Homework 3

Discrete Structures 2

Due Thursday, Jan 31, 2019, 12:00 pm

Instructions: You should submit your homework online on webcourse. Only 4 problems will be graded, each graded problem is worth 10 points. There will be 12 effort points in total for the ungraded problems, 2 for each problem. Hence the maximum score for this homework is **4 × 10 + 12= 52**. The graded problem will be selected randomly.

Part 1: From the textbook, 3ed, page 84, 86, 89:

1.7 (parts e, c) : It will not be graded, just 2 effort points for each part.

1.14 (parts a, b) : Just one part will be graded (10 points) and 2 effort points for the other part.

1.16 (Parts a,b) Just one part will be graded (10 points) and 2 effort points for the other part.

(1.33, 1.34) Just one of the problems will be graded (10 points) and 2 effort point for the other problem.

Part2: Just one problem will be graded (10 points) and 2 effort points for the other problem.

P2-1: Prove that every NFA can be converted into an equivalent NFA that has a single accept state. This proof should be very short.

P2-2: If X and Y are regular languages and language K = $\{x_1y_1x_2y_2 \ldots x_my_m | x_1x_2 \ldots x_m \in X, y_1y_2 \ldots y_m \in Y\}$. Prove that K is a regular language. Notice that K always combines strings of equal length, so that if X = {a, ab, abc} and Y = {1, 12, 123}, then K = {a1, a1b2, a1b2c3}. (The alphabet Σ is union of all digits 0-9 and all lowercase letters a-z.)