Department of Mathematics and Computer Science

2301365 Algorithm Design and Analysis Lab #1

Name_____ StudentID _____

In this lab, write a program of FindGCD1, FindGCD2 and FindGCD3. Identify the basic operation of each step and add instructions to count the number of operations executed.

FindGCD1(m,n)

Step 1 Find the prime factorization of *m*

Step 2 Find the prime factorization of *n*

Step 3 Find all the common prime factors

Step 4 Compute the product of all the common prime factors and return it as gcd*(m,n)*

Where the **prime factorization** technique is implemented by a **Naive solution**.

FindGCD2(m,n)

Step 1 Find the prime factorization of *m*

Step 2 Find the prime factorization of *n*

Step 3 Find all the common prime factors

Step 4 Compute the product of all the common prime factors and return it as gcd*(m,n)*

Where the **prime factorization** technique is implemented by **Sieve of Eratosthenes.**

FindGCD3(m,n)

if m > n, then GCD(m, n) = GCD(m % n, n) = GCD(m, m % n)

if m = n, then GCD(m, n) = m = n

if m < n, then GCD(m, n) = GCD(m, n % m) = GCD(n % m, n)