**9. LR Parser**

#include<stdio.h>

#include<string.h>

int i,j,k,m,n=0,o,p,ns=0,tn=0,rr=0,ch=0;

char read[15][10],gl[15],gr[15][10],temp,templ[15],tempr[15][10],\*ptr,temp2[5],dfa[15][15];

struct states

{

char lhs[15],rhs[15][10];

int n;

}I[15];

int compstruct(struct states s1,struct states s2)

{

int t;

if(s1.n!=s2.n)

return 0;

if( strcmp(s1.lhs,s2.lhs)!=0 )

return 0;

for(t=0;t<s1.n;t++)

if( strcmp(s1.rhs[t],s2.rhs[t])!=0 )

return 0;

return 1;

}

void moreprod()

{

int r,s,t,l1=0,rr1=0;

char \*ptr1,read1[15][10];

for(r=0;r<I[ns].n;r++)

{

ptr1=strchr(I[ns].rhs[l1],'.');

t=ptr1-I[ns].rhs[l1];

if( t+1==strlen(I[ns].rhs[l1]) )

{

l1++;

continue;

}

temp=I[ns].rhs[l1][t+1];

l1++;

for(s=0;s<rr1;s++)

if( temp==read1[s][0] )

break;

if(s==rr1)

{

read1[rr1][0]=temp;

rr1++;

}

else

continue;

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

{

if(gl[s]==temp)

{

I[ns].rhs[I[ns].n][0]='.';

I[ns].rhs[I[ns].n][1]=NULL;

strcat(I[ns].rhs[I[ns].n],gr[s]);

I[ns].lhs[I[ns].n]=gl[s];

I[ns].lhs[I[ns].n+1]=NULL;

I[ns].n++;

}

}

}

}

void canonical(int l)

{

int t1;

char read1[15][10],rr1=0,\*ptr1;

for(i=0;i<I[l].n;i++)

{

temp2[0]='.';

ptr1=strchr(I[l].rhs[i],'.');

t1=ptr1-I[l].rhs[i];

if( t1+1==strlen(I[l].rhs[i]) )

continue;

temp2[1]=I[l].rhs[i][t1+1];

temp2[2]=NULL;

for(j=0;j<rr1;j++)

if( strcmp(temp2,read1[j])==0 )

break;

if(j==rr1)

{

strcpy(read1[rr1],temp2);

read1[rr1][2]=NULL;

rr1++;

}

else

continue;

for(j=0;j<I[0].n;j++)

{

ptr=strstr(I[l].rhs[j],temp2);

if( ptr )

{

templ[tn]=I[l].lhs[j];

templ[tn+1]=NULL;

strcpy(tempr[tn],I[l].rhs[j]);

tn++;

}

}

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

{

ptr=strchr(tempr[j],'.');

p=ptr-tempr[j];

tempr[j][p]=tempr[j][p+1];

tempr[j][p+1]='.';

I[ns].lhs[I[ns].n]=templ[j];

I[ns].lhs[I[ns].n+1]=NULL;

strcpy(I[ns].rhs[I[ns].n],tempr[j]);

I[ns].n++;

}

moreprod();

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

{

//if ( memcmp(&I[ns],&I[j],sizeof(struct states))==1 )

if( compstruct(I[ns],I[j])==1 )

{

I[ns].lhs[0]=NULL;

for(k=0;k<I[ns].n;k++)

I[ns].rhs[k][0]=NULL;

I[ns].n=0;

dfa[l][j]=temp2[1];

break;

}

}

if(j<ns)

{

tn=0;

for(j=0;j<15;j++)

{

templ[j]=NULL;

tempr[j][0]=NULL;

}

continue;

}

dfa[l][j]=temp2[1];

printf("\n\nI%d :",ns);

for(j=0;j<I[ns].n;j++)

printf("\n\t%c -> %s",I[ns].lhs[j],I[ns].rhs[j]);

getch();

ns++;

tn=0;

for(j=0;j<15;j++)

{

templ[j]=NULL;

tempr[j][0]=NULL;

}

}

}

void main()

{

FILE \*f;

int l;

for(i=0;i<15;i++)

{

I[i].n=0;

I[i].lhs[0]=NULL;

I[i].rhs[0][0]=NULL;

dfa[i][0]=NULL;

}

f=fopen("tab6.txt","r");

while(!feof(f))

{

fscanf(f,"%c",&gl[n]);

fscanf(f,"%s\n",gr[n]);

n++;

}

printf("THE GRAMMAR IS AS FOLLOWS\n");

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

printf("\t\t\t\t%c -> %s\n",gl[i],gr[i]);

I[0].lhs[0]='Z';

strcpy(I[0].rhs[0],".S");

I[0].n++;

l=0;

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

{

temp=I[0].rhs[l][1];

l++;

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

if( temp==read[j][0] )

break;

if(j==rr)

{

read[rr][0]=temp;

rr++;

}

else

continue;

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

{

if(gl[j]==temp)

{

I[0].rhs[I[0].n][0]='.';

strcat(I[0].rhs[I[0].n],gr[j]);

I[0].lhs[I[0].n]=gl[j];

I[0].n++;

}

}

}

ns++;

printf("\nI%d :\n",ns-1);

for(i=0;i<I[0].n;i++)

printf("\t%c -> %s\n",I[0].lhs[i],I[0].rhs[i]);

for(l=0;l<ns;l++)

canonical(l);

printf("\n\n\t\tPRESS ANY KEY FOR DFA TABLE");

getch();

printf("\t\t\tDFA TABLE IS AS FOLLOWS\n\n\n");

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

{

printf("I%d : ",i);

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

if(dfa[i][j]!='\0')

printf("'%c'->I%d | ",dfa[i][j],j);

printf("\n\n\n");

}

printf("\n\n\n\t\tPRESS ANY KEY TO EXIT");

getch();

}

**OUTPUT:**

THE GRAMMAR IS AS FOLLOWS

S -> S+T

S -> T

T -> T\*F

T -> F

F -> (S)

F -> t

I0 :

Z -> .S

S -> .S+T

S -> .T

T -> .T\*F

T -> .F

F -> .(S)

F -> .t

I1 :

Z -> S.

S -> S.+T