Data Structures and Algorithms Homework 1

Due Wednesday Sept 4; Joseph Sepich (jps6444)

1 Problem 1

I understand the course policies.

2 Problem 2

2.1   Part a. Prove that if a and b are even, then gcd(a, b) = 2gcd(a/2, b/2)

1. By the definition of even we can state that a = 2n and b = 2m, where n and m are both integers.
2. Using the definition in step 1 we can write gcd(a, b) = gcd(2n, 2m).
3. Since 2 is a common divisor we can also write gcd(2n, 2m) = 2gcd(n, m).
4. Using step 1, we also know that n = $\frac{a}{2}$ and m = $\frac{b}{2}$.
5. Plugging step 4 into the equalities in step 2 and 3 we get gcd(a, b) = gcd(2n, 2m) = 2gcd(n, m) = 2gcd($\frac{a}{2}$, $\frac{b}{2}$).

Therefore if a and b are both even, gcd(a, b) = 2gcd($\frac{a}{2}$, $\frac{b}{2}$)