Lab4

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Problema 1

1.

$T(n) = T(n-1) + n$**:**
$< c(n-1)^2 + n$
$< c(n^2 - 2n + 1) + n$
$< cn^2 - 2cn + c + n$
$< cn^2 - n(2c-1) + c$
$< cn^2$

2.

$T(n) = T(n/2) + 1$**:**
$T(n/2) = [T(n/2^2) + 1] + 1$
$T(n/2) = [T(n/2^2) + 2$
$T(n/2) = [T(n/2^3)] + 2$
$T(n/2) = [T(n/2^3) + 3$

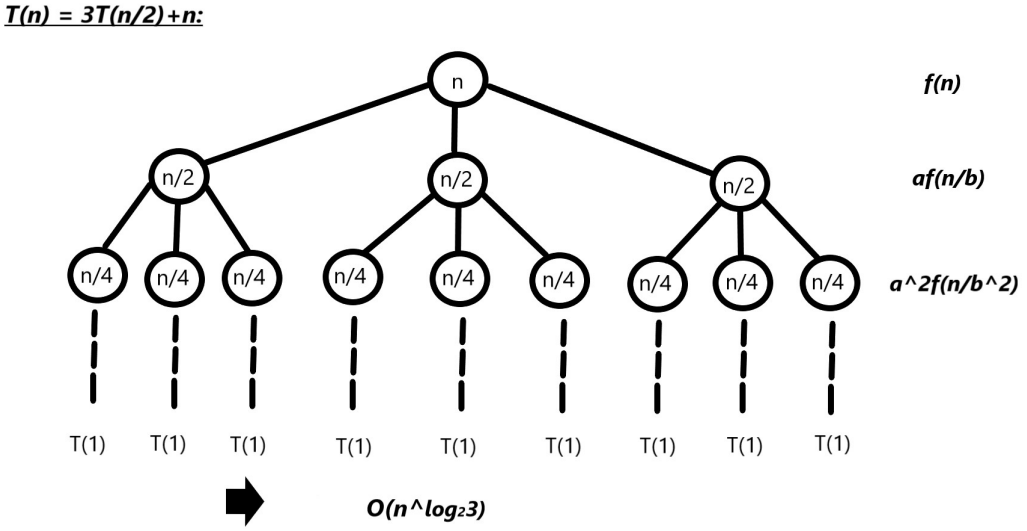
$T(n/2^i) + i$

$T(n) = T(n/2^k) + k$
$n/2^k = 1$
$n = 2^k$
$k = logn$

$T(n) = T(1) + logn$

O(logn)

Problema 2



Problema 3

Master Method:

$a < b^d \longrightarrow T(n) \in O(n^d)$

$a = b^d \longrightarrow T(n) \in O(n^d log n)$

$a > b^d \longrightarrow T(n) \in O(n^{\log_b a})$

1.

$T(n) = 2T(n/4) + 1$

a=2
b=4
d=0

$2 > 1 \longrightarrow O(n^{\log_4 2})$

2.

$T(n) = 2T(n/4) + \sqrt{n}$

a=2
b=4
d=1/2

$2 = 1 \longrightarrow O(\sqrt{n} log n)$

3.

$T(n) = 2T(n/4) + n$

a=2
b=4
d=1

$2 < 4 \longrightarrow O(n)$

4.

$T(n) = 2T(n/4) + n^2$

a=2
b=4
d=2

$2 < 16 \longrightarrow O(n^2)$