$\boldsymbol{Divide\ And\ Conquer -}$
$\boldsymbol{Continuous\ Master\ Theorem\ or}$
$\boldsymbol{Generalized\ Master\ Theorem}$
$\boldsymbol{-Introduction}$

$\boldsymbol{A\ generalized\ version\ of\ the\ Akra - Bazzi\ theorem}$
$\boldsymbol{has\ been\ given\ as\ follows}$:

$$T(n) = \begin{cases} d & n \le n_0 \\ \\ aT\left(\dfrac{n}{b}\right) & n > n_0 \end{cases}$$

$\boldsymbol{and\ a \ge 1, b > 1, n_0 \ge 1, d > 0\ and\ f(n)\ is\ positive\ for}$
$\boldsymbol{n > n_0\ , or}$

$\boldsymbol{Let\ a > 0\ and\ b > 1\ be\ constants, and\ let\ numbers\ n \ge 1.}$
$\boldsymbol{Then\ the\ recurrence}$:

$$T(n) = \begin{cases} \Theta(1) & if\ 0 \le n < 1 \\ \\ \mathrm{aT}\left(\dfrac{\mathrm{n}}{\mathrm{b}}\right) + f(n) & if\ n \ge 1 \end{cases}$$

$Then\ the\ asymptotic\ behavior\ of\ T(n)\ can\ be$
$characterized\ as\ follows$:

1. $If\ there\ exists\ a\ constant\ \varepsilon > 0\ such\ that$
$f(n) = O\left(n^{log_b a-\varepsilon}\right), then\ T(n) = \Theta\left(n^{log_b a}\right).$

2. $If\ there\ exists\ a\ constant\ k \geq 0\ such\ that$
$f(n) = \Theta\left(n^{log_b a} log^k n\right), then\ T(n) = \Theta\left(n^{log_b a} log^{k+1} n\right).$

3. $If\ there\ exists\ a\ constant\ \varepsilon > 0\ such\ that$
$f(n) = \Omega\left(n^{log_b a+\varepsilon}\right), and\ if\ f(n)\ additionally$
$satisfies\ the\ regularity\ condition$
$af\left(\frac{n}{b}\right) \leq cf(n)\ for\ some\ constant\ c < 1\ and$
$all\ sufficiently\ large\ n, then\ T(n) = \Theta\left(f(n)\right).$

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