INSTITUTE OF COMPUTER TECHNOLOGY

B-TECH COMPUTER SCIENCE ENGINEERING 2025-26

SUBJECT:-ALGORITHM ANALYSIS & DESIGN

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BRANCH: CYBER SECURITY

BATCH: 52

ASSIGNMENT_1

✳ Master's Theorem.

$$T(n) = a\,T(n/b) + \theta(n^K \log^P n)$$

$a \geq 1$, $b \geq 1$, $K \geq 0$ and P is real number

i) if $a > b^K$, then $T(n) = \theta\left(n^{\log_b a}\right)$

ii) if $a = b^K$

    a) if $P > -1$, then $T(n) = \theta\left(n^{\log_b a} \log^{P+1} n\right)$

    b) if $P = -1$, then $T(n) = \theta\left(n^{\log_b a} \log\log n\right)$

    c) if $P < -1$, then $T(n) = \theta\left(n^{\log_b a}\right)$

iii) if $a < b^K$

    a) if $P \geq 0$, then $T(n) = \theta(n^K \log^P n)$

    b) if $P < 0$, then $T(n) = \theta(n^K)$