

Estructuras de datos

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Análisis de algoritmos

Arreglos

¡Buenos días!

```

char *strupr (char *s) {
    char *mayusculas="ABCDEFGHIJKLMNOPQRSTUVWXYZ";
    char *minusculas ="abcdefghijklmnopqrstuvwxyz";
    for (int i=0; i<strlen(s); i++) {
        for (int j=0; j<strlen(minusculas); j++) {
            if (s[i]==minusculas[j]) {
                s[i]=mayusculas[j];
            }
        }
    }
    return s;
}

```

Handwritten annotations on the code:

- A bracket above the first for loop is labeled  $26$ .
- Handwritten  $asig_1$  is next to the first for loop.
- Handwritten  $asig_2$  is next to the second for loop.
- Handwritten  $N$  is next to the first for loop's condition.
- Handwritten  $26$  is next to the second for loop's condition.
- Handwritten  $ini$ ,  $cond$ ,  $fin$  are above the first for loop.
- Handwritten  $ini_j$ ,  $cond_j$ ,  $fin_j$  are above the second for loop.
- Handwritten  $verpo$  is to the left of the second for loop.
- Handwritten  $cond$  is above the if statement.
- Handwritten  $cuervo_j$  is to the right of the if statement.
- Handwritten  $asig_3$  is above the assignment  $s[i]=mayusculas[j]$ .

$$\begin{aligned}
 T(N) &= T(asig_1) + T(asig_2) + T(for_i) + T(ret) \\
 &= 3t + T(ini) + v_i(T(cond) + T(cuervo) + T(fin)) \\
 &= 4t + v_i(T_2(N) + T(for_j) + t) \\
 &= 4t + v_i(T_2(N) + T(ini_j) + v_j(T(cond_j) + T(if) + T(fin_j))) \\
 &= 4t + v_i(T_2(N) + t + v_j(T_2(26) + T(cond IF) + T(asig_3) + t)) \\
 &= 4t + v_i(T_2(N) + t + v_j(T_2(26) + 3t))
 \end{aligned}$$



```

int strlen (char *s) {
    int i=0; assign
    while ( s[i] != 0 ) cond
        i++; assign
    return i; ret.
}

```

$$\begin{aligned}
 T_2(N) &= T(\text{assign}) + T(\text{while}) + T(\text{ret}) \\
 &= 2t + v(T(\text{cond}) + T(\text{assign})) \\
 &= 2t + 2tv \quad v = ? = N
 \end{aligned}$$

$$\Rightarrow T_2(N) = 2t + 2tN$$

$$\begin{aligned}
 T(N) &= 4t + v_i (T_2(N)) + t + v_j (T_2(26) + 3t) \\
 &= 4t + v_i (2t + 2tN + t) + v_j (2t + 2(26)t + 3t) \\
 &= 4t + 2tv_i + 3tv_i N + v_i v_j 57t
 \end{aligned}$$

$$v_i = ? = N$$

$$v_j = ? = 26$$

$$\begin{aligned}
 \Rightarrow T(N) &= 4t + 2tN + 3tN^2 + (26)57tN \\
 &= 4 + \underline{1484N} + \underline{3N^2}
 \end{aligned}$$

$$O(N) = \underline{N^2}$$

```
char *strupr (char *s) {  
    char *mayusculas="ABCDEFGHIJKLMNOPQRSTUVWXYZ" ;  
    char *minusculas ="abcdefghijklmnopqrstuvwxyz" ;  
    int tam = strlen(s);  
    for (int i=0; i<strlen(s); i++) {  
        for (int j=0; j<strlen(minusculas); j++)  
            if (s[i]==minusculas[j])  
                s[i]=mayusculas[j] ;  
    }  
    return s ;  
}
```