CS180 Homework 1

Due 4/17 at 11:59PM

1. Exercise 3, Page 22 (TV show scheduling of two TV networks)
    1. If stability is possible, provide an algorithm with corresponding proof and time complexity analysis.
    2. If stability is not always possible, provide a counterexample with at least N=3 shows per network.
2. Exercise 4, on Page 22 (Assigning medical residents to hospitals)
3. Exercise 6 on page 25 (Maintenance scheduling of shipping company)
4. Exercise 4 on page 67. (List the functions in ascending order of growth rate) For the ranked functions provide a brief (1 sentence) explanation

   of why each function is Big O of the next function.
5. Using induction:

   a. Prove that sum of the first n integers (1+2+....+n) is n(n+1)/2.
   b. Find what the sum of $1^2+2^2+3^2+...+n^2=?$ is equal to. HINT: the result above is a factor for this part's solution.
6. Given an array A of size N. The elements of the array consist of positive integers. You have to find the SMALLEST element with MINIMUM frequency. For example:

   Example:

   Input:

   N=5, A=[0 0 5 50 1]

   Output:

   1

   Explanation:

   All values have frequency 1 except the values 0. 1 is the smallest element with minimum frequency.