
UNIVERSIDADE ESTADUAL DA PARAÍBA

CENTRO DE CIÊNCIAS E TECNOLOGIA

CIÊNCIA DA COMPUTAÇÃO

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# ATAL - Exercício 1

CAMPINA GRANDE

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1. Análise assintótica

| | Θ | O | o | Ω | ω |
|---|---|---|---|---|---|
| $5n^2 + 8$ | $n^2$ | $n^2$ | $n^3$ | $n^2$ | $n$ |
| $7n^4 + 5n^2 + 8$ | $n^4$ | $n^4$ | $n^5$ | $n^4$ | $n^3$ |
| $7n.log_n + 5n$ | $n.log_n$ | $n.log_n$ | $n^2.log_n$ | $n.log_n$ | $n^{-1}.log_n$ |
| $2^n + log_n$ | $2^n$ | $2^n$ | $2^{2n}$ | $2^n$ | $n^{10}$ |
| $8n.log_n$ | $n.log_n$ | $n.log_n$ | $n^2.log_n$ | $n.log_n$ | $n^{-1}.log_n$ |

2 - Aplicação dos algoritmos de ordenação nos seguintes conjuntos de números:

- [50, 22, 85, 14, 31, 20]
- [35, 77, 44, 38, 22, 56]

- Bubble Sort

[50, 22, 85, 14, 31, 20] → [50, 22, 85, 14, 31, 20] → [22, 50, 85, 14, 31, 20] →
[22, 50, 85, 14, 31, 20] → [22, 50, 85, 14, 31, 20] → [22, 50, 85, 14, 31, 20] →
[22, 50, 14, 85, 31, 20] → [22, 50, 14, 85, 31, 20] → [22, 50, 14, 31, 85, 20] →
[22, 50, 14, 31, 85, 20] → [22, 50, 14, 31, 20, 85] → [22, 50, 14, 31, 20, 85] →
[22, 50, 14, 31, 20, 85] → [22, 50, 14, 31, 20, 85] → [22, 14, 50, 31, 20, 85] →
[22, 14, 50, 31, 20, 85] → [22, 14, 31, 50, 20, 85] → [22, 14, 31, 50, 20, 85] →
[22, 14, 31, 20, 50, 85] → [22, 14, 31, 20, 50, 85] → [14, 22, 31, 20, 50, 85] →
[14, 22, 31, 20, 50, 85] → [14, 22, 31, 20, 50, 85] → [14, 22, 20, 31, 50, 85] →
[14, 22, 20, 31, 50, 85] → [14, 22, 20, 31, 50, 85] → [14, 20, 22, 31, 50, 85] →
[14, 20, 22, 31, 50, 85] → [14, 20, 22, 31, 50, 85] → [14, 20, 22, 31, 50, 85]

[35, 77, 44, 38, 22, 56] → [35, 77, 44, 38, 22, 56] → [35, 77, 44, 38, 22, 56] →
[35, 44, 77, 38, 22, 56] → [35, 44, 77, 38, 22, 56] → [35, 44, 38, 77, 22, 56] →
[35, 44, 38, 77, 22, 56] → [35, 44, 38, 77, 22, 56] → [35, 44, 38, 22, 77, 56] →
[35, 44, 38, 22, 77, 56] → [35, 44, 38, 22, 56, 77] → [35, 44, 38, 22, 56, 77] →
[35, 44, 38, 22, 56, 77] → [35, 38, 44, 22, 56, 77] → [35, 38, 44, 22, 56, 77] →
[35, 38, 22, 44, 56, 77] → [35, 38, 22, 44, 56, 77] → [35, 38, 22, 44, 56, 77] →
[35, 38, 22, 44, 56, 77] → [35, 38, 22, 44, 56, 77] → [35, 22, 38, 44, 56, 77] →
[35, 22, 38, 44, 56, 77] → [35, 22, 38, 44, 56, 77] → [35, 22, 38, 44, 56, 77] →
[22, 35, 38, 44, 56, 77] → [22, 35, 38, 44, 56, 77] → [22, 35, 38, 44, 56, 77] →
[22, 35, 38, 44, 56, 77]

- Selection Sort

[50, 22, 85, 14, 31, 20] → [50, 22, 85, 14, 31, 20] → [14, 22, 85, 50, 31, 20] →
[14, 22, 85, 50, 31, 20] → [14, 20, 85, 50, 31, 22] → [14, 20, 85, 50, 31, 22] →
[14, 20, 22, 50, 31, 85] → [14, 20, 22, 50, 31, 85] → [14, 20, 22, 31, 50, 85] →
[14, 20, 22, 31, 50, 85]

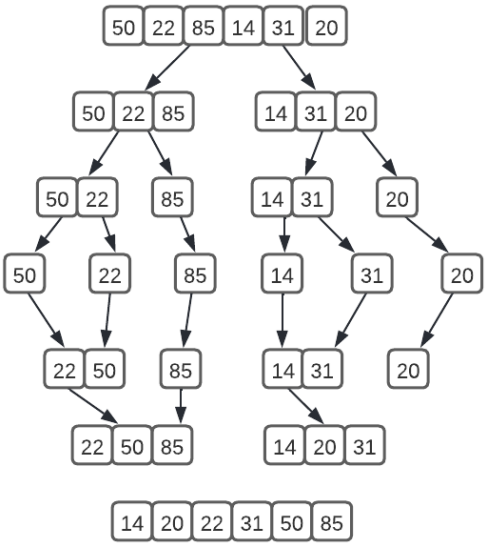
[35, 77, 44, 38, 22, 56] → [35, 77, 44, 38, 22, 56] → [22, 77, 44, 38, 35, 56] →
[22, 77, 44, 38, 35, 56] → [22, 35, 44, 38, 77, 56] → [22, 35, 44, 38, 77, 56] →
[22, 35, 38, 44, 77, 56] → [22, 35, 38, 44, 77, 56] → [22, 35, 38, 44, 56, 77]

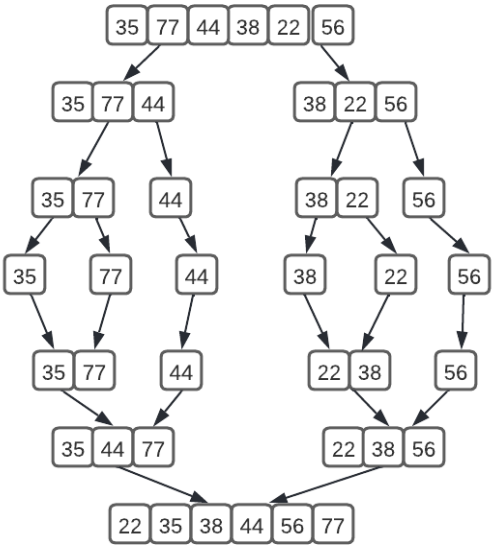
- Insertion Sort

[50, 22, 85, 14, 31, 20] → [50, 22, 85, 14, 31, 20] → [22, 50, 85, 14, 31, 20] →
[22, 50, 85, 14, 31, 20] → [22, 50, 85, 14, 31, 20] → [22, 50, 14, 85, 31, 20] →
[22, 50, 14, 85, 31, 20] → [22, 14, 50, 85, 31, 20] → [22, 14, 50, 85, 31, 20] →
[14, 22, 50, 85, 31, 20] → [14, 22, 50, 85, 31, 20] → [14, 22, 50, 85, 31, 20] →
[14, 22, 50, 31, 85, 20] → [14, 22, 50, 31, 85, 20] → [14, 22, 50, 31, 85, 20] →
[14, 22, 31, 50, 85, 20] → [14, 22, 31, 50, 85, 20] → [14, 22, 31, 50, 20, 85] →
[14, 22, 31, 50, 20, 85] → [14, 22, 31, 20, 50, 85] → [14, 22, 31, 20, 50, 85] →
[14, 22, 20, 31, 50, 85] → [14, 22, 20, 31, 50, 85] → [14, 20, 22, 31, 50, 85] →
[14, 20, 22, 31, 50, 85]

[35, 77, 44, 38, 22, 56] → [35, 77, 44, 38, 22, 56] → [35, 77, 44, 38, 22, 56] →
[35, 44, 77, 38, 22, 56] → [35, 44, 77, 38, 22, 56] → [35, 44, 38, 77, 22, 56] →
[35, 38, 44, 77, 22, 56] → [35, 38, 44, 77, 22, 56] → [35, 38, 44, 22, 77, 56] →
[35, 38, 44, 22, 77, 56] → [35, 38, 22, 44, 77, 56] → [35, 38, 22, 44, 77, 56] →
[35, 22, 38, 44, 77, 56] → [35, 22, 38, 44, 77, 56] → [22, 35, 38, 44, 77, 56] →
[22, 35, 38, 44, 77, 56] → [22, 35, 38, 44, 56, 77] → [22, 35, 38, 44, 56, 77]

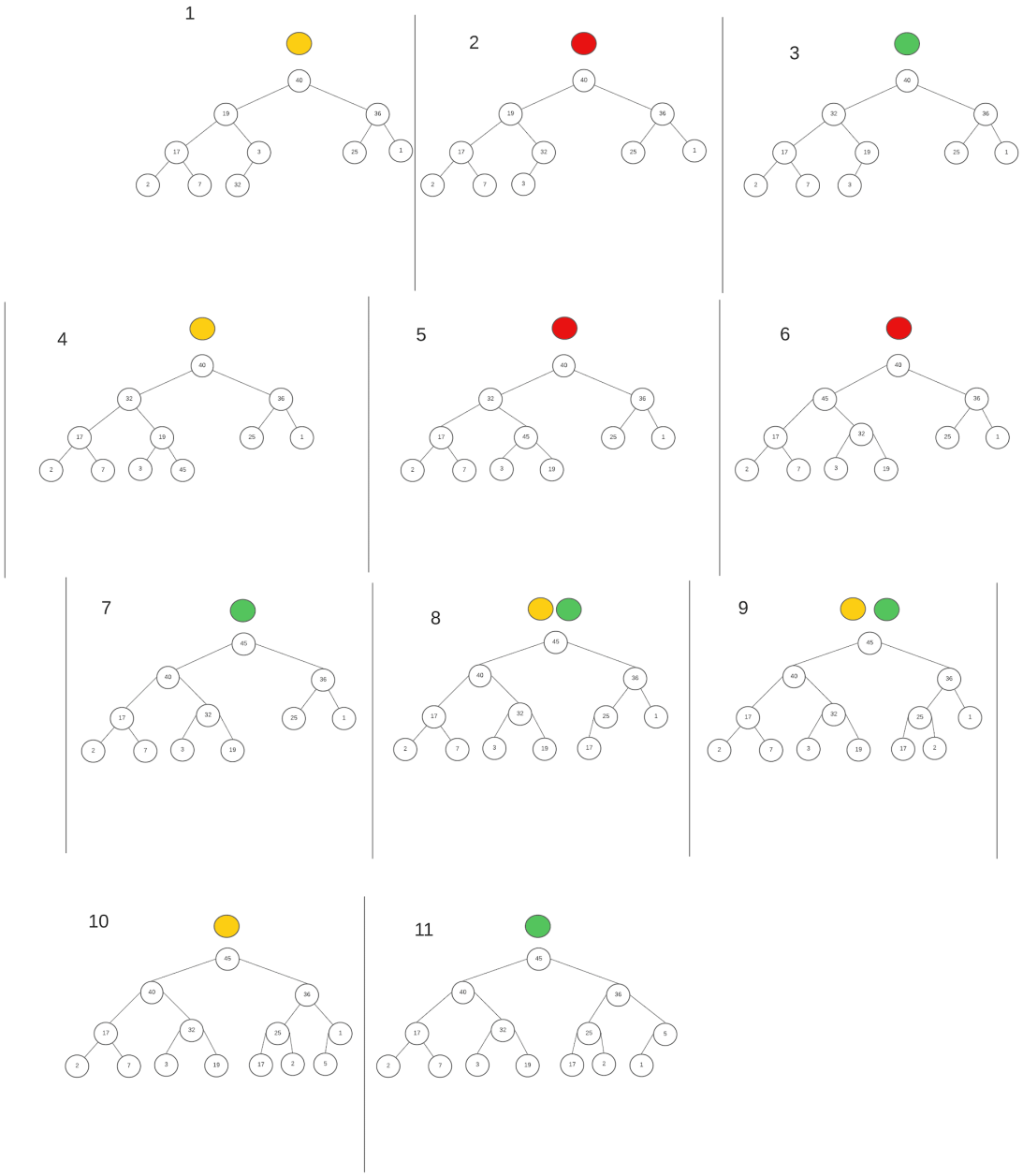
- Merge Sort



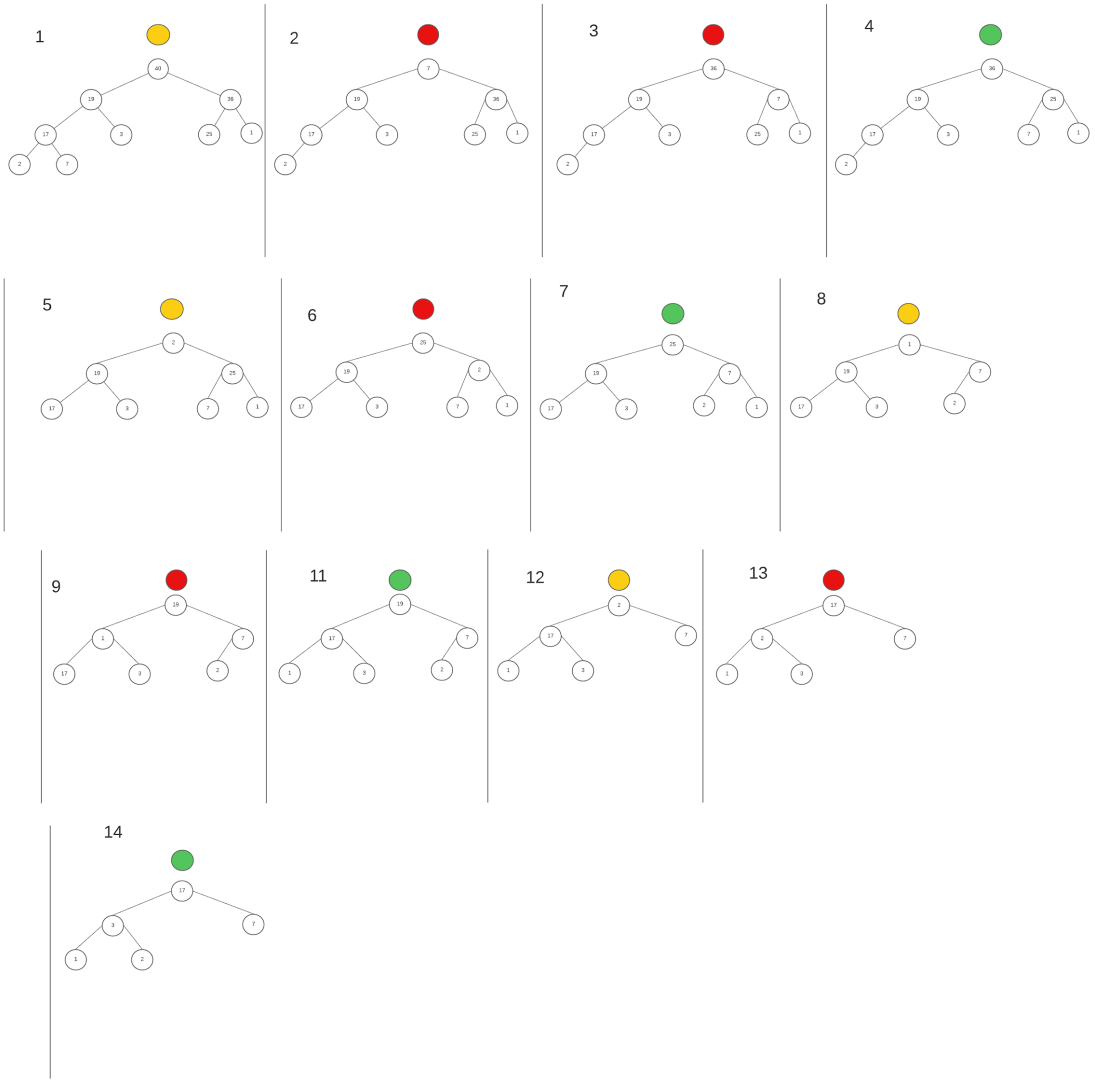




3 -

Insira os elementos 32, 45, 17, 2, 5 na heap seguinte. Mostre visualmente como a heap fica após cada operação.




Aplique a remoção do máximo 4 vezes e mostre visualmente como a heap fica após cada operação.




Ordene as listas a seguir utilizando o quick sort (padrão e randomizado)

- 5, 2, 6, 1, 3, 4
- 13, 19, 9, 5, 12, 8

# QUICKSORT PADRÃO

| | |
|---|---|
| Pegando o primeiro valor como pivô | 5, 2, 6, 1, 3, 4<br>2, 1, 3, 4, 5, 6 |
| Pegando os valores antes e depois do 5 | [2, 1, 3, 4], 5, [6] |
| Pegando o 2 como pivô e ordenando | 1, 2, 3, 4 |
| Só existe o 6 e está ordenado | 6 |
| Reorganizando a lista | 1, 2, 3, 4, 5, 6 |

Segunda lista

| | |
|---|---|
| Pegando o primeiro valor como pivô | 13, 19, 9, 5, 12, 8<br>9, 5, 12, 8, 13, 19 |
| Pegando os valores antes e depois do 13 | [9, 5, 12, 8], 13, [19] |
| Pegando o 9 como pivô e ordenando | 5, 8, 9, 12 |
| Só existe o 19 e está ordenado | 19 |
| Reorganizando a lista | 5, 8, 9, 12, 13, 19 |

Reorganizando a lista ——— 5, 8, 9, 12, 13, 19

# QUICKSORT RANDOM

Escolhendo o 3 como pivô ——— 5, 2, 6, 1, 3, 4
2, 1, 3, 5, 6, 4

Pegando os valores antes e depois do 3 ——— [2, 1], 3, [5, 6, 4]

Escolhendo o 2 como pivô e ordenando ——— 1, 2

Escolhendo o 5 como pivô e ordenando ——— 4, 5, 6

Reorganizando a lista ——— 1, 2, 3, 4, 5, 6

Segunda Lista

Escolhendo o 9 como pivô ——— 13, 19, 9, 5, 12, 8
5, 8, 9, 13, 19, 12

Pegando os valores antes e depois do 13 ——— [5, 8], 9, [13, 19, 12]

Primeira lista já está ordenada ——— 5, 8, 9, 12

Só existe o 19 e está ordenado ——— 19

Reorganizando a lista ——— 5, 8, 9, 12, 13, 19