

CS 536 — Spring 2006

Homework #1

Due: Friday, March 24, 2006

Not accepted after class on March 27, 2006

- #1 Write a regular expression that defines a C-like comment delimited by `/*` and `*/`. Individual `*`'s and `/`'s may appear in the comment body, but the pair `*/` may not.
- #2 Write a finite automaton that accepts non-empty strings of `a`'s, `b`'s and `c`'s with the property that each character must appear *at least* once. The following strings are allowed: `abc`, `bacbb`, `cbaa`, and `aabccba`. The following strings are not allowed: `a`, `abb`, λ , `ccca`, and `bbcbb`.
- #3 Show an NFA that corresponds to the following regular expression:
$$(ab \mid ba \mid a)^*$$
Using `MakeDeterministic`, translate the NFA into a DFA. Optimize this DFA by merging states whenever possible.
- #4 Is the set of binary strings (over 0 and 1) that represent even positive integers a regular set? Why? Is the set of binary strings (over 0 and 1) that represent positive integers evenly divisible by 3 a regular set? Why?
- #5 Let `Delete1` be the operator that systematically removes the last character from a set of non-null strings. For example, `Delete1({abc,xy,a,b,bb}) = {ab,x, λ ,b}`. Let `R` be any regular expression. Show that `Delete1(R)` is a regular set.