ADS HW 4

Problem 4.2

a) $T(n) = 36T(n/6) + 2n$

tightest Upper bound $\Rightarrow O(n^{\log_b a})$ (By using Master Theorem)

$T(n) = O(n^{\log_6 36-\varepsilon}) = O(n^2)$ for $\varepsilon = 0.9 > 0$

tightest lower bound $\Rightarrow \Omega(n^{\log_b a}) = \Omega(n^{\log_6 36-\varepsilon})$

$T(n) = \Omega(n^2)$ for $\varepsilon = 0.9 > 0$

$f(n) < n^2$

$2n < n^2$ holds true

so $T(n) = \Theta(n^2)$

b) $T(n) = 5T(n/3) + 17n^{1.2}$

tightest upper bound $\Rightarrow O(n^{\log_b a})$ (By using Master Theorem)

$17n^{1.2} \leq n^{1.46}$ $T(n) = O(n^{\log_3 5-\varepsilon}) = O(n^{1.46})$

(n^1.2 is smaller than n^1.46)

for $\varepsilon = 0.2 > 0$.

$T(n) = \Omega(n^{\log_3 5}) = \Omega(n^{1.46})$