CSE 547T Introduction to Formal Languages & Automata September 10, 2015

Homework 2

Instructor: Brendan Juba *Due: September 22, 2015*

Reminder: you are permitted to collaborate and use outside sources provided that you document your collaborators and sources for each problem, and you produce your own written solutions. Solutions to each problem should be electronically typeset and submitted online via Blackboard; see the E-Homework Guide `http://www.cse.wustl.edu/~bjuba/cse547t/f15/ehomework/` for instructions.

The problem numbers are for the second edition (2e), third edition (3e), and/or international third edition (i3e) of Introduction to the Theory of Computation by Michael Sipser.

1. Exercise 1.21 (2e/3e/i3e)
2. Problem 1.54 (2e/3e)/1.49 (i3e)
3. Problem 1.61 (2e/3e)/1.55 (i3e)
4. Problem 1.71 (3e)/1.68 (i3e): Let $\Sigma = \{\mathtt{0}, \mathtt{1}\}$.
   (a) Let $A = \{\mathtt{0}^k u \mathtt{0}^k : k \geq 1 \text{ and } u \in \Sigma^*\}$. Show that A is regular.
   (b) Let $B = \{\mathtt{0}^k \mathtt{1} u \mathtt{0}^k : k \geq 1 \text{ and } u \in \Sigma^*\}$. Show that B is not regular.