Lab session 6: Finding FIRST of a variable

**RA1811030010023**

**SAYAN PRAMANICK**

**CODE:**

#include<iostream>

#include<string.h>

#define max 20

using namespace std;

char prod[max][10];

char ter[10],nt[10];

char first[10][10],follow[10][10];

int eps[10];

int count=0;

int findpos(char ch)

{

    int n;

    for(n=0;nt[n]!='\0';n++)

        if(nt[n]==ch)

            break;

        if(nt[n]=='\0')

            return 1;

        return n;

}

int IsCap(char c)

{

    if(c >= 'A' && c<= 'Z')

        return 1;

    return 0;

}

void add(char \*arr,char c)

{

    int i,flag=0;

    for(i=0;arr[i]!='\0';i++)

    {

        if(arr[i] == c)

        {

            flag=1;

            break;

        }

    }

    if(flag!=1)

        arr[strlen(arr)] = c;

}

void addarr(char \*s1,char \*s2)

{

    int i,j,flag=99;

    for(i=0;s2[i]!='\0';i++)

    {

        flag=0;

        for(j=0;;j++)

        {

            if(s2[i]==s1[j])

            {

                flag=1;

                break;

            }

            if(j==strlen(s1) && flag!=1)

            {

                s1[strlen(s1)] = s2[i];

                break;

            }

        }

    }

}

void addprod(char \*s)

{

    int i;

    prod[count][0] = s[0];

    for(i=3;s[i]!='\0';i++)

    {

        if(!IsCap(s[i]))

            add(ter,s[i]);

        prod[count][i-2] = s[i];

    }

    prod[count][i-2] = '\0';

    add(nt,s[0]);

    count++;

}

void findfirst()

{

    int i,j,n,k,e,n1;

    for(i=0;i<count;i++)

    {

        for(j=0;j<count;j++)

        {

            n = findpos(prod[j][0]);

            if(prod[j][1] == (char)238)

                eps[n] = 1;

            else

            {

                for(k=1,e=1;prod[j][k]!='\0' && e==1;k++)

                {

                    if(!IsCap(prod[j][k]))

                    {

                        e=0;

                        add(first[n],prod[j][k]);

                    }

                    else

                    {

                        n1 = findpos(prod[j][k]);

                        addarr(first[n],first[n1]);

                        if(eps[n1] == 0)

                            e=0;

                    }

                }

                if(e==1)

                    eps[n]=1;

            }

        }

    }

}

void findfollow()

{

    int i,j,k,n,e,n1;

    n = findpos(prod[0][0]);

    add(follow[n],'#');

    for(i=0;i<count;i++)

    {

        for(j=0;j<count;j++)

        {

            k = strlen(prod[j])-1;

            for(;k>0;k--)

            {

                if(IsCap(prod[j][k]))

                {

                    n=findpos(prod[j][k]);

                    if(prod[j][k+1] == '\0')    // A -> aB

                    {

                        n1 = findpos(prod[j][0]);

                        addarr(follow[n],follow[n1]);

                    }

                    if(IsCap(prod[j][k+1]))     // A -> aBb

                    {

                        n1 = findpos(prod[j][k+1]);

                        addarr(follow[n],first[n1]);

                        if(eps[n1]==1)

                        {

                            n1=findpos(prod[j][0]);

                            addarr(follow[n],follow[n1]);

                        }

                    }

                    else if(prod[j][k+1] != '\0')

                        add(follow[n],prod[j][k+1]);

                }

            }

        }

    }

}

int main()

{

    char s[max],i;

    cout<<"Enter the productions(type 'end' at the last of the production)\n";

    cin>>s;

    while(strcmp("end",s))

    {

        addprod(s);

        cin>>s;

    }

    findfirst();

    findfollow();

    for(i=0;i<strlen(nt);i++)

    {

        cout<<nt[i]<<"\t";

        cout<<first[i];

        if(eps[i]==1)

            cout<<((char)238)<<"\t";

        else

            cout<<"\t";

        cout<<follow[i]<<"\n";

    }

    return 0;;

}

**OUTPUT:**



