

Math 382

Homework 3

Due Friday, February 19

For each of the functions below, give an algorithm for computing the function and analyze its running time. Any correct and correctly-analyzed algorithm will get substantial credit, but each of these problems have multiple possible solutions. The faster your algorithm, the more credit you will get for the problem.

1. $\text{SUM2}(A, t)$ is a function that takes as input an array A of numbers and a target number t . The output should be a boolean equal to “true” if there are two (distinct) numbers in A whose sum is t and “false” otherwise.
2. $\text{BETWEEN}(A, x, y)$ is a function that takes as input a *sorted* array of numbers A and two numbers x and y . The output should be equal to the number of numbers in A that are greater than x and less than y .
3. $\text{SORT}(A)$ takes as input an array and sorts it. In this problem, you are allowed to assume that the elements of A are all integers, and that they are all between 1 and n^4 , where n is the length of A .