

CMSC 441
Section 0201
Spring 2008
Homework 9

Reading Assignment:

- 1) Listen to Symphonie Fantastique by Berlioz.
- 2) Read Chapters 10 and 11 of the text.
- 3) Study ahead by reading Chapters 12, 13, and 14 of the text.

Homework:

- 1) Use Garner's algorithm to find the unique integer $0 \leq x < 5 \cdot 7 \cdot 11$ that satisfies the following three modular equations:

$$x = 2 \pmod{5}$$

$$x = 4 \pmod{7}$$

$$x = 3 \pmod{11}$$

- 2) Use the Chinese Remainder Theorem to compute the integer product

$$5723 \cdot 7956$$

as follows:

Step 1) Compute $5723 \cdot 7956$ modulo each of the pairwise relatively prime integers $101, 103, 107$, and 109 .

Step 2) Then use Garner's algorithm to piece together the above four modular solutions into a unique integer $0 \leq x < 101 \cdot 103 \cdot 107 \cdot 109$. Under what circumstances does this result $\pmod{101 \cdot 103 \cdot 107 \cdot 109}$ produce the same integer which would have been produced if you had instead computed the integer product $5723 \cdot 7956$ in the integers \mathbb{Z} , and not in $\mathbb{Z}_{101 \cdot 103 \cdot 107 \cdot 109}$? Suggest some potential applications of this method.