

$$T(n) = aT(n/b) + f(n)$$

$$= a(aT(n/b^2)) + f(n/b) + bn$$

$$= a^2T(n/b^2) + af(n/b) + f(n)$$

$$= a^3T(n/b^3) + a^2f(n/b^2) + af(n/b) + f(n)$$

$$= \dots$$

$$= a^{\log_b n} T(1) + \sum_{i=0}^{(\log_b n)-1} a^i f(n/b^i)$$

$$= n^{\log_b a} T(1) + \sum_{i=0}^{(\log_b n)-1} a^i f(n/b^i)$$