

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

```
#define MAX_RULES 18
```

```
#define MAX_PROD_LEN 3
```

```
#define STACK_SIZE 5
```

```
char arr[MAX_RULES][MAX_PROD_LEN] = {  
    {'E', '+', 'F'}, {'E', '*', 'F'}, {'E', '(', 'F'}, {'E', ')', 'F'}, {'E', 'i', 'F'},  
    {'E', '$', 'F'}, {'F', '+', 'F'}, {'F', '*', 'F'}, {'F', '(', 'F'}, {'F', ')', 'F'},  
    {'F', 'i', 'F'}, {'F', '$', 'F'}, {'T', '+', 'F'}, {'T', '*', 'F'}, {'T', '(', 'F'},  
    {'T', ')', 'F'}, {'T', 'i', 'F'}, {'T', '$', 'F'}  
};
```

```
char prod[7] = "EETFFF"; // increased size to include the null terminator
```

```
char res[6][MAX_PROD_LEN] = {  
    {'E', '+', 'T'}, {'T', '\0', '\0'}, {'T', '*', 'F'}, {'F', '\0', '\0'}, {'(', 'E', ')'}, {'i', '\0', '\0'}  
};
```

```
char stack[STACK_SIZE][2];
```

```
int top = -1;
```

```
void install(char pro, char re) {  
    int i;  
    for (i = 0; i < MAX_RULES; ++i) {  
        if (arr[i][0] == pro && arr[i][1] == re) {  
            arr[i][2] = 'T';  
        }  
    }  
    ++top;  
    stack[top][0] = pro;
```

```

    stack[top][1] = re;
}

int main() {
    int i, j;
    char pro, re, pri = ' ';

    for (i = 0; i < 6; ++i) {
        for (j = 2; j >= 0; --j) {
            if (res[i][j] == '+' || res[i][j] == '*' || res[i][j] == '(' || res[i][j] == ')' || res[i][j] == 'i' || res[i][j] == '$') {
                install(prod[i], res[i][j]);
                break;
            } else if (res[i][j] == 'E' || res[i][j] == 'F' || res[i][j] == 'T') {
                if (j > 0 && (res[i][j - 1] == '+' || res[i][j - 1] == '*' || res[i][j - 1] == '(' || res[i][j - 1] == ')' || res[i][j - 1] == 'i' || res[i][j - 1] == '$')) {
                    install(prod[i], res[i][j - 1]);
                    break;
                }
            }
        }
    }
}

while (top >= 0) {
    pro = stack[top][0];
    re = stack[top][1];
    --top;
    for (i = 0; i < 6; ++i) {
        for (j = 2; j >= 0; --j) {
            if (res[i][0] == pro && res[i][0] != prod[i]) {
                install(prod[i], re);
                break;
            }
        }
    }
}

```

```
        } else if (res[i][0] != '\0') {  
            break;  
        }  
    }  
}  
}
```

```
for (i = 0; i < MAX_RULES; ++i) {  
    printf("\n\t");  
    for (j = 0; j < MAX_PROD_LEN; ++j)  
        printf("%c\t", arr[i][j]);  
}
```

```
printf("\n\n");
```

```
for (i = 0; i < MAX_RULES; ++i) {  
    if (pri != arr[i][0]) {  
        pri = arr[i][0];  
        printf("\n\t%c -> ", pri);  
    }  
    if (arr[i][2] == 'T')  
        printf("%c ", arr[i][1]);  
}
```

```
return 0;
```

}

```
C:\Users\geeth\OneDrive\Doc x + v
E      +      T
E      *      T
E      (      F
E      )      T
E      i      F
E      +      F
F      *      F
F      (      F
F      )      T
F      i      T
F      $      F
T      +      F
T      *      T
T      (      F
T      )      T
T      i      T
T      $      F

E -> + * ) i
F -> ) i
T -> * ) i
-----
Process exited after 0.0603 seconds with return value 0
Press any key to continue . . .
```