Computer Science 320SC – (2017)

Programming Assignment 1

Due: Sunday, July 30 (9pm)

Requirements

This first assignment lets you get familar with submission of simple (but correct and efficient) algorithms to the CompSci 320 *automated marker*. There are two algorithms/programs required but three different submissions (two data sets for one of them). It is worth 5% of your total course marks. (Note future programming assignments will require much more work to obtain the same number of marks so you are encouraged to make a serious attempt on this one.)

Problem Statement 1: Computing GCD

Read in a sequence of 32-bit signed integers (several per line separated by spaces) until a single line containing zero (0). There will be at most 1000 integers per line. For each line except for the last one, compute the *greatest common divisor* (gcd) of that set of integers. Then output on a line the statement "The gcd of the integers is x." where x is the desired gcd. Note, for this problem, all answers should be non-negative.

The input should be taken from keyboard/stdin/System.in.

Sample Input:

```
2      4  8
15 0 -5
6 20 25 5 30
  28 21952  49 294 3822
0
```

The precisely formated output should be sent to console/stdout/System.out.

Sample Output:

```
The gcd of the integers is 2.
The gcd of the integers is 5.
The gcd of the integers is 1.
The gcd of the integers is 7.
```

Problem Statement 2: Minimum Double Pair

The input format for this problem is the same as in Problem 1 but all integers (per line) are assumed to be different. We read in a sequence of 32-bit signed integers (several per line separated by spaces) until a single line containing zero (0). For each line except for the last one, compute the smallest sum s such that there are two different pairs of integers (x_1, x_2) and (y_1, y_2), where $x_1 < x_2$, $x_1 \neq y_1 < y_2 \neq x_2$, that both sum to s (e.g., $x_1 + x_2 = y_1 + y_2 = s$). If such a sum s is possible, output on a line "yes: s". Otherwise output on a line "None".

The input should be taken from keyboard/stdin/System.in.

Sample Input:

```
2  1  3  4
10 20 40 45 5 15 25
24 23 8 29 31 5
10 20 50 51 52 53 54 12 15 16
0
```

The output should be sent to console/stdout/System.out.

Sample Output:

```
yes: 5
yes: 25
None
yes: 62
```

Submission

For Problem 1, name your source code `gcd.ext`, where `ext` denotes one of { `java`, `cpp`, `py`, `cs` } that indicates java/c++/python/mono language. You need to use just one source file per problem.

For the second problem we plan to set up two test cases for automated marking where you submit to http://www.cs.auckland.ac.nz/automated-marker. Limited feedback will be given by the submission system (see Help/FAQ) and you are allowed to resubmit several times.

Please submit source code named `pairE.ext` or `pairH.ext`. Here the suffix `E` of the basename denotes 'E'asy (test data) and `H` denotes 'H' arder (test data).

There is two marks awarded for Problem 1 and three marks awarded for Problem 2 (with `pairH.ext` being worth one mark).