ICS 6D Winter 2017 **Due: Wednesday, Jan 25, 2017, 1:45PM**

Homework 2

Instructor: Sandy Irani

Covers sections 8.1-8.4

Written Homework

zyBook Exercises are labeled in the text with an "E" in the title bar. You do not have to copy the questions for any of the written homework in your solutions that you turn in.

For the induction proofs in this week's homework, it is important that you label the base case and the inductive step. It is also important that you begin the inductive step with a clear statement about what you are assuming and what you will prove. In the actual derivation in the inductive step, you need to label where you are using the inductive hypothesis. Please refer to the examples in the zyBook for the correct format.

1) zyBook exercise 8.1.1, parts c, f, g, h, i
2) zyBook exercise 8.3.1, parts c, d, g, h
3) Express the following sums using summation notation:
   (a) $(-3) + (-2) + (-1) + 0 + 1 + 2 + 3 + 4$
   (b) $3^4 + 3^5 + 3^6 + 3^7 + 3^8 + 3^9$
   (c) $2^3 + 3^4 + 4^5 + 5^6 + 6^7 + 7^8$
   (d) The sum of the cubes of the first 12 positive integers
   (e) The sum of the cubes of the even integers between 1 and 99
4) zyBook exercise 8.4.1
5) zyBook exercise 8.4.2, Part a
6) zyBook exercise 8.4.2. Part c
7) For any $n \geq 1$, the factorial function, denoted by $n!$ is the product of all the positive integers through n:
   $$n! = 1 \cdot 2 \cdot 3 \cdots (n-1) \cdot n$$
   Prove that for $n \geq 7$, $n! \geq 3^n$.
8) Prove that for $n \geq 4$, $3^n > n^3$.
9) zyBook exercise 8.5.1, Part a
10) zyBook exercise 8.5.1. Part b
11) zyBook exercise 8.5.2, Part a
12) zyBook exercise 8.5.2. Part b

There are no challenge activities for this homework assignment.