

$$1) T(n) = 3T(n/2) + n^2$$

$$c_{crit} = \log_2 3 : T(n) = \theta(n^{\log_2 3})$$

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

$$2) T(n) = 7T(n/2) + n^2$$

$$c_{crit} = \log_2 7 : T(n) = \theta(n^{\log_2 7})$$

$$n^2 = O(n^{\log_2 7})$$

$$3) T(n) = 4T(n/2) + n^2$$

$$c_{crit} = \log_2 4 = 2 : T(n) = \theta(n^2 \log n)$$

$$n^2 = \theta(n^2 (\log n)^0)$$

$$4) T(n) = 3T(n/4) + n \log n$$

$$c_{crit} = \log_4 3 : T(n) = n \log n$$

$$\Omega(n) = n \log n$$

$$5) T(n) = 4T(n/2) + \log n$$

$$c_{crit} = \log_2 4 = 2 : T(n) = \theta(n^2)$$

$$\log(n) = O(n^2)$$

$$6) T(n) = T(n-1) + n$$

$$n \text{ operations } n \text{ times} : T(n) = \theta(n^2)$$

$$7) T(n) = 4T(n/2) + n^2 \log n$$

$$c_{crit} = 2 : T(n) = \theta(n^2 (\log n)^2)$$

$$n^2 \log n = \theta(n^2 (\log n)^1)$$

$$8) T(n) = 5T(n/2) + n^2 \log n$$

$$c_{crit} = \log_2 5 : T(n) = \theta(n^{\log_2 5})$$

$$n^2 \log n = O(n^{\log_2 5})$$

$$9) T(n) = 3T(n/3) + \frac{n}{\log n}$$

$$c_{crit} = 1 : T(n) = \theta(n)$$

$$\frac{n}{\log n} = \theta(n (\log n)^{-1})$$

doesn't apply

$$10) T(n) = 2T(n/4) + c$$

$$c_{crit} = \log_4 2 = 1/2 : T(n) = \theta(n^{1/2})$$

$$c = \theta(n^{1/2})$$

$$11) T(n) = T(n/4) + \log n$$

$$c_{crit} = \log_4 1 = 0 : T(n) = \theta(\log^2 n)$$

$$\log n = \theta(1 \log n)$$

$$12) T(n) = T(n/2) + T(n/4) + n^2$$

Doesn't apply

$$13) T(n) = 2T(n/4) + \log n$$

$$c_{crit} = \log_4 2 = 1/2 : T(n) = \theta(n^{1/2})$$

$$\log n = O(n^{1/2})$$

$$14) T(n) = 3T(n/3) + n \log n$$

$$c_{crit} = \log_3 3 = 1 : T(n) = \theta(n \log^2 n)$$

$$n \log n = \theta(n \log n)$$

$$15) T(n) = 8T((n-\sqrt{n})/4) + n^2$$

Master theorem doesn't apply

$$16) T(n) = 2T(n/4) + \sqrt{n}$$

$$c_{crit} = \log_4 2 = 1/2 : T(n) = \theta(n^{1/2} \log n)$$

$$n^{1/2} = \theta(n^{1/2})$$

$$17) T(n) = 2T(n/4) + n^{.51}$$

$$c_{crit} = \log_4 2 = 1/2 : T(n) = \theta(n^{.51})$$

$$n^{.51} = \Omega(n^{.501})$$

$$18) T(n) = 16T(n/4) + n!$$

$$c_{crit} = \log_4 16 = 4 : T(n) = \theta(n!)$$

$$n! = \Omega(n^5)$$