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COMPILER DESIGN LAB EXP6

PREDICTIVE PARSING

AIM: A program for Predictive Parsing.

ALGORITHM:

1. Start the program.
2. Initialize the required variables.
3. Get the number of coordinates and productions from the user.
4. Perform the following
 - for (each production $A \rightarrow \alpha$ in G) {
 - for (each terminal a in $FIRST(\alpha)$)
 - add $A \rightarrow \alpha$
 - to $M[A, a]$;
 - if (ϵ is in $FIRST(\alpha)$)
 - for (each symbol b in $FOLLOW(A)$)
 - add $A \rightarrow \alpha$
 - to $M[A, b]$;
5. Print the resulting stack.
6. Print if the grammar is accepted or not.
7. Exit the program.

CODE :

```
#include <bits/stdc++.h>

using namespace std;

int main()
{
    char fin[10][20],st[10][20],ft[20][20],fol[20][20];
    int a=0,e,i,t,b,c,n,k,l=0,j,s,m,p;

    cout << ("enter the no. of nonterminals\n");
    scanf("%d",&n);
    cout << ("enter the productions in a grammar\n");
    for(i=0;i<n;i++)
        scanf("%s",st[i]);
    for(i=0;i<n;i++)
        fol[i][0]='\0';
    for(s=0;s<n;s++)
    {
        for(i=0;i<n;i++)
        {
            j=3;
            l=0;
            a=0;
            l1:if(!((st[i][j]>64)&&(st[i][j]<91)))
            {
                for(m=0;m<l;m++)
                {
                    if(ft[i][m]==st[i][j])
                        goto s1;
                }
            }
        }
    }
```

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    ft[i][l]=st[i][j];
    l=l+1;
    s1:j=j+1;
}
else
{
    if(s>0)
    {
        while(st[i][j]!=st[a][0])
        {
            a++;
        }
        b=0;
        while(ft[a][b]!='\0')
        {
            for(m=0;m<l;m++)
            {
                if(ft[i][m]==ft[a][b])
                    goto s2;
            }
            ft[i][l]=ft[a][b];
            l=l+1;
            s2:b=b+1;
        }
    }
}
while(st[i][j]!='\0')
{
    if(st[i][j]=='|')
    {
        j=j+1;

```

```

        goto l1;
    }
    j=j+1;
}

    ft[i][1]='\0';
}
}
cout << ("first \n");
for(i=0;i<n;i++)
    cout << ("FIRS[%c]=%s\n",st[i][0],ft[i]);
fol[0][0]='$';
for(i=0;i<n;i++)
{
    k=0;
    j=3;
    if(i==0)
        l=1;
    else
        l=0;
    k1:while((st[i][0]!=st[k][j])&&(k<n))
    {
        if(st[k][j]=='\0')
        {
            k++;
            j=2;
        }
        j++;
    }

    j=j+1;

```

```

if(st[i][0]==st[k][j-1])
{
    if((st[k][j]!='')&&(st[k][j]!='\0'))
    {
        a=0;
        if(!((st[k][j]>64)&&(st[k][j]<91)))
        {
            for(m=0;m<l;m++)
            {
                if(fol[i][m]==st[k][j])
                    goto q3;
            }
            fol[i][l]=st[k][j];
            l++;
            q3::;
        }
    }
else
{
    while(st[k][j]!=st[a][0])
    {
        a++;
    }
    p=0;
    while(ft[a][p]!='\0')
    {
        if(ft[a][p]!='@')
        {
            for(m=0;m<l;m++)
            {
                if(fol[i][m]==ft[a][p])
                    goto q2;
            }
        }
    }
}
}

```

```

        }
        fol[i][l]=ft[a][p];
        l=l+1;
    }
    else
        e=1;
        q2:p++;
    }
    if(e==1)
    {
        e=0;
        goto a1;
    }
}
}
else
{
    a1:c=0;
    a=0;
    while(st[k][0]!=st[a][0])
    {
        a++;
    }
    while((fol[a][c]!='\0')&&(st[a][0]!=st[i][0]))
    {
        for(m=0;m<l;m++)
        {
            if(fol[i][m]==fol[a][c])
                goto q1;
        }
        fol[i][l]=fol[a][c];

```

```

        l++;
        q1:c++;
    }
}
goto k1;
}
fol[i][l]='\0';
}
cout << ("follow \n");
for(i=0;i<n;i++)
    cout << ("FOLLOW[%c]=%s\n",st[i][0],fol[i]);
cout << ("\n");
s=0;
for(i=0;i<n;i++)
{
    j=3;
    while(st[i][j]!='\0')
    {
        if((st[i][j-1]=='|')||(j==3))
        {
            for(p=0;p<=2;p++)
            {
                fin[s][p]=st[i][p];
            }
            t=j;
            for(p=3;((st[i][j]!='|')&&(st[i][j]!='\0'));p++)
            {
                fin[s][p]=st[i][j];
                j++;
            }
            fin[s][p]='\0';

```

```

if(st[i][k]=='@')
{
    b=0;
    a=0;
    while(st[a][0]!=st[i][0])
    {
        a++;
    }
    while(fol[a][b]!='\0')
    {
        cout << ("M[%c,%c]=%s\n",st[i][0],fol[a][b],fin[s]);
        b++;
    }
}
else if(!((st[i][t]>64)&&(st[i][t]<91)))
    cout << ("M[%c,%c]=%s\n",st[i][0],st[i][t],fin[s]);
else
{
    b=0;
    a=0;
    while(st[a][0]!=st[i][3])
    {
        a++;
    }
    while(ft[a][b]!='\0')
    {
        cout << ("M[%c,%c]=%s\n",st[i][0],ft[a][b],fin[s]);
        b++;
    }
}
s++;

```



```

    }
    if(st[i][j]=='|')
        j++;
    }
}
}

```

OUTPUT :

```

2
enter the productions in a grammar
s->CC
C->eC|d
first
FIRS[s]=ed
FIRS[C]=ed
follow
FOLLOW[s]=$
FOLLOW[C]=ed$

M[s,e]=s->CC
M[s,d]=s->CC
M[C,e]=C->eC
M[C,d]=C->d

```

RESULT: The program for Predictive Parsing was successfully compiled and run.