CS 153	**Foundations of Software**	**Homework 2**
Fall 2006		**Due: October 11, 2006**

1. Exercise 2.5.3(b,d) (p. 125) [5 points]

2. Exercise 2.5.6 (p. 125) [5]

3. Exercise 2.5.10 (p. 125) [10]

4. [10] Give a simple proof, using the Schröder-Bernstein Theorem, that $\mathbf{Nat} \times \mathbf{Nat}$ has the same cardinality as $\mathbf{Nat}$ (*i.e.* $\mathbf{Nat} \times \mathbf{Nat} \sim \mathbf{Nat}$).

5. 4.1.2(b,d) (p. 210) [5]

6. 4.1.7(b) (p. 35) [5]

7. 4.1.13(b,d) (p. 211) [5]

8. 4.1.25(b) (p. 213) [5]

9. 4.2.4(b) (p. 230) [5]

10. 4.2.8 (p. 231) [10]

11. 4.2.13* (p. 231) [0]

12. [15] Let $R \subset A \times A$ be a binary relation on the set A. Consider the set of equivalence relations on A containing R:

$$\mathcal{E} = \{E \subset A \times A \mid E \text{ is an equivalence reln on } A \ \wedge \ R \subset E\}$$

Show that $\mathcal{E}$ is not empty, and that the intersection of $\mathcal{E}$ is equal to $tsr(R)$ (the transitive, symmetric, reflexive closure of R).

13. 4.3.7(b) (p. 252) [5]

14. 4.3.12 (p. 252) [5]

15. [10] Consider the relation of refinement on partitions of a set A as a partial order. Show that if A is infinite, the partial order of partitions is not well-founded.