SSN COLLEGE OF ENGINEERING, KALAVAKKAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UCS1602 - Compiler Design Programming

Assignment-3

Implementation of Left Recursion Elimination

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Date: 23/02/2021

CODE:

ex_03.main

```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <stdbool.h>

char* getSubString(char line[], int start, int stop)
{
int length = stop - start + 1;
char *sub = (char*)malloc(sizeof(char) * (length + 1));

int c = 0;
while (c < length) {
    sub[c] = line[start+c];
```

```
    c++;
        }
        sub[c] = '\0';
        return sub;
}

void eliminateLeftRecursion(char eq[])
{
char NT = eq[0];
char productions[10][15];
int num = 0, start = 2;

// extracting right productions and placing it in string array
for(int i = 2; i < strlen(eq); i++)
{
if(eq[i] == '|')
{
strcpy(productions[num++], getSubString(eq, start, i-1));
start = i + 1;
}
}
if(start < strlen(eq))
{
strcpy(productions[num++], getSubString(eq, start, strlen(eq)-1));
```

```
}

// checking for left recursion
bool isleftrecursive = false;
for(int i = 0; i < num; i++)
{
if(NT == productions[i][0])
{
isleftrecursive = true;
break;
}
}

if(!isleftrecursive)
{
printf("%s\n", eq);
return;
}

// eliminating left recursion
bool nonterminal = false, isFirst = true;
printf("%c=", NT);
for(int i = 0; i < num; i++)
{
```

```
if(NT != productions[i][0])
{
if(!isFirst)
{
printf("|");
}
else
{
isFirst = false;
}
printf("%s%c\'", productions[i], NT);
nonterminal = true;
}
}


if(!nonterminal)
{
printf("%c'\n", NT);
}
else
{
printf("\n");
}
```

```
printf("%c'=", NT);
isFirst = true;
for(int i = 0; i < num; i++)
{
if(NT == productions[i][0])
{
if(!isFirst)
{
printf("|");
}
else
{
isFirst = false;
}
printf("%s%c\'", getSubString(productions[i], 1, strlen(productions[i])-1), NT);
}
}

printf("|e\n");

}

int main()
```

```
{
FILE *file = fopen ("input.txt", "r");
char eq[30];
while (fgets(eq, 30, file))
{
eq[strcspn(eq, "\n")] = 0;
eliminateLeftRecursion(eq);
}

}
```

Sample Input:

```
E=E+T|T
T=T*F|F
F=id|(E)
```

Sample Output:

```
E=TE'
E'=+TE'|e
T=FT'
T'=*FT'|e
F=id|(E)
```

Learning Outcomes:

This assignment helped me

1. To understand the need for elimination of left recursion.
2. To understand the rules in the elimination of left recursion.

3. To implement the elimination of left recursion.