

CS 3723, Parser and Reverse Polish Generator, 20 Feb 2001

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vip% cat rp.c
/* rp.c: output Reverse Polish Form */
#include <stdio.h>
#include <stdlib.h>
#include <ctype.h>
char next;
void E(void);
void T(void);
void S(void);
void F(void);
void gen(char);
void error(void);
void scan(void);

void main(void)
{
    scan();
    E();
    if (next != '#') error();
    else printf("\n");
}

void E(void)
{
    char save;
    T();
    while (next == '+' || next == '-'') {
        save = next;
        scan();
        T();
        gen(save);
    }
}

void T(void)
{
    char save;
    S();
    while (next == '*' || next == '/') {
        save = next;
        scan();
        S();
        gen(save);
    }
}

void S(void)
{
    F();
    if (next == '^') {
        scan();
        S();
        gen('^');
    }
}

void F(void)
{
    if (isAlpha(next)) {
        gen(next);
        scan();
    }
    else if (next == '(') {
        scan();
        E();
        if (next == ')') scan();
        else error();
    }
    else {
        error();
    }
}

void scan(void)
{
    while (isspace(next = getchar()))
        ;
    void error(void)
    {
        printf("\n*** ERROR ***\n");
        exit(1);
    }
    void gen(char ch)
    {
        putchar(ch);
    }
    vip% rp
    a + b + c + d #
    ab+c+d+
    vip% rp
    a\b^c\d#
    abcd^^^
    vip% rp
    (a + b*c)^(d/e - f)*g#
    abc*+de/f-^g*
    vip% rp
    a + b c #
    ab+
    *** ERROR ***
    vip% rp
    ( (a + b)*c #
    ab+c*
    *** ERROR ***
    vip% rp
    a + b ) #
    ab+
    *** ERROR ***

```