**Projeto e Análise de Algoritmo**

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Atividade Avaliativa 03

|  |  |
| --- | --- |
| **f(n)** | **g(n)** |
| n - 100 | n - 200 |
| log n | 2  (𝑙𝑜𝑔 𝑛) |
| log n | 2  𝑙𝑜𝑔 𝑛 |
| 𝑛  2 | 𝑛+1  2 |
| n! | 𝑛  2 |
| 2  2𝑛 + 5𝑛 | 2  𝑛 |
| 2  2𝑛 + 5𝑛 | 3  𝑛 |

f(n) = n - 100 e g(n) = n - 200

lim

𝑛 → ∞

𝑓(𝑛)

𝑔(𝑛)

=

𝑛 − 100 ∞

𝑛 − 200 ∞

=

lim

𝑛 → ∞

(1 − 100 )

(1 − 200 ) = 1

𝑛

𝑛

f(n) = O(g(n)) e f(n) = Ω(g(n))

f(n) = Θ(g(n)), f(n) ≠ o(g(n)) e f(n) ≠ ω(g(n)).

**f(n) = log n e g(n) =** (𝑙𝑜𝑔 𝑛)2

lim

𝑛 → ∞

𝑓(𝑛)

𝑔(𝑛)

=

𝑙𝑜𝑔 𝑛

2

(𝑙𝑜𝑔 𝑛)

1

𝑙𝑜𝑔 𝑛

=

= 0

𝐟(𝐧) ≠ 𝛚(𝐠(𝐧)) e 𝐟(𝐧) = 𝐨(𝐠(𝐧))

f(n) = O(g(n)), f(n) ≠ Θ(g(n)) e f(n) ≠ 𝛀(g(n)).

**f(n) = log n e g(n) =** 𝑙𝑜𝑔 𝑛2

lim

𝑛 → ∞

𝑓(𝑛)

𝑔(𝑛)

=

𝑙𝑜𝑔 𝑛

2

𝑙𝑜𝑔 𝑛

𝑙𝑜𝑔 𝑛 1

2𝑙𝑜𝑔 𝑛 2

=

=

f(n) = O(g(n)) e f(n) = Ω(g(n))

f(n) = Θ(g(n)), f(n) ≠ o(g(n)) e f(n) ≠ ω(g(n)).

**f(n) =** 𝑛 **e g(n) =** 𝑛+1

2

2

lim

𝑓(𝑛)

𝑔(𝑛)

𝑛

𝑛+1

= 2

𝑛 1

𝑛 2

= 2

=

𝑛 → ∞

2 2 \* 2

f(n) = O(g(n)) e f(n) = Ω(g(n))

f(n) = Θ(g(n)), f(n) ≠ o(g(n)) e f(n) ≠ ω(g(n)).

f(n) = n! e g(n) = 𝑛

2

lim

𝑛 → ∞

𝑓(𝑛)

𝑔(𝑛)

𝑛!

𝑛

=

2

𝑛

𝑛

= 𝑛

2

= ( 𝑛 )𝑛 = ∞

f(n) = 𝛚(𝐠(𝐧)) e 𝐟(𝐧) ≠ 𝐨(𝐠(𝐧))

2

f(n) ≠ O(g(n)), f(n) ≠ Θ(g(n)) e f(n) = 𝛀(g(n)).

𝑛

2

f(n) =

2𝑛 + 5𝑛

e g(n) = 2

lim

𝑓(𝑛)

2

= 2𝑛 + 5𝑛

𝑛

= 𝑛(2𝑛 + 5)

= 2𝑛 + 5 = 2 + 5 = 2 + 0 = 2

𝑛 → ∞

𝑔(𝑛) 2 2

f(n) = O(g(n) e f(n) = 𝛀(𝐠(𝐧))

𝑛

𝑛

𝑛

f(n) = Θ(g(n)), f(n) ≠ o(g(n)) e f(n) ≠ ω(g(n)).

2

f(n) =

2𝑛 + 5𝑛

e g(n) = 3

lim

𝑓(𝑛)

2

= 2𝑛 + 5𝑛

𝑛

𝑛

= 𝑛(2𝑛 + 5)

= 2𝑛 + 5 = 2 + 5 = 0 + 0 = 0

𝑛 → ∞

𝑔(𝑛) 3

3 2

𝑛 𝑛

2

𝑛 𝑛

f(n) ≠ 𝛚(𝐠(𝐧)) e f(n) = o(g(n))

f(n) = O(g(n)), f(n) ≠ Θ(g(n)) e f(n) ≠ 𝛀(g(n)).