4304- Transcribed Books

Solution
The Problem

• Given a set of serial numbers:

\[ a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10} \]

• Find the largest \( N \) that satisfies:

\[ \sum_{i=1}^{9} a_i \equiv a_{10} \mod N \]

• Constraints:
  • \( N > a_{10} \)
  • \( N > 1 \)

• If no such \( N \) exists, or if every \( N \) satisfies the requests: Output “Impossible”
The Solution

• N should be the largest that holds:

\[ \sum_{i=1}^{9} a_i \equiv a_{10} \mod N \iff N | (\sum_{i=1}^{9} a_i - a_{10}) \]

for all serial numbers

• N should be the gcd of all \((\sum_{i=1}^{9} a_i - a_{10})\)
  • Serial numbers where \(\sum_{i=1}^{9} a_i = a_{10}\) are not included
Tricky points

• Use `long` instead of `int`. Using `int` may result in Wrong Answer, or an infinite loop (TLE).

• Don’t forget to output “Impossible” if:
  • You get $N = 1$
  • None of the serial numbers impose constraints
  • You get $N \leq a_{10}$ for some serial number