CSE 5311 Lab Assignment 2

Due July 25, 2011

Goals:

1. Review of "merging".

2. Understanding of *subset sums*, an NP-complete problem.

Requirements:

1. Write (and test) two versions of a C/C++ code that implements 1) the $O\left(2^n\right)$ merging approach for solving exact subset sums as shown in section 35.5 of CLRS and 2) a faster version that runs in $O\left(2^{\frac{n}{2}}\right)$ time. Your program must compile and execute on at least one of `omega.uta.edu` or Visual Studio.

   The input (`stdin`) to your program will a single line with 1) the number of points (n) and 2) a target value followed by n positive integers, one per line. Do not prompt for an input file name! n will not exceed 100. The n positive integers will be in ascending order, possibly with duplicates.

   The output from your codes will be a subset or an indication that it does not exist. In addition, each code should indicate its time and space usage.

2. Email your code (as attachments) to `miao.zhang@mavs.uta.edu` before 3:15 pm on July 25. The subject should include your name as recorded by the University.

Getting Started:

1. The basic technique in CLRS will take $O\left(2^n\right)$ time. To reduce the time, you should split the input into two halves and apply the merging technique to each half. Now, attempt to match some subset sum for the first half with an appropriate subset sum for the second half to achieve the desired target value. In some cases, the target sum may be achieved using only one of the two halves.

2. This exercise may be implemented using arrays.