**First Set**

### **Description**

First set is an important information in building Parser, when it conform many rule, it can use to decide which route to expend. The definition of First set is:

1. If a Nonterminal A, it rule is A → α1 | α2 | … | αn , then
2. If a Right Hand Side is β1 β2 … βn , then
3. Hence, if , then , and so on。
4. Hence, if ，then 。

Please according to the rules, calculate the First set of Grammar.

### **Input Format**

Each line is a Nonterminal in begin, and follow the rule separate by a blank, then end by ‘\n’.

Difference rules will separate by ‘|’.

When each line input finish, it will input “END\_OF\_GRAMMAR” to mean it’s end.

Nonterminal and Terminal are one letter.

Allowed token is:

* One lower case letter “a-z” is Nonterminal.
* One uppercase letter ”A-Z” and “!@#%^&\*” is Terminal.
* ‘;’ is end of string.
* ‘$’ is ‘EOF’.

※The all cases are legitimate.

※The all cases are not recursive.

### **Output Format**

Order Nonterminal and First Set by ASCII from small to big.

Output each line Nonterminal in begin, and follow the First Set by a blank, then end by ‘\n’.

E.g. First Set of a is “ABC;”, then print “a CBA;”. Print “END\_OF\_FIRST” at last line, then end by ‘\n’.

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| **Sample Input** s abc  a A|cB|;  b c|Da|;  c E|F|;  END\_OF\_GRAMMAR **Sample Output** s FEDBA;  c FE;  b FED;  a FEBA;  END\_OF\_FIRST | **Sample Input** s ac$  c C|;  a AbcD|bq  b Bb|;  q Q|;  END\_OF\_GRAMMAR **Sample Output** s QCBA$  q Q;  c C;  b B;  a QBA;  END\_OF\_FIRST |
| **Sample Input** s AbdH  b Cc  c Bc|;  d ef  e G|;  f F|;  END\_OF\_GRAMMAR **Sample Output** s A  f F;  e G;  d GF;  c B;  b C  END\_OF\_FIRST | **Sample Input** s aAaB|bBbA  a ;  b ;  END\_OF\_GRAMMAR **Sample Output** s BA  b ;  a ;  END\_OF\_FIRST |