Problem BABYTRANS: Baby Translator

I am Herb, the half brother of Homer. I am the product of an affair between our father and a carnival prostitute. I was put up for adoption shortly after birth, and Homer never knew me until recently. I am a successful businessperson as I founded Powell Motors, a car company based in Detroit.
But my biggest success will be my baby translator, that I invent in the episode *Brother Can You Spare Two Dimes?* It should able to analyze baby speech and translate it into comprehensible English. I work hard with Maggie to develop this product. Nevertheless, I need your help as you are working for this well known company called Chomsky Inc. At your company, the context free grammars are coded that I so desperately need.
A rule in a contextfree grammar consists of a left hand side containing one nonterminal symbol. The right hand side can contain one to four hundred symbols, nonterminal and terminal symbols can be mixed freely. Each grammar has a start symbol, in our case `S`, where a derivation begins. Rules are applied to nonterminal symbols to derivate sentences. In each step of the derivation, a nonterminal symbol is substituted with the help of a rule whose left hand side equals the chosen symbol. Derivation means that the symbol is deleted from the sentence and the right hand side is inserted instead. The derivation is finished, if a sentence contains only terminal symbols. You are given a big grammar containing up to 4000 rules.
Your task is to calculate the possible first terminal symbols of the sentences that can be derived from all nonterminals of the given grammar. E.g. having the rules $S \rightarrow aSb|ab$, every sentence derivable from S starts with a. You can assume that only symbols are used that can be derived to sentences containing only terminal symbols. All nonterminal symbols can be reached from the start symbol S.
There are no ϵ-rules in the grammar.

Input

Rules are composed of symbols. Each rule is given in one line. The first symbol of each line is the left hand side, all remaining symbols form the right hand side. There are at least two symbols per line. Terminal symbols are the letters `a` $-$ `z`. Nonterminal symbols are the letters `A` $-$ `Z`. There can be several rules for one nonterminal symbol. The first line of the input contains the number of rules.

Output

In each line a nonterminal symbol and the first terminal symbols of all sentences it can be derived to are given. The terminal symbols are ordered alphabetically. These lines are also ordered alphabetically according to the nonterminal symbols they describe.

Sample Input 1

```
6
S a S b
S a b
S c d
S B
B C
C c
```

Sample Output 1

```
B c
C c
S a c
```