Assignment 1, CS 4384/5349

due at the beginning of Lecture on 9/21

no late homework would be accepted

1 In Du-Ko's book, Problem 3(d) in Exercise 1.1.

2 In Du-Ko's book, Problem 6 in Exercise 1.1.

3 Suppose Σ is an alphabet. Find all solutions for the following equations and systems of equations:

(a) $A\Sigma^* = \Sigma^*$.

(b) $A\Sigma^+ = \Sigma^+$.

(c) $A\{\varepsilon\} = \{\varepsilon\}$.

(d) $AB = B$ for $B = \Sigma^*, \Sigma^+$ and $\{\varepsilon\}$.

(e) $AB = B$ for any $B \subseteq \Sigma^*$.

4 In Du-Ko's book, Problem 3(b)(c) in Exercise 1.2.

5 For any language A, define

$$Prefix(A) = \{x \mid xy \in A \text{ for some } y\}.$$

Show by induction that if A is regular, so is $Prefix(A)$.

6 In Du-Ko's book, Problem 3(b) in Exercise 1.3.

7 In Du-Ko's book, Problem 4(b) in Exercise 1.3.

8 In Du-Ko's book, Problem 2(b) in Exercise 2.2.

9 In Du-Ko's book, Problem 2(c) in Exercise 2.2.

10 Construct a DFA accepting the language described in Problem 5 in Exercise 1.2.