20041525

CS-340

Assignment 1

Example 2: a) given that

$$T(N) = o(f(N))$$

that implies

$$T(N) \leq c\, f(N) \quad \text{where } c \text{ is a constant.}$$

we also have

$$f(N) = \theta(g(N)) \quad \text{which implies}$$

$$c_1 g(N) \leq f(N) \leq c_2 g(N) \quad \text{where } c_1 < c_2.$$

So we can say that

$$T(N) < c_2 f(N)$$

$$\therefore T(N) < c\, f(N) \quad \text{where } c = c \times c_2$$

$$\text{i.e. } T(N) = o(g(N))$$

b) given that $T(N) = O(g(N))$

which implies to $0 \leq T(N) \leq c\, g(N)$

also $f(N) = o(g(N))$,

$$0 < f(N) < c\, g(N)$$

but $T(N) \neq \Omega(f(N))$

which implies we will not be comparing equations from left right.