CS 240: Data Structures and Data Management **Fall 2024**

Tutorial 01: Sep 13

1. **Θ-notation**

   Prove from first principles that $n^3 \in \Theta(4n^3 - 3n^2 + 2n - 1)$.

2. **Little-o**

   (a) Prove from first principles that $\frac{1}{n} \in o(1)$.

   (b) Prove from first principles that $2000n^2 \in o(n^n)$.

3. **Relationships between order-notations**

   Assume f and g are positive functions. Disprove following statement using definitions of order notations.

   There exists $f(n)$ and $g(n)$ such that $f(n) \in o(g(n))$ and $f(n) \in \omega(g(n))$