

Algoritma Analizinde Kullanışlı Formüller

1 Logaritma Özellikleri

$$\log_a 1 = 0 \quad (1)$$

$$\log_a a = 1 \quad (2)$$

$$\log_a x^y = y \log_a x \quad (3)$$

$$\log_a xy = \log_a x + \log_a y \quad (4)$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y \quad (5)$$

$$a^{\log_b x} = x^{\log_b a} \quad (6)$$

$$\log_a x = \frac{\log_b x}{\log_b a} = \log_a b \log_b x \quad (7)$$

2 Kombinasyon ile İlgili

1. n-elemanlı bir kümenin permütasyon sayısı $P(n) = n!$
2. n-elemanlı kümenin k-kombinasyon sayısı $C(n, k) = \frac{n!}{k!(n-k)!}$
3. n-elemanlı bir kümenin alt küme sayısı: 2^n

3 Önemli Toplam Formülleri

$$\sum_{i=l}^u = \underbrace{1 + 1 + \dots + 1}_{u-l+1 \text{ defa}} = u - l + 1 \quad (1, u \text{ tamsayı sınırlar, } l \leq u); \sum_{i=1}^n 1 = n \quad (8)$$

$$\sum_{i=1}^n i = 1 + 2 + \dots + n = \frac{n(n+1)}{2} \approx \frac{1}{2}n^2 \quad (9)$$

$$\sum_{i=1}^n i^2 = 1^2 + 2^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6} \approx \frac{1}{3}n^3 \quad (10)$$

$$\sum_{i=1}^n i^k = 1^k + 2^k + \dots + n^k \approx \frac{1}{k+1}n^{k+1} \quad (11)$$

$$\sum_{i=0}^n a^i = 1 + a + \dots + a^n = \frac{a^{n+1} - 1}{a - 1} (a \neq 1); \sum_{i=0}^n 2^i = 2^{n+1} - 1 \quad (12)$$

$$\sum_{i=1}^n i2^i = 1 \cdot 2 + 2 \cdot 2 + \dots + n2^n = (n-1)2^{n+1} + 2 \quad (13)$$

$$\sum_{i=1}^n \frac{1}{i} = 1 + \frac{1}{2} + \dots + \frac{1}{n} \approx \ln n + \gamma, \gamma \approx 0.5772 \dots (\text{Euler sabiti}) \quad (14)$$

$$\sum_{i=1}^n \lg i \approx n \lg n \quad (15)$$

4 Toplam Değişiklik Kuralları

$$\sum_{i=l}^u ca_i = c \sum_{i=l}^u a_i \quad (16)$$

$$\sum_{i=l}^u (a_i \pm b_i) = \sum_{i=l}^u a_i \pm \sum_{i=l}^u b_i \quad (17)$$

$$\sum_{i=l}^u a_i = \sum_{i=l}^m a_i + \sum_{i=m+1}^u a_i, \quad l \leq m \leq u \quad (18)$$

$$\sum_{i=l}^u (a_i - a_{i-1}) = a_u - a_{l-1} \quad (19)$$