5. FIRST OF THE GIVEN GRAMMAR

CODE:

#include<stdio.h>

#include<ctype.h>

void FIRST(char[],char );

void addToResultSet(char[],char);

int numOfProductions;

char productionSet[10][10];

main()

{

int i;

char choice;

char c;

char result[20];

printf("How many number of productions: ");

scanf(" %d",&numOfProductions);

for(i=0;i<numOfProductions;i++)//read production string eg: E=E+T

{

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

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

}

do

{

printf("\n Find the FIRST of : ");

scanf(" %c",&c);

FIRST(result,c); //Compute FIRST; Get Answer in 'result' array

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

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

printf(" %c ",result[i]); //Display result

printf("}\n");

printf("press 'y' to continue : ");

scanf(" %c",&choice);

}

while(choice=='y'||choice =='Y');

}

/\*

\*Function FIRST:

\*Compute the elements in FIRST(c) and write them

\*in Result Array.

\*/

void FIRST(char\* Result,char c)

{

int i,j,k;

char subResult[20];

int foundEpsilon;

subResult[0]='\0';

Result[0]='\0';

//If X is terminal, FIRST(X) = {X}.

if(!(isupper(c)))

{

addToResultSet(Result,c);

return ;

}

//If X is non terminal

//Read each production

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

{

//Find production with X as LHS

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

{

//If X ? e is a production, then add e to FIRST(X).

if(productionSet[i][2]=='$') addToResultSet(Result,'$');

//If X is a non-terminal, and X ? Y1 Y2 … Yk

//is a production, then add a to FIRST(X)

//if for some i, a is in FIRST(Yi),

//and e is in all of FIRST(Y1), …, FIRST(Yi-1).

else

{

j=2;

while(productionSet[i][j]!='\0')

{

foundEpsilon=0;

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

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

addToResultSet(Result,subResult[k]);

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

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

{

foundEpsilon=1;

break;

}

//No e found, no need to check next element

if(!foundEpsilon)

break;

j++;

}

}

}

}

return ;

}

/\* addToResultSet adds the computed

\*element to result set.

\*This code avoids multiple inclusion of elements

\*/

void addToResultSet(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';

}

OUTPUT:

How many number of productions: 3

Enter productions Number 1: Ac

Enter productions Number 2: Ca

Enter productions Number 3: DEF

Find the FIRST of : S

FIRST(S)= { }

press 'y' to continue : y

Find the FIRST of : A

FIRST(A)= { }

press 'y' to continue : y

Find the FIRST of : a

FIRST(a)= { a }

press 'y' to continue :

y

Find the FIRST of : n

FIRST(n)= { n }

press 'y' to continue : n

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Process exited after 39.41 seconds with return value 0

Press any key to continue . . .

