INT202 Complexity of Algorithms

1. Exercises of modular arithmetic

a) 12+18 (mod 9)

b) 3*7(mod 11)

c) 103*42 (mod 17)

d) 72 (mod 13)

e) 73 (mod 13)

f) 74 (mod 13)

g) 75 (mod 13)

h) 76 (mod 13)

2. Use Euclidean Algorithm to find GCD of 134 and 52

3. Given two integers 134 and 52, find two integers, s and t, such that s*a+t*b=gcd(a,b)

4. Find the multiplicative inverse of 8 mod 11.

5. Let n > 0 be an integer. Prove that n is divisible by 9 if and only if the sum of its digits is divisible by 9.

6. Let us consider Z_{28} the set of integers modulo 28.

    1) Give the necessary and sufficient condition required for an element of Z_{28} to have an inverse in Z_{28}.

    2) Determine all the elements of Z_{28} that have an inverse in Z_{28}.

    3) Evaluate $\varphi(28)$ wherein φ is the Euler totient function.

    4) Evaluate 4^{-1} and 5^{-1} if they exist.