Assignment 6 - Inductive Proofs

CS 234

due March 17, 11:59pm *

0 Introduction

This assignment is to be completed individually, but feel free to collaborate according to the course's external collaboration policy (which can be found in the syllabus).

The deliverables consist of one `.pdf` file and one `.py` file. The deliverables should be submitted electronically to by the deadline. Put any attribution text in the `.pdf` file. You may also consider adding an experience report to the `.pdf` describing your experience with the assignment: how long did it take, how hard/fulfilling was it, etc.

Your `.pdf` file should be named like `FLast_cs234_aX.ext` where `F` is your first initial, `Last` is your last name, `X` is the assignment number, and `ext` is the appropriate file extension. For example, Joan Moschovakis's `.pdf` file should be given the name `JMoschovakis_cs234_a6.pdf`. (Joan Moschovakis is researcher in constructive/computable logic and mathematics. She has studied advanced forms of induction like bar induction!)

*The last 2 exercises may be turned in on March 24 11:59pm instead.

1 The Only Part – Proofs on Paper

Please complete the following exercises from the textbook in your `.pdf` submission. Clearly label your responses with the exercise number.

This part is worth all **100 points**.

- 8.5
- 8.12 (Pseudocode is sufficient for the code part, as is a screenshot of real code. But please make sure you actually use recursion to accomplish the given task. And please make sure you actually still provide the proof!)
- 8.29
- The n^{th} Fibonacci number is given by $F(n)$, which is defined by the following recursive recurrence equation:

$$F(n) = \begin{cases} 0 & n = 0 \\ 1 & n = 1 \\ F(n-1) + F(n-2) & n \geq 2 \end{cases}$$

  For this task, show that $F(n+1) \geq 1.5 \cdot F(n)$ for all $n \geq 2$.
- 9.3
- 9.12