CSCE 222 Discrete Structures for Computing – Fall 2023
Hyunyoung Lee

Problem Set 3

Due dates: Electronic submission of *yourLastName-yourFirstName-hw3.tex* and *yourLastName-yourFirstName-hw3.pdf* files of this homework is due on **Friday, 9/29/2023 11:59 p.m.** on `https://canvas.tamu.edu`. You will see two separate links to turn in the .tex file and the .pdf file separately. Please do not archive or compress the files. **If any of the two files are missing, you will receive zero points for this homework.**

Name: Kevin Lei **UIN: 432009232**

Resources. (All people, books, articles, web pages, etc. that have been consulted when producing your answers to this homework)

On my honor, as an Aggie, I have neither given nor received any unauthorized aid on any portion of the academic work included in this assignment. Furthermore, I have disclosed all resources (people, books, web sites, etc.) that have been used to prepare this homework.

Electronic signature: **Kevin Lei**

Total $100 + 10$ (bonus) points.

The intended formatting is that this first page is a cover page and each problem solved on a new page. You only need to fill in your solution between the `\begin{solution}` and `\end{solution}` environment. Please do not change this overall formatting.

Checklist:
- ☐ Did you type in your name and UIN?
- ☐ Did you disclose all resources that you have used? (This includes all people, books, websites, etc. that you have consulted.)
- ☐ Did you sign that you followed the Aggie Honor Code?
- ☐ Did you solve all problems?
- ☐ Did you submit both the .tex and .pdf files of your homework to each correct link on Canvas?

Problem 1. (20 points) Section 3.4, Exercise 3.26. [Hint: Use the definition of set difference, the distributive laws, and de Morgan's laws involving the set complement. Starting from the right side of the equal sign may be easier.]

Solution.

Problem 2. (20 points) Section 3.5, Exercise 3.33. [Hint: To show two sets S_1 and S_2 are equal ($S_1 = S_2$), you need to show that (1) $S_1 \subseteq S_2$ *and* (2) $S_2 \subseteq S_1$. Here, for each direction, you need to argue based on the definition of $\subseteq$.]

Solution.

Problem 3. (20 points) Section 3.6, Exercise 3.37. *Justify your answers.*

Solution.

Problem 4. (30 points) Section 3.9, Exercise 3.60. Proving your function is bijective by showing that it is injective and surjective is required. [Hint: Define a bijective function $f\colon \mathbf{N}_0 \to \mathbf{Z}$ by considering the argument being even or odd. Then prove that your function is indeed bijective by showing that it is injective and surjective.]

Solution.

Problem 5. (20 points) Section 5.1, Exercise 5.4.

Solution.