# Homework Assignment 3
# CS 6104: Algorithmic Number Theory

Each problem in this assignment is worth 50 points. The assignment is due by 9:30AM on June 5, 1998. Prepare your solutions in LaTeX, preferably using this file as a starting point. You may submit your solutions in printed form or by email to `cs6104@ei.cs.vt.edu`. Explain your solution to each problem, including references to the appropriate theorems in the textbook.

Help is available by email as well as during my office hours. It is especially helpful to request clarification or hints by email to `cs6104@ei.cs.vt.edu`, so I can send the response to everyone.

The person assigned to present the solution to a problem (if anyone) is noted at the beginning of the problem.

**Problem 1. [Duxing]** Chapter 5, Problem 24. Do not look up the answer. Think about the Chinese Remainder Theorem.

Also, derive all solutions for $n = 30$.

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**Problem 2. [Cara]** Use Theorem 5.8.1 to compute the Legendre symbol

$$\left(\frac{958816}{129527}\right)$$

is two distinct ways. If

$$\left(\frac{958816}{129527}\right) \;=\; 1,$$

then find a solution $x$ to the congruence

$$x^2 \;\equiv\; 958816 \pmod{129527}.$$

(Consult Theorem 7.1.1 and Corollary 7.1.2.)

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