CS2040S: Data Structures and Algorithms

Exercises/Optional Problems for Week 2

For: March 2, 2020

Problem 1. Isolation Consider the following classic problem: Given an array of n integers, and a separate target integer T, decide if there is at least a pair a, b among the n integers that sum to T. This time, with a mild twist, **count** all disjoint pairs that sum to T.

For example, consider the following arrangement of bottles:

$$[1, 1, 3, 10], T = 4$$

Then the number of pairs is 1 (not 2), since you can match one of the 1's with one of the 3's.

Another example is the following"

$$[4, 5, 4, 5, 4, 5, 4], T = 9$$

Then the number of pairs is 3.

Give a solution that runs in expected $O(n)$ time.