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DATE: PAGE:

1 $T(n) = 8T(n/2) + 1000n^2$

WKT $T(n) = aT(n/b) + f(n)$

$a = 8 ; b = 2 ; f(n) = cn^d$

$= 1000n^2$

$c = 1000, d = 2$

Since $a > b^d$

i.e $8 > 2^2$

using master theorem

$T(n) = \Theta(n^{\log_b a})$

$= \Theta(n^{\log_2 8})$

$= \Theta(n^{\log_2 2^3}) = \Theta(n^3)$

2 $T(n) = 2T(n/2) + n^2$

$a = 2 ; b = 2 ; c = 1 ; d = 2$

since $a < b^d$

$2 < 2^2$

$T(n) = \Theta(n^d)$

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

3 $T(n) = 2T(n/2) + 10n$

$a = 2, b = 2, c = 10, d = 1$

since $a = b^d$

$2 = 2^1$

using master theorem

$T(n) = \Theta(n^d \log n)$

$T(n) = \Theta(n \log n)$

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