

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  $\text{gcd}(m,n)$

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  $\text{gcd}(m,n)$

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

### FindGCD3(m,n)

if  $m > n$ , then  $\text{GCD}(m, n) = \text{GCD}(m \% n, n) = \text{GCD}(m, m \% n)$

if  $m = n$ , then  $\text{GCD}(m, n) = m = n$

if  $m < n$ , then  $\text{GCD}(m, n) = \text{GCD}(m, n \% m) = \text{GCD}(n \% m, n)$