Pledge: I (we) have not received unauthorized aid on this assignment. I (we) understand the answers that I (we) have submitted. The answers submitted have not been directly copied from another source, but instead are written in my (our) own words.

1. [10 points] Why is the following argument wrong?
   “We have shown that \( n - 1 \) comparisons are necessary to find the maximum of \( n \) values. By symmetry, \( n - 1 \) comparisons are necessary to find the minimum. Therefore, \( 2n - 2 \) comparisons are necessary to find the minimum and maximum.

2. [25 points] Give closed-form solutions for the following full-history recurrences. Be sure to explain why your closed-form solution is correct.
   (a) 
   \[
   f(n) = \begin{cases} 
   1 & n = 1 \\
   \sum_{i=1}^{n-1} f(i) + 1 & n > 1 
   \end{cases}
   \]
   
   (b) 
   \[
   f(n) = \begin{cases} 
   1 & n = 1 \\
   \sum_{i=1}^{n-1} f(i) + n & n > 1 
   \end{cases}
   \]
   
   (c) 
   \[
   f(n) = \begin{cases} 
   1 & n = 1 \\
   \sum_{i=1}^{n-1} if(i) + 1 & n > 1 
   \end{cases}
   \]

3. [15 points] Given a list of \( n \) elements, an element of the list is a majority if it appears more than \( n/2 \) times. Design an algorithm that is linear in the number of element-element comparisons in the worst case that will find a majority if one exists, and report that there is no majority if no such element exists.