

Master theorem - Dividing function

$$T(n) = aT(n/b) + f(n) \\ = aT(n/b) + n^k \log n^p$$

pre-requisite for cases:

(1) $\log_b a$, k , p

eg. $2T(n/2) + n \log^2 n$

$$\log_b^a = \log_2^2 = 1; k=1; p=2$$

Case 1: $\log_b^a > k$

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

eg. Case 1: $4T(n/2) + n \log^2 n$

$$\log_b^a = \log_2^4 = 2; k=1$$

$$\text{i.e. } \log_b^a > k$$

$$\Theta(n) = n^{\log_b^a} = \underline{\underline{n^2}}$$

Note: whenever \log_b^a is greater than k ,
 $\Theta(n)$ will not depend on $f(n)$.