Bucknell UNIVERSITY

Theory of Computation
CSCI 341, Fall 2016

Homework 2
Due 2016-09-23

(2pt) Problem 1

Following the spirit of the algorithm converting regular expressions to NFAs, propose an extension of this algorithm to convert regular expressions of the form $E = E_1^+$ to NFAs. Draw the conversion **and** define it formally, by assuming E_1 is recognized by an NFA $(Q_1, \Sigma, \Delta_1, s_1, F_1)$, define an NFA $N = (Q, \Sigma, \Delta, s, F)$ recognizing E_1^+.

(3pt) Problem 2

Convert the following regular expressions to NFAs using the procedure we saw in class, and then convert the NFAs to DFAs using the other procedure we saw in class.

1. $a^*(a(b^*))b$
2. $(a \cup b)^* b(aa)b$
3. $a(b^+)(a \cup b)^*(b^+)a$

(2.5pt) Problem 3

Exercise 4.7 from Sipser, page 211. Maximum credit for a clear and complete proof.

(2.5pt) Problem 4

Problem 1.32 from Sipser, page 88.