HW 8 – Regular Expressions

CS 421 – Fall 2015

Revision 1.1

Assigned October 20, 2015
Due October 28, 2015, 23:59
Extension 48 hours (20% penalty)

1 Change Log

1.1 Clarified problem 2 description by listing terminals and non-terminals; in problem 2.1 fixed the rule B = `ba` to B = `b`A, making the grammar regular. (Note that these changes do not actually change the problems.)

1.0 Initial Release.

2 Turn-In Procedure

Answer the problem below, save your work as a PDF (either scanned if handwritten or converted from a program), add the PDF to the subversion repository (`svn add hw8-submission.pdf`) and commit it (`svn commit -m ""`). Your file should be named `hw8-submission.pdf` and committed in your `assignments/hw8` directory.

3 Objectives and Background

The purpose of this HW is to test your understanding of regular expressions and remind you of their connection to regular grammars.

4 Problems

1. (15 points) For this problem, you will be given regular expressions describing given languages, and asked to write regular grammars defining the same language.

   1. `let` ∨ `rec` ∨ `in`

   2. `(a` ∨ `b` ∨ `c)(a` ∨ `b` ∨ `c)*`

   3. (`0` ∨ `1` ∨ `8` ∨ `9`) (`0` ∨ `1` ∨ `8` ∨ `9`)* (.) (`0` ∨ `1` ∨ `8` ∨ `9`)*

   (problem 2 on next page)

2. (10 points) For this problem, you will be given regular grammars with start symbol S describing given languages, and asked to write regular expressions defining the same language. S, A, B, and C are non-terminals, and `a`, `b`, and `c` are terminals.

    1. S = `a`A | `b`B
       A = `a`
       B = `b`B | `b`A

    2. S = `a`S | `b`S | `c`C
       C = `a`S | `c`C | `c`