CSCE 750, Fall 2021, Assignment 1
Due August 31

September 1, 2021

This assignment covers material from the lectures on Chapters 1–3 and Appendix A, in preparation for Quiz 1.

Let $x \in \mathbb{R}$ be any real number. Recall that $\lfloor x \rfloor$ (the *floor* of x) is the greatest integer not exceeding x and that $\lceil x \rceil$ (the *ceiling* of x) is the least integer not less than x. Thus $\lfloor x \rfloor$ and $\lceil x \rceil$ are the unique integers satisfying

$$x - 1 < \lfloor x \rfloor \leq x \leq \lceil x \rceil < x + 1 \; .$$

Exercises

Page 22 Exercise 2.1-2

Pages 41–42 Problem 2-4

Pages 52–53 Exercises 3.1-1, 3.1-2 (note that b need not be an integer, and a need not be positive), 3.1-3, 3.1-4

(not in the textbook) Give an example of two functions $f(n)$ and $g(n)$, both eventually positive, for which $f(n) \notin O(g(n))$ and $g(n) \notin O(f(n))$. Prove that your answer is correct. [This shows that the eventually positive functions cannot be totally ordered by asymptotic growth rate.]

Page 1149 Exercises A.1-1, A.1-3 (Hint: Start with Equation A.8, then differentiate both sides.), A.1-7

Page 1156 Exercises A.2-1, A.2-2, A.2-4