

Answers to Lecture 2 Problems:

1. Find the gcd and lcm of a and b where

(a) We have $a = 2^4 \times 3^4$ and $b = 2^3 \times 5^3$. Hence, $\gcd(a, b) = 2^3$ and $\text{lcm}(a, b) = 2^4 \times 3^4 \times 5^3$.

(b) We have $a = 2^8 \times 3^4 \times 5^2 \times 7$ and $b = 2^8 \times 3^8$. Hence, $\gcd(a, b) = 2^8 \times 3^4$ and $\text{lcm}(a, b) = 2^8 \times 3^8 \times 5^2 \times 7$.

(c) We have $a = 241$ and $b = 197$ are both prime. Thus, $\gcd(a, b) = 1$ and $\text{lcm}(a, b) = 241 \times 197$.

(d) We have $\gcd(118500, 600) = \gcd(600, 300) = 300$. Thus, $\text{lcm}(118500, 600) = \frac{118500 \times 600}{300} = 237000$.

2. Using the Euclidean algorithm, we get

$$\begin{aligned}F_n &= 1(F_{n-1}) + F_{n-2} \\F_{n-1} &= 1(F_{n-2}) + F_{n-3} \\&\vdots \\F_4 &= F_3 + F_2 = F_3 + 1\end{aligned}$$

Thus, $\gcd(F_n, F_{n-1}) = 1$.

3. We get

(a) It takes $\text{lcm}(2111, 5393) = 11384623$ hours.

(b) It takes $\text{lcm}(11384623, 2110800204) = 11384623 \times 2110800204$ hours.