, artichoke) (champignons, mushrooms) (kaese, cheese) (kaese, ham) (kaese, tomatoes) (oliven, artichoke) (salami, peppers) (salami, salami) (spinat, peppers) (spinat, salami) (thunfisch, peppers) (thunfisch, salami) (tomaten, cheese) (tomaten, ham) (tomaten, tomatoes) Case #2: (champignons, cheese) (champignons, mushrooms) (champignons, tomatoes) (kaese, cheese) (kaese, mushrooms) (kaese, tomatoes) (tomaten, cheese) (tomaten, mushrooms) (tomaten, tomatoes)