CS 1800 **Exam #2 (Study Guide)** **Spring 2024**

Name _____

Instructions:

- This exam follows the procedures spelled out in your syllabus. That is, this exam is **closed book, closed internet, closed fellow students.** However, you may use any **handwritten** notes (of your creation) in your notebook.
- The exam consists of 7 questions. You will be asked to complete them ONE PER PAGE on provided paper and staple them together, in order, upon completion.
- Scores will be awarded based on your explicit answers. Show your work where appropriate.
- There is a 50-minute time limit.

1. Prove that $n^2 \leq 2^n$ for integers $4 \leq n \leq 7$. **(Proof by Exhaustion).**

2. Prove that the sum of two integers is always greater than both integers. **(Proof by counterexample).**

3. Prove that if x and y are both odd integers then 2x+4y is an even integer **(Direct Proof).**

4. Prove that if integer p is odd then p+4 is odd. **(Direct Proof).**

5. Prove that for every integer x, if $x^2 - 2x + 7$ is even, then x is odd. **(Proof by contrapositive).**

6. Prove that if 8 students eat 50 slices of pizza that at least one student ate more than 6 slices of pizza. **(Proof by contradiction).**

7. Prove that if n is an integer, then $| x - 5 | - x > -6$ **(Proof by cases).**