

Homework 2: assigned 10/14, LATEST due date 10/21 9 am (all pacific times)

All exercises that require an algorithm:

Write the algorithm in bullet form

Prove the correctness of your algorithm in bullet form

Analyze its time complexity

Justify the correctness of your time complexity

1. Exercise 8 b on Page 70 “You’re doing some stress testing ...”
2. Exercise 5 on Page 108 “A binary tree is a rooted tree”
3. Exercise 7 on page 108 “Some friends of yours work on wireless networks....”
4. Exercise 10 on page 110 “A number of art museums around the country”
5. Suppose that you are given an algorithm as a blackbox. You cannot see how it is designed. The blackbox has the following properties: If you input any sequence of real numbers, and an integer k , the algorithm will answer YES or NO indicating whether there is a subset of the numbers whose sum is exactly k . Show how to use this blackbox to find the subset whose sum is k , if it exists.

You should use the blackbox $O(n)$ times (where n is the size of the input sequence).
6. An array of n elements contains all but one of the integers from 1 to $n+1$.
 - a. Give the best algorithm you can for determining which number is missing if the array is sorted, and analyze its asymptotic worst-case running time.
 - b. Give the best algorithm you can for determining which number is missing if the array is not sorted, and analyze its asymptotic worst-case running time.