

CD Lab 6

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Q1.

S \rightarrow a | > | (T)

T \rightarrow ST'

T' \rightarrow ,ST' | ϵ

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

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

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

```
int curr;
```

```
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() {
```

```
    // S  $\rightarrow$  a
```

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

```
        curr++;
```

```
        return;
```

```
    }
```

```
    // S  $\rightarrow$  >
```

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

```
        curr++;
```

```
        return;
```

```
    }
```

```
    // S  $\rightarrow$  (T)
```

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

```
        curr++;
```

```
        T();
```

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

```
            curr++;
```

```

        return;
    }
    else {
        invalid();
    }
}

// none of the possibilities match - invalid
else {
    invalid();
}
}

void T() {
    // T -> ST'
    S();
    Tprime();
}

void Tprime() {
    // T' -> ,ST'| ε
    if (str[curr] == ',') {
        curr++;
        S();
        Tprime();
    }
}

int main() {
    printf("Enter String: ");
    scanf("%s", str);
    curr = 0;

    // start symbol
    S();

    if (str[curr] == '$') {
        valid();
    } else {
        invalid();
    }
}

```

```

student@lplab-Lenovo-Product: ~/Desktop/CD-Lab/paawan/lab6
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q1
Enter String: a$
-----SUCCESS!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q1
Enter String: aaaa$
-----ERROR!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q1
Enter String: a
-----ERROR!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q1
Enter String: (a,a,a,a,a,a,a)$
-----SUCCESS!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ █

```

Q2.

S -> UVW

U -> (S)|aSb|d

V -> aV| ϵ

W -> cW| ϵ

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

```
int curr;
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() {
    // S -> UVW
    U();
    V();
    W();
}
```

```
void U() {
    // U -> (S)
    if (str[curr] == '(') {
        curr++;
        S();
        if (str[curr] == ')') {
            curr++;
            return;
        }
    }
    else {
        invalid();
    }
}
```

```

// U -> aSb
else if (str[curr] == 'a') {
    curr++;
    S();
    if (str[curr] == 'b') {
        curr++;
        return;
    }
    else {
        invalid();
    }
}

// U -> d
else if (str[curr] == 'd') {
    curr++;
    return;
}

// none of the possibilities match - invalid
else {
    invalid();
}
}

void V() {
    // V -> aV | ε
    if (str[curr] == 'a') {
        curr++;
        V();
    }
}

void W() {
    // W -> cW | ε
    if (str[curr] == 'c') {
        curr++;
        W();
    }
}

int main() {
    printf("Enter String: ");
    scanf("%s", str);
    curr = 0;

    // start symbol
    S();

    if (str[curr] == '$') {
        valid();
    } else {
        invalid();
    }
}

```

```

student@lplab-Lenovo-Product: ~/Desktop/CD-Lab/paawan/lab6
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q2
Enter String: daaaccc$
-----SUCCESS!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q2
Enter String: (adb)$
-----SUCCESS!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q2
Enter String: (ab)aaacc$
-----ERROR!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ █

```

Q3.

S -> aAcBe

A -> bA'

A' -> bA'|ε

B -> d

```

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

```

```

char str[100];
int curr;

```

```

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

```

```

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

```

```

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

```

```

void S() {
    // S -> aAcBe
    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() {
    // A -> bA'
    if (str[curr] == 'b') {
        curr++;
        Aprime();
    } else {
        invalid();
    }
}

void Aprime() {
    // A' -> bA'|ε
    if (str[curr] == 'b') {
        curr++;
        Aprime();
    }
}

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

```

```

int main() {
    printf("Enter String: ");
    scanf("%s", str);
    curr = 0;

    // start symbol
    S();

    if (str[curr] == '$') {
        valid();
    } else {
        invalid();
    }
}

```

```

student@lplab-Lenovo-Product: ~/Desktop/CD-Lab/paawan/lab6
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q3
Enter String: aaabbbcccddeee$
-----ERROR!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q3
Enter String: abbbbbcde$
-----SUCCESS!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$

```

Q4.

$S \rightarrow (L)a$
 $L \rightarrow SL'$
 $L' \rightarrow ,SL' | \epsilon$

```

#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() {
    // S -> (L)
    if (str[curr] == '(') {
        curr++;
        L();
        if (str[curr] == ')') {
            curr++;
            return;
        }
        else {
            invalid();
        }
    }
    // S -> a
    else if (str[curr] == 'a') {
        curr++;
        return;
    }
    // invalid
    else {
        invalid();
    }
}

```

```

void L() {
    // L -> SL'
    S();
    Lprime();
}

```

```

void Lprime() {
    // L' -> ,SL'|ε
    if (str[curr] == ',') {
        curr++;
        S();
        Lprime();
    }
}

```

```

int main() {
    printf("Enter String: ");
    scanf("%s", str);
    curr = 0;

    // start symbol
    S();

    if (str[curr] == '$') {
        valid();
    } else {
        invalid();
    }
}

```



```
student@lplab-Lenovo-Product: ~/Desktop/CD-Lab/paawan/lab6
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q4
Enter String: (a,(a,(a,a)))$
-----SUCCESS!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q4
Enter String: (a,(a,(a,a,a)))$
-----SUCCESS!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$ ./q4
Enter String: (a,(a,a)))$
-----ERROR!-----
student@lplab-Lenovo-Product:~/Desktop/CD-Lab/paawan/lab6$
```