

CS 536

Spring 2016

Homework #1

Due: Tuesday, March 15, 2016
Not accepted after class on March 22, 2016

- #1 Write a regular expression that defines a C-like comment whose body is 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 and `b`'s with the property that each character must appear *at least* twice. The following strings are allowed: `abab`, `baabb`, `bbaa`, and `aabbaba`. The following strings are not allowed: `a`, `abb`, λ , `bbba`, and `bbabb`.
- #3 Show an NFA that corresponds to the following regular expression:
 $(a \mid aa \mid ba)^+$
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 first character from a set of non-null strings. For example, `Delete1({abc,xy,a,b,bb}) = {bc,y, λ ,b}`. Let `R` be any regular expression that does not generate λ . Show that `Delete1(R)` is a regular set.