

CSE 651 Homework 4

Due: Friday, May 8 by class time

1. List all elements of Z_{10} .
2. (a) List all elements of Z_{10}^* . (b) What is the value of $\varphi(10)$?
3. Find the order of each element in Z_{10}^* . (Check that $x^{\varphi(10)} = 1$ for all $x \in Z_{10}^*$.)
4. Do b and c of Problem 4.19 on page 132 of Stallings.
5. Solve the following system using the Chinese Remainder Theorem:

$$x \equiv 1 \pmod{3}$$

$$x \equiv 3 \pmod{5}$$

$$x \equiv 5 \pmod{8}$$

6. Find the multiplicative inverse of 37 mod 120 (i.e., the inverse of 37 in Z_{120}^*) using the Chinese Remainder Theorem. (Note: $120 = 3 \times 5 \times 8$.)