

NOME: FELIPE ANCHATO DA CUNHA MENDOS

LISTA 1

①

a) SELECTION-SORT(A)

2. FOR $j \leftarrow 1$ TO $\text{COMPIMENTO}[A] - 1$ DO	$C_2 \cdot n$
3. $i \leftarrow j + 1$	$C_3 \cdot (n-1)$
4. $\text{MENOR} \leftarrow A[j]$	$C_4 \cdot (n-1)$
5. $\text{POSICAO} \leftarrow j$	$C_5 \cdot (n-1)$
6. $\text{TEMP} \leftarrow A[j]$	$C_6 \cdot (n-1)$
7. WHILE $i \leq \text{COMPIMENTO}[A]$ DO	$C_7 \cdot \sum_{j=1}^{n-1} t_j$
8. IF $A[i] < \text{MENOR}$ THEN	$C_8 \cdot \sum_{j=1}^{n-1} (t_j - 1)$
9. $\text{MENOR} \leftarrow A[i]$	$C_9 \cdot \sum_{j=1}^{n-1} (t_j - 1)$
10. $\text{POSICAO} \leftarrow i$	$C_{10} \cdot \sum_{j=1}^{n-1} (t_j - 1)$
11. $i \leftarrow i + 1$	$C_{11} \cdot \sum_{j=1}^{n-1} (t_j - 1)$
12. $A[j] \leftarrow \text{MENOR}$	$C_{12} \cdot (n-1)$
13. $A[\text{POSICAO}] \leftarrow \text{TEMP}$	$C_{13} \cdot (n-1)$

b)

$$T(n) = C_2 \cdot n + C_3 \cdot (n-1) + C_4 \cdot (n-1) + C_5 \cdot (n-1) + C_6 \cdot (n-1) + C_7 \cdot \sum_{j=1}^{n-1} t_j \\ + C_8 \cdot \sum_{j=1}^{n-1} (t_j - 1) + C_9 \cdot \sum_{j=1}^{n-1} (t_j - 1) + C_{10} \cdot \sum_{j=1}^{n-1} (t_j - 1) \\ + C_{11} \cdot \sum_{j=1}^{n-1} (t_j - 1) + C_{12} \cdot (n-1) + C_{13} \cdot (n-1)$$

$$+ \sum_{j=1}^n t_j = 1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$$

$$+ \sum_{j=1}^{n-1} t_j = 1 + 2 + 3 + \dots + n-1 = \frac{n(n+1)}{2} - n //$$

$$+ \sum_{j=1}^{n-1} (t_j - 1) = \frac{n(n+1)}{2} - n - n + 1 = \frac{n(n+1)}{2} - 2n + 1 //$$

$$+1m) = C_2 m + (n-1)(C_3 + C_4 + C_5 + C_6 + C_{12} + C_{13}) + C_7 \sum_{j=1}^{n-1} x_j \\ + \sum_{j=1}^{n-1} (x_j - 1)(C_8 + C_9 + C_{10} + C_{11})$$

$$= n(C_2 + C_3 + C_4 + C_5 + C_6 + C_{12} + C_{13}) - (C_3 + C_4 + C_5 + C_6 + C_{12} + C_{13}) \\ + C_7 \left(\frac{n(n+1)}{2} - n \right) + (C_8 + C_9 + C_{10} + C_{11}) \left(\frac{n(n+1)}{2} - 2n + 1 \right)$$

$$= n(C_2 + C_3 + C_4 + C_5 + C_6 + C_{12} + C_{13}) - (C_3 + C_4 + C_5 + C_6 + C_{12} + C_{13}) + \frac{C_7(n^2 - n)}{2} \\ + \frac{(C_8 + C_9 + C_{10} + C_{11})}{2} (n^2 - 3n + 2)$$

$$= n(C_2 + C_3 + C_4 + C_5 + C_6 + C_{12} + C_{13}) - (C_3 + C_4 + C_5 + C_6 + C_{12} + C_{13}) + \frac{C_7 \cdot n^2}{2} \\ - \frac{C_7 \cdot n}{2} + \left(\frac{C_8 + C_9 + C_{10} + C_{11}}{2} \right) n^2 - \left(\frac{C_8 + C_9 + C_{10} + C_{11}}{2} \right) \cdot 3n \\ + 2 \left(\frac{C_8 + C_9 + C_{10} + C_{11}}{2} \right)$$

$$= \left(\frac{C_7}{2} + \frac{C_8}{2} + \frac{C_9}{2} + \frac{C_{10}}{2} + \frac{C_{11}}{2} \right) n^2 + \left(C_2 + C_3 + C_4 + C_5 + C_6 + C_{12} + C_{13} - 3 \left(\frac{C_8 + C_9 + C_{10} + C_{11}}{2} \right) \right) n \\ + (C_8 + C_9 + C_{10} + C_{11} - C_3 - C_4 - C_5 - C_6 - C_{12} - C_{13})$$

$$= \alpha n^2 + \beta n + \omega$$

②

a) BUSCA SEQUENCIAL

2 FOR $i \leftarrow 1$ TO COMPRIMENTO[A]

3 IF $A[i] = V$

4 RETORNA i

5 RETORNA NULL

b) Pior Acontece quando o elemento de busca não existe no vetor

$$T(n) = C_2(n+1) + C_3 \cdot n + C_5$$

$$= C_2 n + C_2 + C_3 n + C_5$$

$$= n(C_2 + C_3) + C_2 + C_5$$

$$= \alpha n + \beta, \text{ ONDE } n \text{ É O TAMANHO}$$

DO VETOR //