

CSC311 Tutorial 1

$$\sum_{i=1}^{n^2} i = 1 + 2 + 3 + \dots + n^2$$

$$= \frac{n^2 (n^2 + 1)}{2}$$

$$\sum_{i=1}^n \sum_{j=1}^{n+1} j = \sum_{i=1}^n \frac{(n+i)(n+i+1)}{2}$$

$$= \frac{1}{2} \sum_{i=1}^n (n^2 + 2in + i^2 + n + i)$$

$$= \frac{1}{2} [n^3 + 2n \sum_{i=1}^n i + \sum_{i=1}^n i^2 + n^2 + \sum_{i=1}^n i]$$

$$= \frac{1}{2} \left[n^3 + 2n \cdot \frac{n(n+1)}{2} + \frac{n(n+1)(2n+1)}{6} + n^2 + \frac{n(n+1)}{2} \right]$$

$$= \left[n^3 + n^2(n+1) + \frac{n(n+1)(2n+1)}{6} + n^2 + \frac{n(n+1)}{2} \right]$$

$$= \frac{1}{2} \left[n^3 + n^3 + n^2 + \frac{1}{6}(2n^3 + 3n^2 + n) + n^2 + \frac{1}{2}(n^2 + n) \right]$$

$$= \frac{1}{2} \left[\frac{7}{3}n^3 + 3n^2 + \frac{2}{3}n \right]$$

$$= \frac{n}{2} \left[\frac{7}{3}n^2 + 3n + \frac{2}{3} \right]$$