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CSE C

**Exercise 3**

Objective:

Eliminate Left Recursion in given grammar

**Code:**

#include <stdio.h>

#include <stdlib.h>

#include <string.h>

#include <ctype.h>

int main() {

char\* name = (char\*)calloc(100,sizeof(char));

printf("Enter File name: ");

scanf("%[^\n]",name);

FILE \*fp;

fp = fopen(name, "r");

int i = 0;

char str[100];

char ans[100][100];

int arow = 0,acol = 0;

printf("\n\t Eliminate left recursion\n");

int flag = 0;

while(fgets(str, 100, fp)) {

str[strlen(str)] = '\0';

char ch = str[0];

int start = 3;

int p1 = 0;

int p2 = 0;

char beta[100][100];

char alpha[100][100];

char A = str[0];

for(int i=3;i<=strlen(str);i++){

if(str[i] == '|'||str[i]=='\0'){

int h = 0;

if(str[start]==A){

for(int j=start+1;j<i;j++){

alpha[p1][h] = str[j];

h++;

}

alpha[p1][h] = '\0';

p1++;

}

else{

for(int j=start;j<i;j++){

if(str[i]=='\0'&&j==i-1)

break;

beta[p2][h] = str[j];

h++;

}

beta[p2][h] = '\0';

p2++;

}

start = i+1;

}

}

if(p1==0){

strcpy(ans[arow],str);

arow++;

continue;

}

flag = 1;

ans[arow][0] = A;

ans[arow][1] = '-';

ans[arow][2] = '>';

acol = 3;

for(int i=0;i<p2;i++){

for(int j=0;beta[i][j]!='\0';j++){

ans[arow][acol] = beta[i][j];

acol++;

}

ans[arow][acol] = A;

acol++;

ans[arow][acol] = '\'';

acol++;

if(i!=p2-1){

ans[arow][acol] = '|';

acol++;

}

}

ans[arow][acol] = '\0';

arow++;

acol = 6;

ans[arow][0] = A;

ans[arow][1] = '\'';

ans[arow][2] = '-';

ans[arow][3] = '>';

ans[arow][4] = 'e';

ans[arow][5] = '|';

for(int i=0;i<p1;i++){

for(int j=0;alpha[i][j]!='\0';j++){

ans[arow][acol] = alpha[i][j];

acol++;

}

ans[arow][acol] = A;

acol++;

ans[arow][acol] = '\'';

acol++;

if(i!=p1-1){

ans[arow][acol] = '|';

acol++;

}

}

ans[arow][acol] = '\0';

arow++;

}

if(!flag){

printf("No left recursion\n");

}

printf("New grammar:\n");

for(int i=0;i<arow;i++){

printf("%s\n",ans[i]);

}

}

**Input:**

A->A+T|T

T->T\*F|F

B->B+T|B-T|a|b

F->id

**Output:**

Text

Description automatically generated

**Learning Objective:**

Left Recursion was eliminated from the grammar.