EE2302 Foundations of Information and Data Engineering

Assignment 4 **Due: 11 pm, Sep 30**

Full mark: 14 points

1. (4 marks) Use the quotient-remainder theorem with $d = 3$ to prove that the square of any integer has the form $3k$ or $3k+1$ for some integer k.

2. (2 marks) Find the value of $\phi(9100)$. Show your steps.

3. (4 points) Use the Euclidean algorithm to compute $\gcd(12000, 67890)$. Show your steps.

4. (4 marks) Use the extended Euclidean algorithm to find $\gcd(54321, 6789)$ and a solution in integers to the equation
$$54321x + 6789y = \gcd(54321, 6789).$$
Show your steps.

Programming exercise (not to be handed in)

5. Use C++ (or any other general-purpose programming language) to write a computer program to compute $\gcd(a, b)$, where a and b are positive integers.