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Problem Set 2

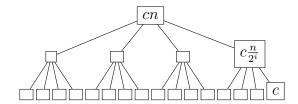
Problem Set 2

Name: Your Name

Collaborators: Name1, Name2

Problem 2-1.

(a)
$$T(n) = 4T(\frac{n}{2}) + O(n)$$



$$T(n) = \sum_{i=0}^{\log n} 4^i \frac{n}{2^i} = n \sum_{i=0}^{\log n} 2^i = n(2n-1) = \Theta(n^2)$$

(b)

$$T(n) = 3T(\frac{n}{\sqrt{2}}) + O(n^4) = \sum_{i=0}^{\log_{\sqrt{2}} n} 3^i (\frac{n^4}{4^i})$$
 (1)

$$=4n^{4}(1-(\frac{3}{4})^{\log_{\sqrt{2}}n+1})=O(n^{4})$$
(2)

(c)

$$T(n) = 2T(\frac{n}{2}) + 5nlogn = \sum_{i=0}^{logn} 2^{i} \frac{5nlogn}{2^{i}}$$
 (3)

$$=5nlogn(logn+1) = O(nlog^2n)$$
(4)

Problem Set 2

Problem 2-2.

- (a)
- (b)
- (c)

Problem Set 2 3

Problem 2-3.

Problem Set 2

Problem 2-4.

Problem Set 2 5

Problem 2-5.

- (a)
- (b)
- (c) Submit your implementation to alg. mit.edu. $\,$