



Simulation – GCD & LCM Algorithm

Lesson Plan: Class 07 / ALG / 08



Overall goal of the lesson	Students learn to simulate algorithms for LCM and GCD using example input values.
Prior Knowledge Required	Prime Factorization, Algorithms for LCM and GCD (07-ALG-07)

Module time: 35 minutes

Goal:	Simulate the GCD and LCM algorithm using two numbers as input.
Description:	Simulating GCD and LCM algorithm using example numbers and determine their GCD and LCM
Material Required:	<ol style="list-style-type: none"> 1. One copy of worksheet per student 2. Pen/Pencil, eraser. 3. Lesson Presentation
Procedure Summary :	<ol style="list-style-type: none"> 1. Go through the presentation. 2. Simulate GCD and LCM algorithm. 3. Determine GCD and LCM of the inputs using the simulation. 4. Provide the worksheets, once presentation is done. 5. Let the students solve them and help them with answers.
Procedure Details:	<p>Slide 1: Title Slide</p> <p>Slide 2: Remind students of the last lesson related to writing algorithms for LCM and GCD.</p> <p>Ask them if they remember the algorithms they developed in the last class, they will be simulating (or using) those algorithms on input numbers to find the GCD and LCM.</p> <p>At first, go through the algorithms as a revision in the next slide.</p> <p>Slide 3: Ask the students to revise the algorithms by reading out loud each step of both the algorithms.</p> <p>Slide 4: Tell the students they will simulate the GCD algorithm first using input values as 45 and 60, i.e. they will determine the GCD of 45 and 60 by following each step of the algorithm.</p> <p>Starting from the first step – they will find the smallest prime factor for both 45 and 60.</p> <p>Step 2 – writing 45 and 60 in factor form using the prime factors.</p> <p>Step 3 – check if all the factors are prime.</p> <p>Slide 5: Since all the factors are not prime. They will go back to the first step of the algorithm and start with step 1 using the composite number (or factors)</p>

Repeat step 1, 2, and 3. All factors of 45 are prime, but 15 – a factor of 60 is not prime.

Slide 6:

Now, 15 is not a prime number, so go back to step 1 of the algorithm.

Repeat step 1, 2, and 3. All factors of 45 and 60 are prime now.

Slide 7:

Now, all the factors of 45 and 60 are prime, hence we move to step 4 of the algorithm.

The step 4 is to find the common factors between the factors of 45 and 60. The common factors are marked and underlined in red.

Next, we move on to step 5, that is to multiply the common factors. Multiplying the common factors, we obtained the GCD of 45 and 60 by simulating a GCD algorithm.

Slide 8:

Now, determine the LCM between 45 and 60 by simulating the LCM algorithm.

Remind the students that the algorithm is very similar to the GCD algorithm with an additional step.

The common factors of 45 and 60 are 3, and 5. The last step is to multiply the common factors along with all the other factors to obtain the LCM.

Slide 9:

Tell the students that if they follow the steps of this algorithm they can determine the GCD and LCM of 2 or more numbers. They can even use the algorithms to teach someone or computers to calculate GCD and LCM.

One can teach (or program) a computer to carry out mathematical operations at each step of the algorithm and make a computer calculate GCD and LCM. There are no good algorithms to calculate LCM efficiently other than prime factorization, but one can use more efficient Euclidean algorithm to determine GCD.

Slide 10:

Thank you. Get on with worksheets