Assignment 6 is due at the start of class on **Monday, April 30**.

Instructions

Write the answers to the following exercises, in order. If you create a file containing your answers, print the file. Staple pages together, and include your name. Turn in your work in paper form at the start of class.

Exercises

1. Do exercise 7.1.3, on page 277.

2. Do exercise 8.2.2a, on pages 335–336. Give a state diagram for the TM.

3. Do exercise 8.4.3, on page 350. *Note: "**Informally** but **clearly** describe . . . ."*

4. Do exercise 9.2.1, on page 390. Your argument can be somewhat informal, but should be correct.

5. In each part below, there is a problem with the given argument. Explain the flaw.

   5a. Let L be a language. If there is a TM that accepts L, then there must be a TM that accepts $\overline{L}$; simply reverse the accepting & non-accepting states.

   5b. Let M be a TM, and let w be a string. The problem of whether M accepts w is clearly decidable, as follows. Simulate M, and give it w as input. If it accepts, then answer "yes"; otherwise, answer "no".

   5c. Rice's Theorem states that no nontrivial property of recursively enumerable languages is decidable. We describe a RE language using a TM that accepts it. Thus, the theorem says that no nontrivial property of TMs is decidable.

6. Rice's Theorem impacts programming language design, particularly regarding things like testing whether two functions are equal. Explain.

7. Do exercise 10.1.6, parts a, b, and f, on page 437.