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 times the operation that are executed.

FindGCD1(m,n)

```
Step 1  Assign the value of min{m,n} to t
Step 2  Divide m by t.  If the remainder is 0, go to Step 3;
        otherwise, go to Step 4
Step 3  Divide n by t.  If the remainder is 0, return t and stop;
        otherwise, go to Step 4
Step 4  Decrease t by 1 and go to Step 2
```

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)
```

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)
```