Master Theorem for Dividing Functions

$$\boldsymbol{T(n) = aT\left(\frac{n}{b}\right) + f(n)}, a \geq 1 \text{ and } b > 1$$
$$f(n) = \theta(n^k(\log n)^{p+1})$$

Case 1: $if\ log_b\ a > k, then\ \boldsymbol{\theta\left(n^{\log_b a}\right)}$

Case 2: $if\ \log_b a = k, then$

$if\ p > -1, \boldsymbol{T(n) = \theta\left(n^k(\log n)^{p+1}\right)}$

$if\ p = -1, \boldsymbol{T(n) = \theta\left(n^k \log\log n\right)}$

$if\ p < -1, \boldsymbol{T(n) = \theta\left(n^k\right)}$

Case 3: $if\ \log_b a < k, then$

$if\ p \geq 0, \boldsymbol{T(n) = \theta\left(n^k(\log n)^p\right)}$

$if\ p < 0, \boldsymbol{T(n) = \theta\left(n^k\right)}$

Master Theorem for Decreasing Functions

$$\boldsymbol{T(n) = aT(n-b) + f(n)}, a > 0 \text{ and } b > 0$$
$$f(n) = \theta(n^k)$$

Case 1: if a < 1, $T(n) = \boldsymbol{O\left(n^k\right)}$

Case 2: if a = 1, $T(n) = \boldsymbol{O\left(n^{k+1}\right) = O(n \cdot f(n))}$

Case 3: if a > 1, $T(n) = \boldsymbol{O\left(n^k \cdot a^{n/b}\right)}$