

Q1)
code

```
/*  
S->a | > | ( T )  
T->T, S|S  
  
after removing lr  
S->a | > | ( T )  
T -> ST'  
T' -> ,ST' | empty  
  
ex1- (a,>)$ //success  
ex2- ,a)$ //failure  
*/
```

```
#include <stdio.h>  
#include <stdlib.h>  
#include <string.h>  
int curr = 0;  
char str[100];
```

```
void S();  
void T();  
void Tprime();
```

```
void invalid()  
{  
    printf("-----ERROR!-----\n");  
    exit(0);  
}  
void valid()  
{  
    printf("-----SUCCESS!-----\n");  
    exit(0);  
}
```

```
void S(){  
    if(str[curr]=='a' || str[curr]=='>'){  
        curr++;  
        return;  
    }  
    else if(str[curr]=='('){  
        curr++;
```

```
        T();
        if(str[curr]==' '){
            curr++;
            return;
        }
        else{
            invalid();
        }
    }
    else{
        invalid();
    }
}
void T(){
    S();
    Tprime();
}
void Tprime(){
    if(str[curr]==' '){
        curr++;
        S();
        Tprime();
    }
}

void main(){
    printf("Enter String\n");
    scanf("%s",str);
    S();
    if(str[curr]=='$')
        valid();
    else{
        // printf("c\n",str[curr]);
        invalid();
    }
}
```

Output

```
student@dslab:~/180905350/cd/lab6$ cc p1.c
student@dslab:~/180905350/cd/lab6$ ./a.out
Enter String
(a,>)$
-----SUCCESS!-----
student@dslab:~/180905350/cd/lab6$ ./a.out
Enter String
,a)$
-----ERROR!-----
student@dslab:~/180905350/cd/lab6$
```

Q2)

Code

```
/*
```

```
S->UVW
```

```
U -> (S) | aSb | d
```

```
V -> aV | empty
```

```
W-> cW | empty
```

```
ex1-daac$
```

```
ex2- addca$
```

```
*/
```

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

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

```
#include <string.h>
```

```
int curr = 0;
```

```
char str[100];
```

```
void S();
```

```
void U();
```

```
void V();
```

```
void W();
```

```
void invalid()
```

```
{
```

```
    printf("-----ERROR!-----\n");
```

```
    exit(0);
```

```
}
```

```
void valid()
```

```
{
```

```
    printf("-----SUCCESS!-----\n");
```

```
    exit(0);
```

```
}
```

```
void S(){
```

```
    U();
```

```
    V();
```

```
    W();
```

```
}
```

```
void U(){
```

```
    if(str[curr]=='('){
```

```
        curr++;
```

```
        S();
```

```
    if(str[curr]==')'){
```

```
        curr++;
```

```
        return;
```

```
    }
```

```
        else {
            invalid();
        }

    }
    else if(str[curr]=='a'){
        curr++;
        S();
        if(str[curr]=='b'){
            curr++;
            return;
        }
        else{
            invalid();
        }
    }
    else if(str[curr]=='d'){
        curr++;
        return;
    }
    else{
        invalid();
    }
}

void V(){
    if (str[curr]=='a'){
        curr++;
        V();
    }
}

void W(){
    if(str[curr]=='c'){
        curr++;
        W();
    }
}

void main(){
    printf("Enter String\n");
    scanf("%s",str);
    S();
    if(str[curr]=='$')
        valid();
    else{
        // printf("c\n",str[curr]);
        invalid();
    }
}
```

Output

```
File Edit View Search Terminal Help
student@dslab:~/180905350/cd/lab6$ cc p2.c
student@dslab:~/180905350/cd/lab6$ ./a.out
Enter String
daac$
-----SUCCESS!-----
student@dslab:~/180905350/cd/lab6$ ./a.out
Enter String
addca$
-----ERROR!-----
student@dslab:~/180905350/cd/lab6$
```

Q3)

Code

```
/*  
S->aAcBe  
A->Ab|b  
B->d
```

after removing lr

```
S->aAcBe  
A->bA'  
A'->bA'|empty  
B->d
```

ex1- abbbbcde\$

ex2 -abbce\$

```
*/
```

```
#include <stdio.h>  
#include <stdlib.h>  
#include <string.h>  
int curr = 0;  
char str[100];
```

```
void S();  
void A();  
void Aprime();  
void B();
```

```
void invalid()  
{  
    printf("-----ERROR!-----\n");  
    exit(0);  
}  
void valid()  
{  
    printf("-----SUCCESS!-----\n");  
    exit(0);  
}
```

```
void S(){  
    if(str[curr]=='a'){  
        curr++;  
        A();  
    }  
    if(str[curr]=='c'){  
        curr++;  
        B();  
    }  
    if(str[curr]=='e'){
```

```
        curr++;
        return;
    }
    else{
        invalid();
    }
}
else{
    invalid();
}
}
else{
    invalid();
}
}

void A(){
    if(str[curr]=='b'){
        curr++;
        Aprime();
    }
    else{
        invalid();
    }
}

void Aprime(){
    if(str[curr]=='b'){
        curr++;
        Aprime();
    }
}

void B(){
    if(str[curr]=='d'){
        curr++;
        return;
    }
    else{
        invalid();
    }
}

void main(){
    printf("Enter String\n");
    scanf("%s",str);
    S();
    if(str[curr]=='$')
        valid();
    else{
        // printf("c\n",str[curr]);
        invalid();
    }
}
```


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```
}  
}
```

Ouput

```
File Edit View Search Terminal Help  
student@dslab:~/180905350/cd/lab6$ cc p3.c  
student@dslab:~/180905350/cd/lab6$ ./a.out  
Enter String  
abbbbcde$  
-----SUCCESS!-----  
student@dslab:~/180905350/cd/lab6$ ./a.out  
Enter String  
abbce$  
-----ERROR!-----  
student@dslab:~/180905350/cd/lab6$
```

Q4)

Code

```
/*
```

```
S ->(L) | a
```

```
L ->L,S | S
```

after removing lr

```
S ->(L) | a
```

```
L ->SL'
```

```
L' ->,SL'|empty
```

```
ex1-((a,(a),a))$
```

```
ex2- (aa,a)$
```

```
*/
```

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

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

```
#include <string.h>
```

```
int curr = 0;
```

```
char str[100];
```

```
void S();
```

```
void L();
```

```
void Lprime();
```

```
void invalid()
```

```
{  
    printf("-----ERROR!-----\n");  
    exit(0);  
}
```

```
void valid()
```

```
{  
    printf("-----SUCCESS!-----\n");  
    exit(0);  
}
```

```
void S(){
```

```
    if(str[curr]=='a' ){  
        curr++;  
        return;
```

```
    }
```

```
    else if(str[curr]=='('){  
        curr++;
```

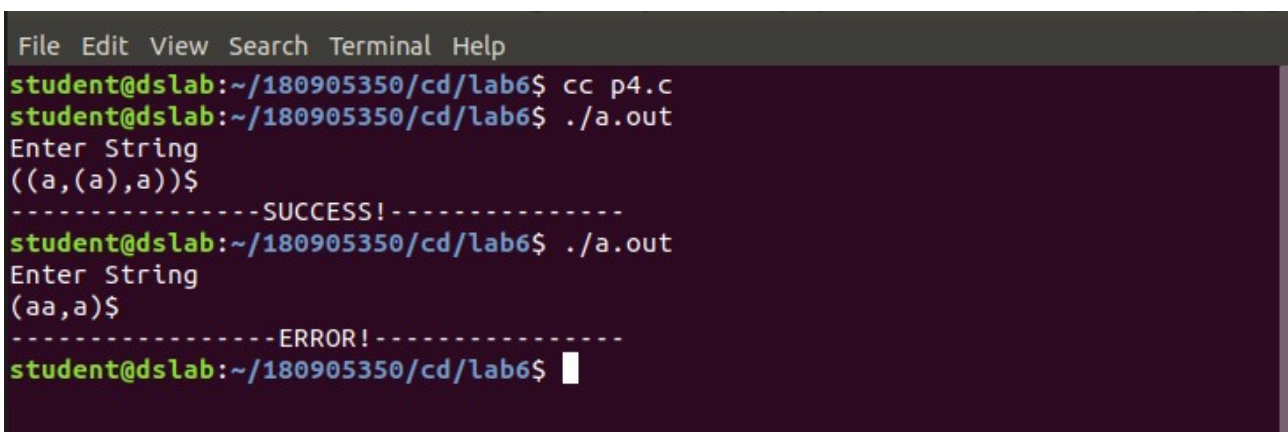
```
        L();
```

```
        if(str[curr]==')'){  
            curr++;  
            return;
```

```
        }
        else{
            invalid();
        }
    }
    else{
        invalid();
    }
}
void L(){
    S();
    Lprime();
}
void Lprime(){
    if(str[curr]==' '){
        curr++;
        S();
        Lprime();
    }
}

void main(){
    printf("Enter String\n");
    scanf("%s",str);
    S();
    if(str[curr]=='$')
        valid();
    else{
        // printf("c\n",str[curr]);
        invalid();
    }
}
```

Output



```
File Edit View Search Terminal Help
student@ds1ab:~/180905350/cd/lab6$ cc p4.c
student@ds1ab:~/180905350/cd/lab6$ ./a.out
Enter String
((a,(a),a))$
-----SUCCESS!-----
student@ds1ab:~/180905350/cd/lab6$ ./a.out
Enter String
(aa,a)$
-----ERROR!-----
student@ds1ab:~/180905350/cd/lab6$
```