COMP-4540/8540
Design and Analysis of Algorithms

Winter 2025

Assignment 1

Due Date: February 4 (before 11:59p.m.)

1. Prove that $n! \in o(n^n)$ using the definition of o-notation.

2. Prove or disprove: $\Theta(n) - \Theta(n-1) = \Theta(1)$.

3. Prove that $\sum_{k=1}^{n} \frac{1}{2k-1} = O(\lg \sqrt{n})$. [**Hint:** $\sum_{k=1}^{n} \frac{1}{k} = \ln n + \gamma + \frac{1}{2n} + o(\frac{1}{n})$.]

4. To be posted

5. To be posted

6. To be posted