SSN COLLEGE OF ENGINEERING, KALAVAKKAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UCS1602 - Compiler Design

EX - 4 : Implementation of Recursive Descent Parser

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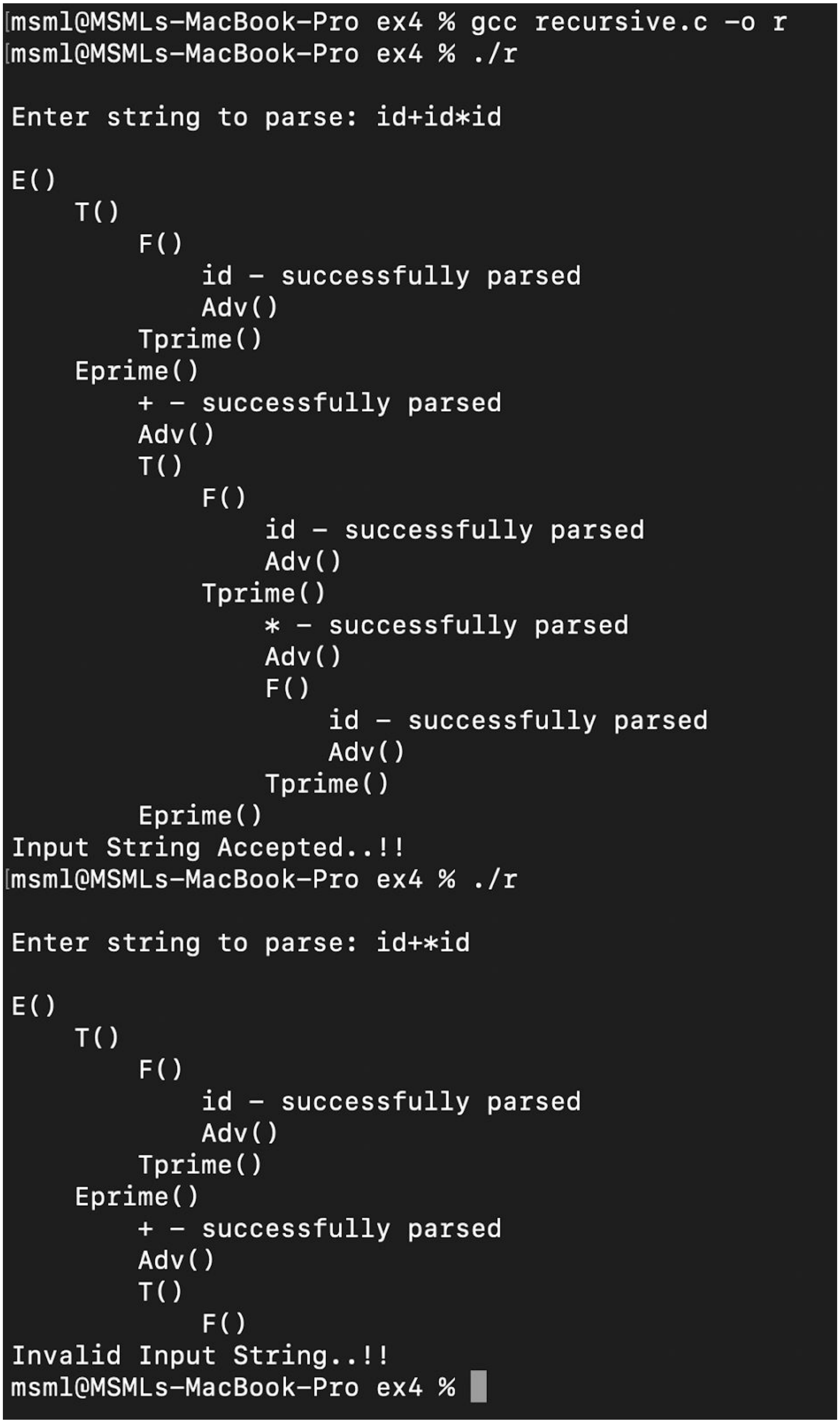
<u>Program Code:</u>

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

void E();
void Eprime();
void T();
void Tprime();
void F();
char s[20];
int pos = 0;
int tabs = 0;

void printfOP(char t[]){
    printf("\n");
    for (int i = 0; i < tabs; ++i)
        printf("    ");
    printf("%s",t);
}
void advance(){
    printfOP("Adv()");
    if(s[pos]!='\0')
        pos++;
}
void E()
{
    printfOP("E()");
    tabs++;
    T();
    Eprime();
    tabs--;
}
void Eprime()
{
    printfOP("Eprime()");
    tabs++;
    if(s[pos] == '+') {
        printfOP("+ - successfully parsed");
        advance();
        T();
        Eprime();
    }
    tabs--;
}
void T()
{
    printfOP("T()");
    tabs++;
    F();
    Tprime();
    tabs--;
}
void Tprime()
{
    printfOP("Tprime()");
    tabs++;
    if(s[pos] == '*') {
        printfOP("* - successfully parsed");
        advance();
        F();
        Tprime();
    }
    tabs--;
}
void F()
{
    printfOP("F()");
    tabs++;
    if(s[pos] == '(') {
        printfOP("( - successfully parsed");
        advance();
        E();
        if(s[pos]==')'){
            printfOP(") - successfully parsed");
            advance();
        }
        else
        {
            printf("\nInvalid Input String..!!\n");
            exit(0);
        }
    }
    else if(s[pos] == 'i') {
        pos++;
        if(s[pos]=='d'){
            printfOP("id - successfully parsed");
            advance();
        }
        else{
            printf("\nInvalid Input String..!!\n");
            exit(0);
        }
    }
    else {
        printf("\nInvalid Input String..!!\n");
        exit(0);
    }
    tabs--;
}
int main()
{
    printf("\nEnter string to parse: ");
    scanf("%s",s);
    E();
    printf("\nInput String Accepted..!!\n");
    return 0;
}
```

Sample I/O:



```
[msml@MSMLs-MacBook-Pro ex4 % gcc recursive.c -o r
[msml@MSMLs-MacBook-Pro ex4 % ./r

Enter string to parse: id+id*id

E()
    T()
        F()
            id - successfully parsed
            Adv()
        Tprime()
    Eprime()
        + - successfully parsed
        Adv()
        T()
            F()
                id - successfully parsed
                Adv()
            Tprime()
                * - successfully parsed
                Adv()
                F()
                    id - successfully parsed
                    Adv()
                Tprime()
        Eprime()
Input String Accepted..!!
[msml@MSMLs-MacBook-Pro ex4 % ./r

Enter string to parse: id+*id

E()
    T()
        F()
            id - successfully parsed
            Adv()
        Tprime()
    Eprime()
        + - successfully parsed
        Adv()
        T()
            F()
Invalid Input String..!!
msml@MSMLs-MacBook-Pro ex4 % 
```

Learning Outcomes :

- I have learnt the concept of Recursive Descent Parser.
- I have learnt about parsing using recursive functions.
- I have learnt to parse an input string for a given grammar.