MIDDLE SCHOOL PROCEDURE TO FIND GCD(M, N)

// English Like Algorithm

Step 1: Find the prime factors of m.

Step 2: Find the prime factors of n.

Step 3: Identify all the common factors in the two prime expansions found in Step 1 and Step 2. (If p is a common factor occurring

p_m and p_n times in m and n, respectively, it should be repeated $\min\{p_m, p_n\}$ times.)

E.g.:

$\quad$ 60 = $2 \times 2 \times 3 \times 5$

$\quad$ 24 = $2 \times 2 \times 2 \times 3$

$\gcd(60, 24) = 2 \times 2 \times 3 = 12$

// Pseudo Code

$GCD(M, N)$:

   $int\ IndexA\ \leftarrow 0$

   $int\ IndexB \leftarrow 0$

   $int\ res \leftarrow 1$

  $Arr1[p] = primeFact(M)$

  $Arr2[q] = primeFact(N)$

  $Arr3[n] \leftarrow NULL$

  $While(IndexA < p\ AND\ IndexB < q)$:

   $if(Arr1[IndexA] == Arr2[IndexB])$:

       $Arr3[n] \leftarrow Arr1[IndexA]$

       $IndexA \leftarrow IndexA + 1$

       $IndexB \leftarrow IndexB + 1$

    $Else\ If(Arr1[IndexA] < Arr2[IndexB])$:

       $IndexA \leftarrow IndexA + 1$

    $Else$:

       $IndexB \leftarrow IndexB + 1$

$PrimeFact(n):$

    $Arr1[p] \leftarrow NULL$

    $for\ i\ \leftarrow 2\ to\ n-1\ do$

        $while\ (\ n\ mod\ i\ \leftarrow 0):$

            $n \leftarrow n\ /\ i$

            $Arr1[i] \leftarrow i$

   $return\ Arr1$