Problem Set 6 – Due Tuesday, February 28, 2012

This problem set may be done in groups of 1–3 people. A team must turn in a single writeup.

Problem 1. Understand everything you missed on the midterm. Then redo the midterm, turning in a model solution.¹ For the initial true/false questions, also add in a brief (at most one-sentence) explanation. Where appropriate, make that explanation a counter-example.

Problem 2. Following the conventions of your book, fully specify a Turing machine that decides the language

\[ L = \{ x = y : x, y \in \{a, b\}^* \} \]

You may employ any tape alphabet you wish.

Problem 3. Are the decidable languages closed under the regular operations of union, complement, and star? Are the Turing-acceptable languages closed under these operations? Explain all answers.

¹Exception: if you got \( \geq 120/135 \) on the exam and are working alone, do not redo the exam. Do understand whatever you missed. But, after that, write a brief, thoughtful critique of any question(s) on the exam that you find worthy of comment.