

```

1  #include<bits/stdc++.h>
2  using namespace std;
3
4  vector<string>sp,ke,ri;
5  map<string,string>mp,mpp;
6  string ans;
7
8  bool isTERMINAL(char a){
9      if(a>='A' && a<='Z') return true;
10     return false;
11 }
12
13 void FIRST(string key){
14
15     string val = mp[key];
16
17     if(isTERMINAL(val[0])){
18         string p = "";
19         p += val[0];
20         FIRST(p);
21     }
22     else{
23         ans += val[0];
24         ans += ",";
25         int flag = 0;
26         for(int i=0;i<val.size();i++){
27             if(val[i]=='|'){
28                 flag = 1;
29                 continue;
30             }
31             if(flag){
32                 ans += val[i];
33             }
34         }
35     }
36 }
37
38 }
39
40 void FOLLOW(string key,int z){
41
42     int flag = 0;
43
44     for(int i=0;i<ri.size();i++){
45         if (ri[i].find(key) != string::npos) {
46             if(key.size()==1){
47                 for(int j=0;j<ri[i].size();j++){
48                     if(ri[i][j]==key[0]){
49                         if(j+1<ri.size() && ri[i][j+1]!='\'){
50                             flag = 1;
51                             if(isTERMINAL(ri[i][j+1])==false){
52                                 if(z==0)ans += "$,";
53                                 ans += ri[i][j+1];
54                             }
55                             else{
56                                 string g = ri[i];
57                                 g.erase(0,1);
58                                 FIRST(g);
59                                 if(z==0)ans += "$,";
60                                 FOLLOW(mpp[ri[i]],1);
61                             }
62                         }
63                     }
64                     break;
65                 }
66             }

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67         }
68     }
69     else{
70         flag = 1;
71
72         for(int j=0;j+1<ri[i].size();j++){
73             if(ri[i][j]==key[0] && ri[i][j+1]==key[1]){
74                 if(j+2>=ri[i].size()){
75                     FOLLOW(mpp[ri[i]],1);
76                     if(z==0)ans += ",$";
77                 }
78                 else{
79
80                 }
81             }
82         }
83         break;
84     }
85 }
86 if(flag) break;
87 }
88
89
90 }
91
92
93
94 string remove_space(string s){
95
96     string p="";
97
98     for(int i=0;i<s.size();i++){
99         if(s[i]!=' ') p = p + s[i];
100     }
101
102     return p;
103
104 }
105
106
107
108 int main(){
109
110     freopen("input.txt","r",stdin);
111     freopen("out.txt","w",stdout);
112
113     string s;
114
115     while(getline(cin,s)){
116         sp.push_back(remove_space(s));
117     }
118
119     for(int i=0;i<sp.size();i++){
120         int flag = 0;
121
122         string key="",val="";
123
124         for(int j=0;j<sp[i].size();j++){
125             if(sp[i][j]=='='){
126                 flag = 1;
127                 continue;
128             }
129
130             if(flag==0) key += sp[i][j];
131             else val += sp[i][j];
132         }

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133
134     mp[key] = val;
135     ke.push_back(key);
136 }
137
138 cerr<<"FIRST: \n\n";
139 cout<<"FIRST: \n\n";
140
141 for(int i=0;i<ke.size();i++){
142     ans = "";
143     FIRST(ke[i]);
144     cerr<<"FIRST("<<ke[i]<<")"<<" = {"<<ans<<"}\n";
145     cout<<"FIRST("<<ke[i]<<")"<<" = {"<<ans<<"}\n";
146 }
147
148 for(int i=0;i<ke.size();i++){
149
150     string val = mp[ke[i]];
151     string v = "";
152
153     for(int j=0;j<val.size();j++){
154         if(val[j]=='|') break;
155         v += val[j];
156     }
157
158     mp[ke[i]] = v;
159     mpp[v] = ke[i];
160     ri.push_back(v);
161 }
162
163 cerr<<"\nFOLLOW: \n\n";
164 cout<<"\nFOLLOW: \n\n";
165
166
167 for(int i=0;i<ke.size();i++){
168     ans = "";
169
170     FOLLOW(ke[i],0);
171     cerr<<"FOLLOW("<<ke[i]<<")"<<" = {"<<ans<<"}\n";
172     cout<<"FOLLOW("<<ke[i]<<")"<<" = {"<<ans<<"}\n";
173 }
174
175
176 }
177
178

```