CS608 Programming Assignment 2

This assignment has two parts: Part 2A and Part 2B. If you successfully complete both, you will receive 15 points. If you successfully complete only one (either one), you will receive 10 points.

Programming Assignment 2A: The GCD problem

The Greatest Common Divisor of two positive integers a and b, denoted GCD(a,b), is the largest integer which divides both the given numbers.
Example: GCD(96,72) = 24.

The following algorithm, called Euclid's algorithm, works on the following principle

(1) If b = 0, then GCD(a,b) = a.
and
(2) GCD(a,b) = GCD(b,a%b).

Remember % is the remainder operator (for example, 17%3 is 2. 16%2 is 0).

Example:

If you want to find the GCD(96,72):
GCD(96,72) = GCD(72,96%72) = GCD(72,24)
= GCD(24, 72%24) = GCD(24,0) = 24.

Code for Euclid's algorithm:

```
long rem = 0;
while( b!=0){
  rem = a % b;
  a = b;
  b = rem;
}
return a;
```

Now the programming assignment 2A:
Write a Java program to calculate the GCD of two numbers using Euclid's algorithm. Include a counter in your program to count how many steps it took for the program to complete (just include counter++ at the end of the loop).

Input:

(1) 96, 72
(2) 63245986, 514229
(3) 701408733, 3524578

Include all three in the same program (don' run three times).

Output:
For each pair of input, output must contain (1) the given two numbers (2) the GCD and (3) the number of steps taken.

Programming Assignment 2B: Maximum Subsequence Sum Problem
The textbook discusses the maximum subsequence sum problem and presents four algorithms to solve the problem.
Assignment 2B is to implement all the four methods.

Write a Java program which implements the four algorithms (make them four methods). Measure the amount of time taken by each of the four methods (use **currentTimeMillis()** method).

Input: Run your program for the following data:
33 6 16 1 7 -49 53 95 48 79 -42 27 63 -22 60 90 13 2 8 51 28 18 30 93 98 44 26 24
35 70 66 89 -61 9 -43 87 38 92 3 -80 55 78 32 50 77 73 -83 17 19 31 39 76 62 96 -23
65 72 4 37 12 -54 15 94 21 -52 58 64 40 59 82 81 41 -57 69 25 97 -11 47 88 -36 20
68 67 34 -45 10 56 91 29 14 74 -46 84 100 5 86 99 75 -85 71

Output: Include (1) Algorithm number (1,2,3,4) (2) the maximum subsequence sum (3) actual sequence and (4) time taken

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General instructions:

- If your program has several classes, include all of them in the same file and name your Java file
CS6082Axxxxx.java (Assignment 2A) and CS6082Bxxxxx.java (assignment 2B), where xxxxx is your last name. **Example**: If your name is John Smith, name the file CS6082Asmith.java and CS6082Bsmith.java. **DO NOT SEND ZIP files.**

- Output must include: **Your name, course number and date (use Date class).** If any of the above items are missing, you will not receive full credit.

- Send your Java file as email attachment to CS608Assignment@gmail.com. Include your name and assignment number in the email subject.

Note: I will run your programs and grade them. If your programs do not compile (that is, show syntax errors, you will receive 0 for the programming assignment).