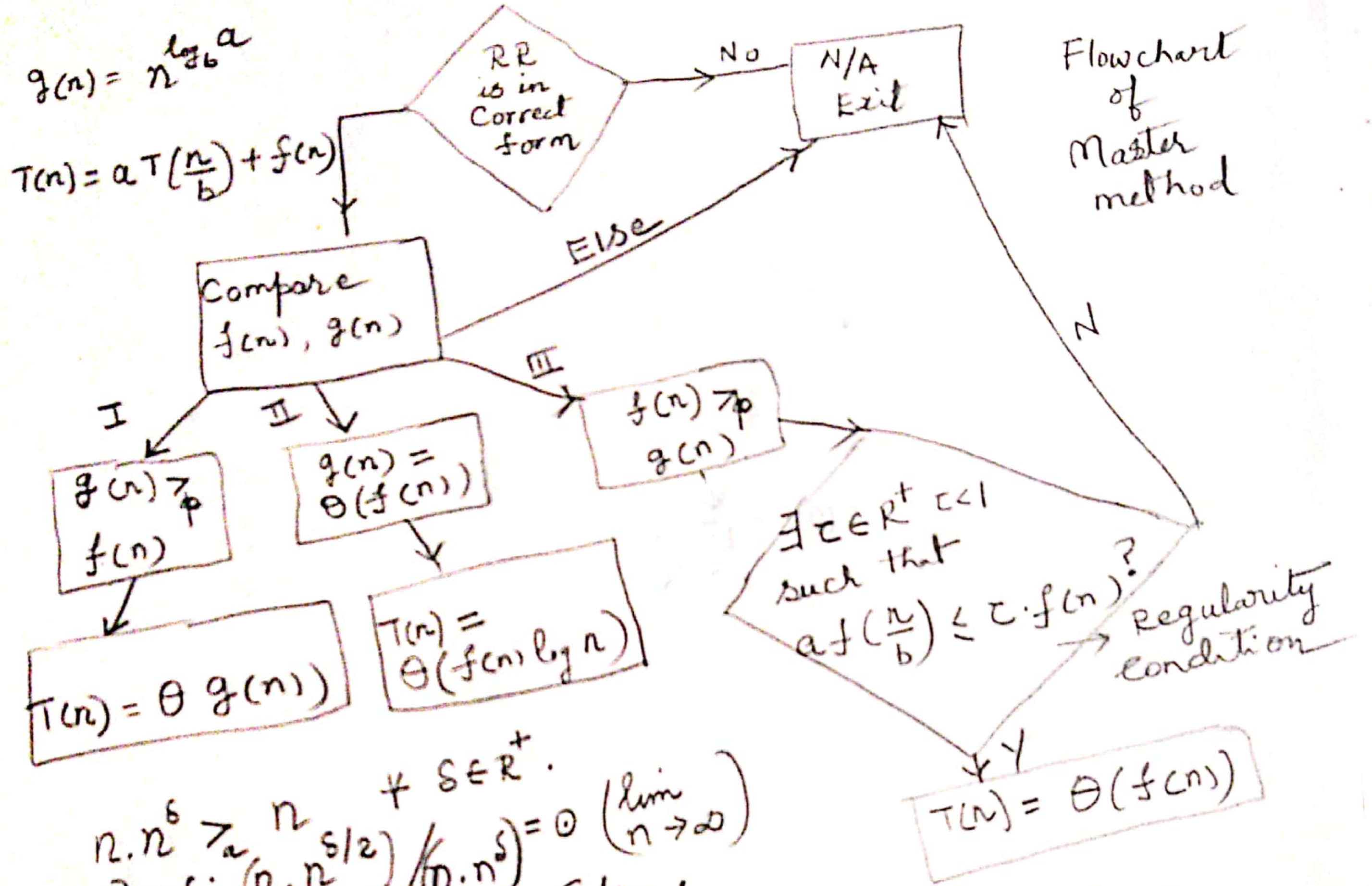

$n.n^{\delta} >_a n \quad \forall\, \delta \in \mathbb{R}^+$.

Note: Proof: $(n.n^{\delta/2}) / (n.n^{\delta}) = 0 \ (\lim_{n \to \infty})$

I.E. we choose $\epsilon = \delta/2$.

$\delta > 0 \to \epsilon > 0$ ▨

Examples. (i) $T(n) = T(n-4) + n^2$. N/A wrong form

(ii) $T(n) = 5T(n/2) + \underset{f(n)}{n^2}$. $g(n) = n^{\log_2 5}$. Clearly $g(n) >_p n^2$ Case (I)

$\therefore T(n) = \Theta(g(n))$

(ii) $T(n) = 4T(n/2) + n^2$ $g(n) = f(n) = \Theta(n^2)$ $\therefore T(n) = \Theta(n^2 \log n)$ (Case II)

(iii) $T(n) = 4T(n/2) + n^3$ $g(n) = n^{\log_2 4} = n^2$. $f(n) >_p g(n)$.

Does $\exists\ 0 < c < 1$ s.t $4(\frac{n}{2})^3 \le cn^3$

$\Rightarrow \frac{4}{8} n^3 \le cn^3 \Rightarrow \frac{1}{2} \le c$. Any $c \in [\frac{1}{2}, 0)$ will do, e.g $c = 1/2$.

half-open interval

Thus, $T(n) = \Theta(n^3)$ Case III.