CSCI 421 Design and Analysis of Algorithms Spring 2019

Assignment 1

**Running Time Comparison of 3-Sum Algorithms**

We have implemented two faster algorithms (~N2) for the 3-Sum problem in Lecture 1 Activity 1. Now we would like to compare them with the brute-force algorithm (~N3) and the binary-search based algorithm (~N2logN, shown in Lecture 1 slide 48) to see their running time in practice.

You need to find the number of triples of N random int values that sum to 0, where the values are uniformly distributed between –M and M, where M is not small. For instance, N can range from 250, 500, 1000, 2000, 4000, 8000, 16000 and you need to find the running time of all the four algorithms aforementioned. Generate a table and a standard plot as shown in Lecture 1 slide 16 and 17, respectively.

Note 1: Regarding the binary-search based algorithm, you need to implement the binary search method by yourself. To obtain a sorted array, you can use the java.util.Arrays library. Regarding the hash-table based algorithm, do not include the table creation part when you measure the running time.

Note 2: A slide showing how to measure running time in Java is attached. You can replace “System.currentTimeMillis” with “System.nanoTime” if you find the running time is too small to be displayed.