**CD LAB ASSIGNMENT**

**Submitted by:**

**M. Lakshmi Abhigna**

**CSE-F**

**AP21110010343**

**Code:**

#include<stdio.h>

#include<ctype.h>

#include<string.h>

void FIRST(char\*,char);

void addToArray(char\*,char);

void printArray(char\*);

void FOLLOW(char \*result,char c);

int n;

char production[20][20],nt[20];

char firstr[20][20],followr[20][20];

main()

{

int i,j=0,k,foundNt=0;

char c,result[20];

nt[0]='\0';

printf("Enter number of productions :");

scanf(" %d",&n);

for(i=0;i<20;i++)

{

firstr[i][0]='\0';

followr[i][0]='\0';

}

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

{

printf("Enter productions Number %d : ",i+1);

scanf(" %s",production[i]);

addToArray(nt,production[i][0]);

}

for(k=0;nt[k]!='\0';k++)

{

c=nt[k];

FIRST(result,c);

printf("\n FIRST(%c)= { ",c);

printArray(result);

printf("}\n");

strcpy(firstr[k],result);

getchar();

}

for(k=0;nt[k]!='\0';k++)

printf("FIRST[%d]=%s\n",k,firstr[k]);

for(k=0;nt[k]!='\0';k++)

{

c=nt[k];

FOLLOW(result,c);

printf("\n FOLLOW(%c)= { ",c);

printArray(result);

printf("}\n");

strcpy(followr[k],result);

}

for(k=0;nt[k]!='\0';k++)

{

printf("FIRST(%c)=%s\tFOLLOW(%c)=%s\n",nt[k],firstr[k],nt[k],followr[k]);

}

}

void FIRST(char\* Result,char c)

{

int i,j,k;

char subResult[20];

int foundEpsilon;

subResult[0]='\0';

Result[0]='\0';

if(!(isupper(c)))

addToArray(Result,c);

else

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

{

if(production[i][0]==c)

{

if(production[i][2]=='^')

addToArray(Result,'^');

else

{

for(j=2;production[i][j]!='\0';j++)

{

foundEpsilon=0;

FIRST(subResult,production[i][j]);

for(k=0;subResult[k]!='\0';k++)

if(subResult[k]=='^')

foundEpsilon=1;

else

addToArray(Result,subResult[k]);

if(!foundEpsilon)

break;

}

}

}

}

return ;

}

void addToArray(char \*Result,char val)

{

int k;

for(k=0 ;Result[k]!='\0';k++)

if(Result[k]==val)

return;

Result[k]=val;

Result[k+1]='\0';

}

void printArray(char \*a)

{

int i=0;

for(i=0;a[i]!='\0';i++)

printf(" %c ",a[i]);

}

void FOLLOW(char \*result,char c)

{

int i,j,k,t,foundEpsilon=0;

char subResult[20];

result[0]='\0';

if(c==production[0][0])

addToArray(result,'$');

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

{

int l=strlen(production[i]);

//printf("\nLength of production = %d Rule 2 \n",l);printArray(result);

for(j=2;j<l;j++)

{

foundEpsilon=0;

if(production[i][j]==c)

{

for(k=j+1; k<l ;k++)

{

subResult[0]='\0';foundEpsilon=0;

char z;

z=production[i][k];

if(!(isupper(z)))

{

addToArray(result,z);

}

else

{ int y;

for( y=0;nt[y]!=z;y++)

;

strcpy(subResult,firstr[y]);

for(t=0;subResult[t]!='\0';t++)

if(subResult[t]=='^')

foundEpsilon=1;

else

addToArray(result,subResult[t]);

}

//FIRST(subResult,production[i][k]);

}

if(production[i][j+1]=='\0'||(k==l &&foundEpsilon==1))

{

int y;

for(y=0;nt[y]!=production[i][0];y++)

;

strcpy(subResult,followr[y]);

for(t=0;subResult[t]!='\0';t++)

addToArray(result,subResult[t]);

}

if(!foundEpsilon)

break;

}

}

}

}

**Output:**

