**UBI602**

**Homework 4**

1. **a.** Write pseudo code for the divide-into-three algorithm for the fake-coin problem. Make sure that your algorithm handles properly all values of *n*, not only those that are multiples of 3.

**b.** Set up a recurrence relation for the number of weighings in the divide-into-three algorithm for the fake-coin problem and solve it for n = 3k.

**c.** For large values of *n*, about how many times faster is this algorithm than the one based on dividing coins into two piles? Your answer should not depend on *n*.

1. **a.** If we measure an instance size of computing the greatest common divisor of *m* and *n* by the size of the second number *n*, by how much can the size decrease after one iteration of Euclid’s algorithm?

**b.** Prove that an instance size will always decrease at least by a factor of two after two successive iterations of Euclid’s algorithm.

3. **a.** Find the smallest value of *n* for which log2 log2 *n* + 1 is greater than 6.

**b.** Determine which, if any, of the following assertions are true:

i) log log n є o(log n) i.e., log log n is in little-oh(log n)

ii) log log n є θ(log n)

iii) log log n є Ω(log n)