CMSC 250

Discrete Structures

Exam 2 Review

Summations

- What is next in the series … $4, \frac{9}{4}, \frac{16}{9}, \frac{25}{16}, \_\_\_\_\_$
- General formula for a series $a_k = \frac{(k+1)^2}{k^2}, \quad k \geq 1$
- Identical series $a_k = \frac{k}{k+1}, \; k \geq 1 \quad b_i = \frac{i-1}{i}, \; i \geq 2$
- Summation and product notation $\sum_{k=1}^{6} 2^k \qquad \prod_{k=1}^{5} 2k$
- Properties (splitting/merging, distribution)
- Change of variables $\sum_{k=0}^{6} \frac{1}{k+1} = \sum_{j=1}^{7} \frac{1}{j} = \sum_{k=1}^{7} \frac{1}{k}$
- Applications (indexing, loops, algorithms)

Properties

- Merging and Splitting

$$\sum_{k=m}^{n} a_k + \sum_{k=m}^{n} b_k = \sum_{k=m}^{n} (a_k + b_k)$$

$$\sum_{k=m}^{n} a_k = \sum_{k=m}^{i} a_k + \sum_{k=i+1}^{n} a_k$$

$$\left[\prod_{k=m}^{n} a_k\right] \cdot \left[\prod_{k=m}^{n} b_k\right] = \prod_{k=m}^{n} (a_k \cdot b_k)$$

$$\prod_{k=m}^{n} a_k = \left[\prod_{k=m}^{i} a_k\right] \cdot \left[\prod_{k=i+1}^{n} a_k\right]$$

- Distribution

$$c \cdot \sum_{k=m}^{n} a_k = \sum_{k=m}^{n} (c \cdot a_k)$$