Homework 0 – Due Thursday, January 25, 2024 at 11:59 PM

Problems

1. Sign up on piazza at `www.piazza.com/bu/fall2024/cs332`.

2. Sign up as a student on Gradescope at `www.gradescope.com`, with course entry code **7DNP62**. Use your **BU email ID** to sign up on Gradescope.

3. Read and sign the Collaboration and Honesty Policy and submit it on Gradescope. We will be able to grade your homework only after you hand this in.

4. Check out the following links and resources:

   (a) Course webpage: `https://cs-people.bu.edu/mbun/courses/332_S24/`;

   (b) Math & algorithms review: `https://cs-people.bu.edu/mbun/courses/332_S24/handouts/mathreview.pdf`;

   (c) Supplementary textbook to review proof techniques:
      Richard Hammack. *Book of Proof*: `http://www.people.vcu.edu/~rhammack/BookOfProof/`

Reminder   Collaboration is permitted, but you must write the solutions *by yourself without assistance*, and be ready to explain them orally to the course staff if asked. You must also identify your collaborators and write "Collaborators: none" if you worked by yourself. Getting solutions from outside sources such as the Web or students not enrolled in the class is strictly forbidden. Collaboration is not allowed on problems marked "INDIVIDUAL."

5. (**Review of Sets and Functions**) For a natural number n, let $[n]$ denote the set $\{1, 2, 3, \ldots, n - 1, n\}$.

   (a) What is $[n] \cap [n + 1]$?

   (b) What is $[n] \cup [n + 1]$?

   (c) Is there an surjective (onto) function from $[n + 1]$ to $[n]$? Prove your answer.

   (d) Is there an injective (one-to-one) function from $[n + 1]$ to $[n]$? Prove your answer.

6. (**Review of Logic**) Consider the following statement: "If mirrors are real, then our eyes are real."

   (a) What is the negation of this statement?

   (b) What is the converse of this statement?

   (c) What is the contrapositive of this statement?