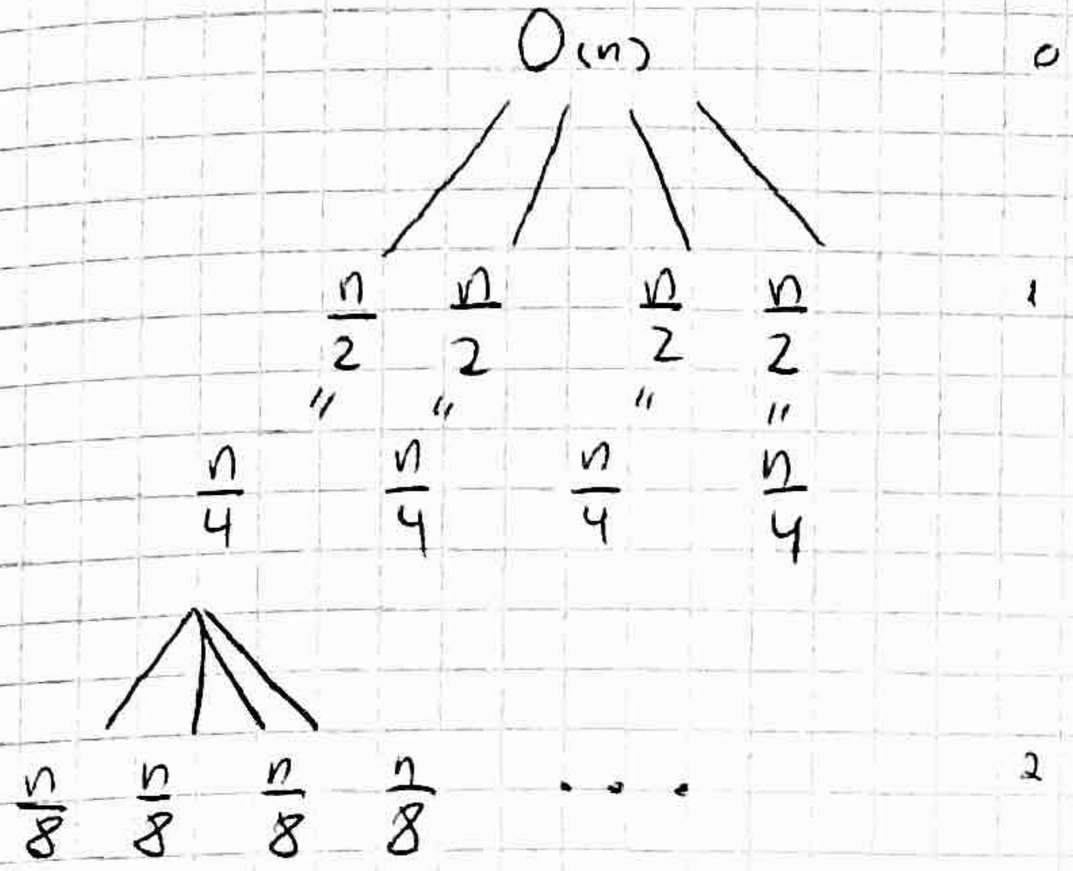
d) $T(n) = 4T(n/2) + O(n)$



0

1

2

$n = \log_4 n$

$O(n^{0.6\ldots})$

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

$a = 4$

$b = 2$

$f(n) = O(n)$

$O(n^{\log_b a - \varepsilon}) = O(n^{\log_2 4}) = O(n^2)$

$O(n) < O(n^2)$ so $f(n)$ polynomially smaller than $n^{\log_b a}$ $\Rightarrow T(n) = \Theta(n^2)$