HW 8 – Regular Expressions
CS 421 – Fall 2015
Revision 1.0

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

1 Change Log

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)*`

    Solution:

    1. S = lL | rR | iI
       L = eE
       E = t
       R = eF
       F = c
       I = n

2. S = aT | bT | cT
   T = aT | bT | cT | ε

3. S = 0A | 1A | 8A | 9A
   A = 0A | 1A | 8A | 9A | .B
   B = 0B | 1B | 8B | 9B | ε

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.

   1. S = aA | bB
      A = a
      B = bB | bA

   2. S = aS | bS | cC
      C = aS | cC | c

   Solution:

   1. `(aa) ∨ (b(b)*ba)`
   2. `(a ∨ b)*c(c ∨ a(a ∨ b)*c)*c`