CSCI 3322 (Principles of Algorithms), Fall 2022
Reading Quiz 2

Credit: 17.5 points.

1 Reading

Be sure you have read, or at least skimmed, Chapter 3 of the textbook. (Be advised that a few of the questions below are based on sections of this chapter that are meant to be review of math you have likely seen before, and if you already remember it you may find the questions easy.)

2 Instructions

Answer the questions below using *only* the readings for the course — no Web searches. It's okay to talk to classmates about this assignment as you usually do, *but* I want each person to at least skim all the reading. Include the Honor Code pledge in what you turn in, either the full pledge or just the word "pledged". For these quizzes by doing this you are also saying you have at least attempted all the reading it covers.

   Please put the pledge in the same document as your answers, so I don't overlook it, and please be sure to include your name somewhere in the file, so when I print it for grading I know whose work it is.

   You may write out your answers by hand and scan them, or you may use a word processor or other program, but please submit PDF or plain text in the "turn-in" folder I have set up for you on Google Drive. (So, no word-processor files and no links to other Google Docs.)

3 Questions

1. (2.5 points) Why is it not correct to say that insertion sort's running time is $\Theta(n^2)$?

2. (2.5 points) What does it mean to say that function $f(n)$ is monotonically increasing? monotonically decreasing?

3. (2.5 points) What does it mean to say that $a = b(\mod n)$?

4. (2.5 points) Express each of the following in a way that involves only one exponentiation operation. (So for example, $a^2 \cdot a^3$ involves two exponentiations, but $a^{2 \cdot 3}$ involves only one.)

   - $c^m \cdot c^n$
   - $\frac{c^m}{c^n}$

5. (2.5 points) Express each of the following in a way that involves only one use of log.

   - $\log_c a + \log_c b$
   - $\log_c a - \log_c b$

6. (2.5 points) What is meant by $\ln^k n$?

7. (2.5 points) Why do we not care much about the base of a logarithm in computing order of growth of a function?