//Expt 3

import java.util.\*;

import java.io.\*;

import java.lang.\*;

class first\_follow{

public static String prod[] = new String[10];

public static char fst[][] = new char[10][4];

public static int n,i,top=0,j,k;

public static char c,temp,next;

public static void main(String args[]) {

Scanner sc = new Scanner(System.in);

System.out.print("\nEnter the no. of productions: ");

n = sc.nextInt();

System.out.println("\nEnter the productions:");

for( i=0 ; i<n ; i++)

prod[i]=sc.next();

calFirst();

calFollow();

System.out.println("\nFirst-Follow Table:");

System.out.println("\n\tNonT \tFirst \tFollow");

for( i=top-1; i>=0; i-- )

System.out.println("\t"+fst[i][0]+"\t"+fst[i][1]+"\t"+fst[i][2]);

}

public static void calFirst() {

for(i=n-1;i>=0;i--) {

c = prod[i].charAt(2);

if(c>='A' && c<='Z') {

temp = find( c, 1 );

fst[top][0] = prod[i].charAt(0);

fst[top][1] = temp;

}

else {

fst[top][0] = prod[i].charAt(0);

fst[top][1] = c;

}

top++;

}

}

public static void calFollow(){

int check=1,index;

fst[top-1][2] = '$';

do

{

check = 1;

for( j=0; j<top; j++ )

{

if( fst[j][2] == '\0')

{

c = fst[j][0];

for( i=0; i<n; i++ )

{

index = prod[i].indexOf(c);

if( index > 0 )

{

if( prod[i].length() == index+1)

temp = find( prod[i].charAt(0) , 2 );

else

{

next = prod[i].charAt(index+1);

if( next>='A' && next<='Z')

temp = find( next , 2 );

else

temp = next;

}

fst[j][2] = temp;

}

}

}

}

for(j=0;j<top;j++)

if(fst[j][2]=='\0')

check=0;

}while(check==0);

}

public static char find(char ch, int z) {

for( k=0; k<top; k++ )

if( ch==fst[k][0] )

return fst[k][z];

return '\0';

}

}

/\* OUTPUT

Enter the no. of productions: 3

Enter the productions:

S-aAa

A-bBb

B-c

First-Follow Table:

NonT First Follow

S a $

A b a

B c b

\*/