**Tutorial 7 Answers**

**1.**The Greatest Common Divisor (GCD), also known as the Greatest Common Factor (GCF) or Highest Common Divisor (HCD), is a mathematical concept used to find the largest positive integer that divides two or more given numbers without leaving a remainder. In other words, it is the largest positive integer that divides all the given numbers evenly.

**2.**

Step 1: Given two positive integers a and b.

Step 2: If b is zero, the GCD is a. Return a.

Step 3: Find the remainder (r) when a is divided by b.

Step 4: Set a = b and b = r.

Step 5: Repeat from Step 2.

Step 6: When b becomes zero, the GCD is the non-zero value of a.

**3.**

def gcd\_recursive(a, b):

if b == 0:

return a

else:

return gcd\_recursive(b, a % b)

# Example usage:

result = gcd\_recursive(24, 36)

print(result) # Output: 12

**4.**

def gcd\_iterative(a, b):

while b != 0:

a, b = b, a % b

return a

# Example usage:

result = gcd\_iterative(24, 36)

print(result) # Output: 12

**5.**

Prime factorization is the process of expressing a composite number as a product of its prime factors. A prime factor is a prime number that divides the original number without leaving a remainder. The prime factorization of a number helps in understanding the unique combination of prime factors that make up the given number.

For example, the prime factorization of 60 is 2 \* 2 \* 3 \* 5 since 60 = 2^2 \* 3 \* 5.

**6.**

Prime factorization can be represented using a factor tree. Here's a graphical representation of the prime factorization of 60:

60

/ \

2 30

/ \

2 15

/ \

3 5