Foundations of Discrete Mathematics
COT 2104

Practice 6

1. Convert these integers from decimal notation to binary notation
    a) 321
    b) 1023

2. Convert these integers from binary notation to decimal notation

    a) 1 1011
    b) 10 1011 0101

3. Use the division algorithm to find q and r

    a) a= 141 and b = -19
    b) a = 98,764 and b = 4789

4. In each of the following cases, find the greatest common divisor (gcd) of a and b applying the Euclidean algorithm.

    a) a = 78, b = 35
    b) a = 111, b = 201
    c) a = 55, b = 21
    d) a = 323, b = 124

5. Find the least common multiple (lcm) of the pairs of integers given in exercises 4.

6. Find the prime numbers less than or equal to the following natural numbers.

    a) less than 300

7. Find a (mod n) in each of the following cases.

    a) a = 43,197, n = 333
    b) a = -125,617, n = 315

8. Find all integers x, $0 \leq x < n$, satisfying each of the following congruence mod n.

    a) $4x \equiv 2 \pmod 6$
    b) $4x \equiv 3 \pmod 7$
    c) $x \equiv 5 \pmod 6$