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CS311 HW1

4-1)

a. $T(n) = 2T(n/2) + n^4 = \theta(n^4)$, master theorem case a < b^k, 2 < 2^4

b. $T(n) = T(7n/10) + n = \theta(n)$, master theorem case a < b^k, 1 < 10/7

c. $T(n) = 16T(n/4) + n^2 = \theta(n^2 \log(n))$, master theorem case a = b^k, 4^2=16

d. $T(n) = 7T(n/3) + n^2 = \theta(n^2)$, master theorem case a < b^k, 7 < 3^2

e. $T(n) = 7T(n/2) + n^2 = \theta(n^{\log_2(7)})$, master theorem case a > b^k, 7 > 2^2

f. $T(n) = 2T(n/4) + \sqrt{n} = \theta(\sqrt{n}\log(n))$, master theorem case a=$b^k$, 2 = $\sqrt{4}$

g. Using iteration : T(n) = n^2 +T(n - 2) + = n^2 +$(n-1)^2$ +T(n-3) = n^2 + $(n-1)^2$ + … + 1 + T(1) =

$$\sum_{i=1}^{n} i^2 + T(1) = \frac{n(n+1)(2n+1)}{6} + T(1) = \theta(n^3)$$