# COMPSCI 250 Spring 2019 - Homework 3

Due: Thursday March 7 at 11:59 pm in Gradescope

This assignment has 100 points plus 10 extra credit. The number in parentheses after each problem is its point value.

Please submit a single PDF file, with the problems in order (as below), and legible. Look at your PDF before submitting it – it is fine to scan or photograph a handwritten document but it the graders can't read it, they won't grade it.

Please assign pages to problems in Gradescope. Graders will click on the problem number. If no page shows up because it's not assigned, the assumption is you have not solved the problem.

Be sure you are doing Problems in the book and not Exercises: the numbers should start with P rather than E.

You are responsible for following the academic honesty guidelines on the Grading and Requirements page. This means that what you present must be your own work in presentation, and you must acknowledge all sources of aid other than course staff and the textbook.

P3.1.5 (10)

P3.3.2 (15)

P3.3.N (10) Show that if $p$ and $q$ are distinct primes, there are exactly $p+q-2$ positive naturals that are less than $pq$ and not relatively prime with $pq$.

P3.5.3 (10)

P3.6.5 (10XC)

P4.1.5 (10)

P4.3.3 (5)

P4.3.5 (10)

P4.3.N (10). For $n > 1$, let $S_n = \sum_{k=2}^{n} \frac{1}{(k-1)k(k+1)}$. Find and prove by induction a formula that expresses $S_n$ in terms of $n$.

P4.4.1 (10)

P4.5.N (10) (See Excursion 4.5). Prove, by strong induction on all naturals $n$, that the Fibonacci number $F(n)$ is equal to $\frac{1}{\sqrt{5}}[(1+\phi)^n - (-\phi)^n]$, where $\phi = \frac{\sqrt{5}-1}{2}$.