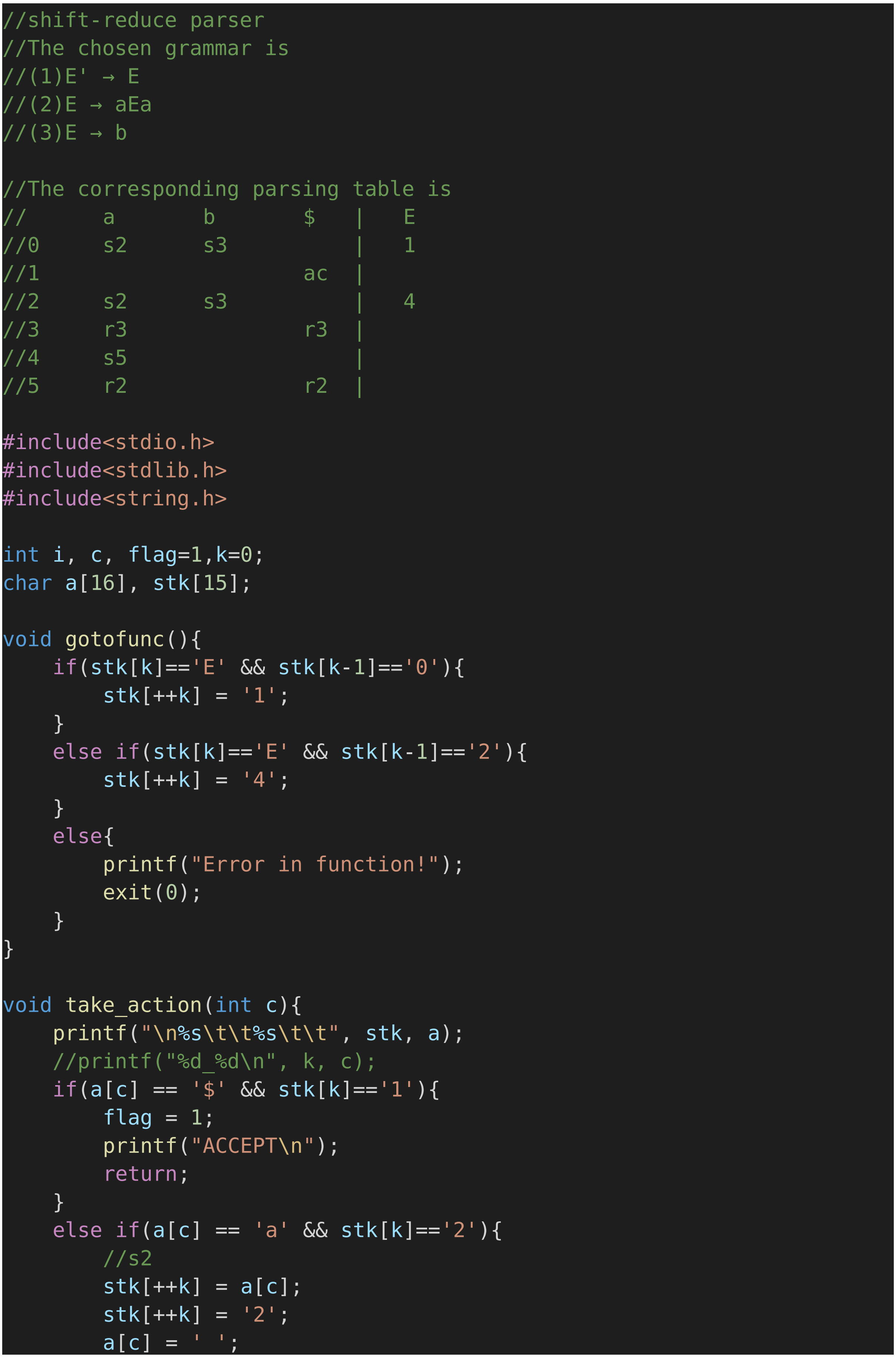
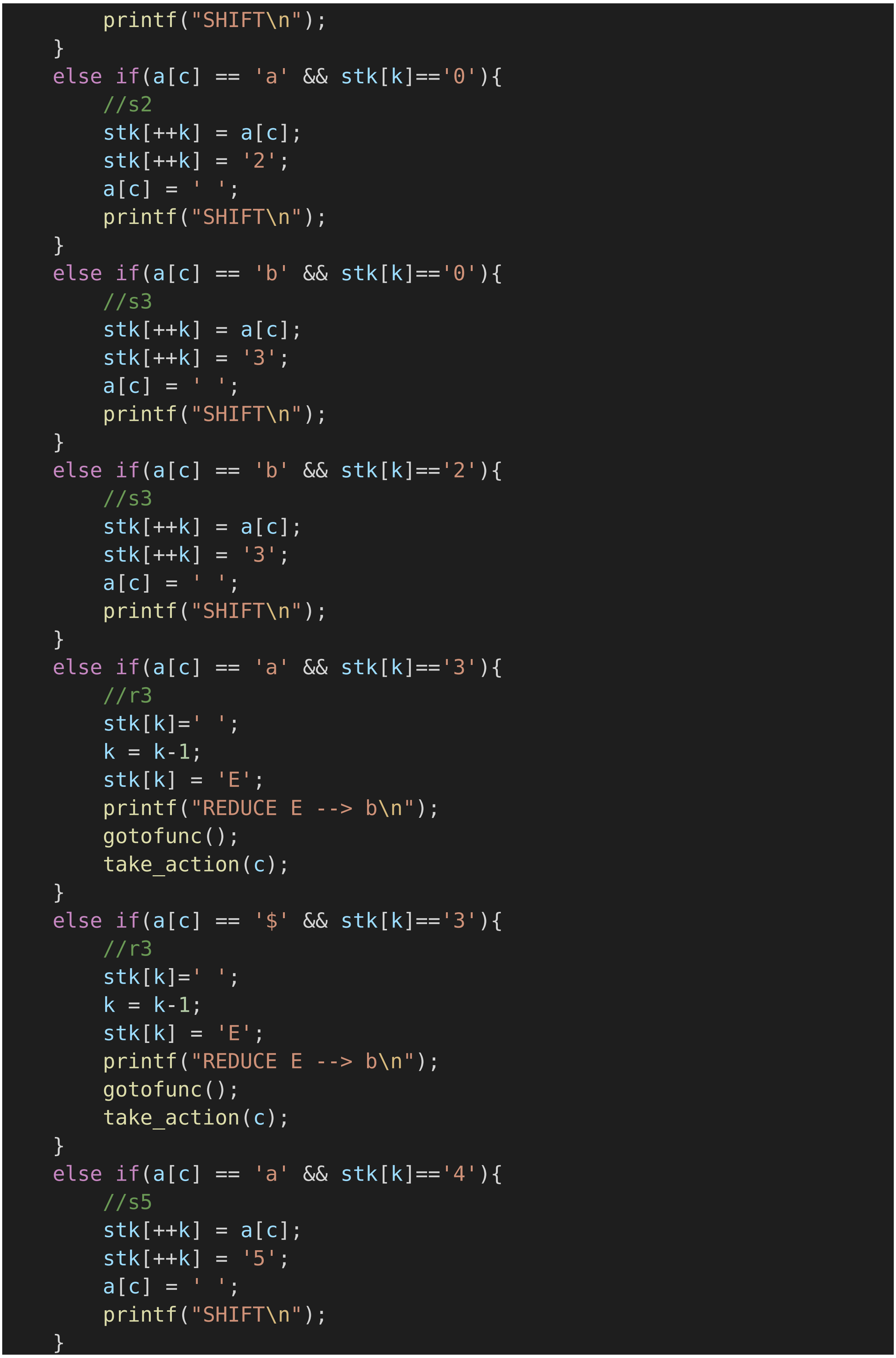
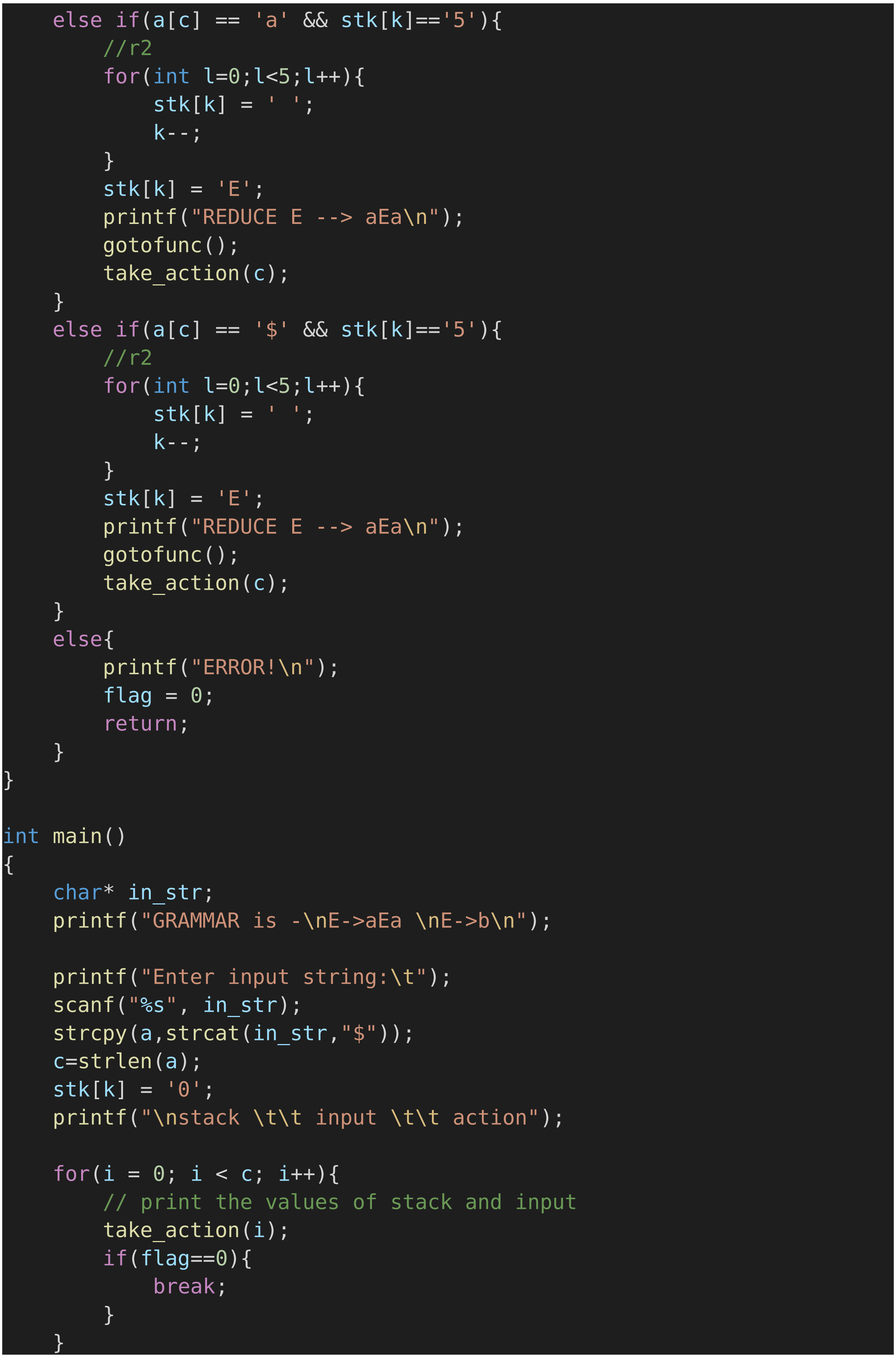


```
//shift-reduce parser
//The chosen grammar is
//(1)E' → E
//(2)E → aEa
//(3)E → b

//The corresponding parsing table is
//      a       b       $   |   E
//0     s2      s3          |   1
//1                     ac  |
//2     s2      s3          |   4
//3     r3              r3  |
//4     s5                  |
//5     r2              r2  |

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

int i, c, flag=1,k=0;
char a[16], stk[15];

void gotofunc(){
    if(stk[k]=='E' && stk[k-1]=='0'){
        stk[++k] = '1';
    }
    else if(stk[k]=='E' && stk[k-1]=='2'){
        stk[++k] = '4';
    }
    else{
        printf("Error in function!");
        exit(0);
    }
}

void take_action(int c){
    printf("\n%s\t\t%s\t\t", stk, a);
    //printf("%d_%d\n", k, c);
    if(a[c] == '$' && stk[k]=='1'){
        flag = 1;
        printf("ACCEPT\n");
        return;
    }
    else if(a[c] == 'a' && stk[k]=='2'){
        //s2
        stk[++k] = a[c];
        stk[++k] = '2';
        a[c] = ' ';
```



```
        printf("SHIFT\n");
    }
    else if(a[c] == 'a' && stk[k]=='0'){
        //s2
        stk[++k] = a[c];
        stk[++k] = '2';
        a[c] = ' ';
        printf("SHIFT\n");
    }
    else if(a[c] == 'b' && stk[k]=='0'){
        //s3
        stk[++k] = a[c];
        stk[++k] = '3';
        a[c] = ' ';
        printf("SHIFT\n");
    }
    else if(a[c] == 'b' && stk[k]=='2'){
        //s3
        stk[++k] = a[c];
        stk[++k] = '3';
        a[c] = ' ';
        printf("SHIFT\n");
    }
    else if(a[c] == 'a' && stk[k]=='3'){
        //r3
        stk[k]=' ';
        k = k-1;
        stk[k] = 'E';
        printf("REDUCE E --> b\n");
        gotofunc();
        take_action(c);
    }
    else if(a[c] == '$' && stk[k]=='3'){
        //r3
        stk[k]=' ';
        k = k-1;
        stk[k] = 'E';
        printf("REDUCE E --> b\n");
        gotofunc();
        take_action(c);
    }
    else if(a[c] == 'a' && stk[k]=='4'){
        //s5
        stk[++k] = a[c];
        stk[++k] = '5';
        a[c] = ' ';
        printf("SHIFT\n");
    }
```



```
    else if(a[c] == 'a' && stk[k]=='5'){
        //r2
        for(int l=0;l<5;l++){
            stk[k] = ' ';
            k--;
        }
        stk[k] = 'E';
        printf("REDUCE E --> aEa\n");
        gotofunc();
        take_action(c);
    }
    else if(a[c] == '$' && stk[k]=='5'){
        //r2
        for(int l=0;l<5;l++){
            stk[k] = ' ';
            k--;
        }
        stk[k] = 'E';
        printf("REDUCE E --> aEa\n");
        gotofunc();
        take_action(c);
    }
    else{
        printf("ERROR!\n");
        flag = 0;
        return;
    }
}

int main()
{
    char* in_str;
    printf("GRAMMAR is -\nE->aEa \nE->b\n");

    printf("Enter input string:\t");
    scanf("%s", in_str);
    strcpy(a,strcat(in_str,"$"));
    c=strlen(a);
    stk[k] = '0';
    printf("\nstack \t\t input \t\t action");

    for(i = 0; i < c; i++){
        // print the values of stack and input
        take_action(i);
        if(flag==0){
            break;
        }
    }
```

```c
    // if top of the stack is E(starting symbol), then it will accept the input
    if(flag == 1){
        printf("String accepted successfully\n");
    }
    else{
        printf("String rejected\n");
    }
}
```