

**CSci 311 : Models of Computation**  
**CSci 500 : Fundamental Concepts of Computing**  
**Fall Semester 2015, Assignment #4**  
**Revised Due Date: Tuesday, 20 October 2015**

Follow the directions given in the syllabus! For example, please write legibly on one side of the paper only, label each problem clearly, staple the papers in the proper order, and write name is on the paper.

Also remember this is an individual assignment. Each student is to do his or her own work.

**Do the following exercises using Section 4.1 concepts:**

1. Use the construction method in Theorem 4.1 to find an nfa that accepts  $L(bba^*b^*) \cap L(b^*a^*b)$ .
2. Show the family of regular languages is closed under symmetric difference. The *symmetric difference* of two sets  $S_1$  and  $S_2$  is defined as  $S_1 \ominus S_2 = \{x : x \in S_1 \text{ or } x \in S_2, \text{ but } x \text{ is not in both } S_1 \text{ and } S_2\}$ .
3. Let  $L_1 = L(b^*abb^*)$  and  $L_2 = L(bab^*)$ . Find  $L_1/L_2$ .

**Do the following exercises from Section 4.2, page 113-14**

- **CSCI 311 students:** Do either exercise 2 or 5
- **CSCI 500 students:** Do both exercises 2 and 5

**Do the following exercises from Section 4.3, page 122-4**

- Exercise 4
  - part(b)
  - part (d)
- Exercise 6
  - part (b)  
Note: In exercises 6 and 15, if you answer “regular”, show (or describe) a dfa or nfa to accept the language. If you answer “not regular”, it is not necessary (but, of course, allowed) to give a formal proof. However, give a sentence or so to justify your answer.
- Exercise 15
  - part (d)
  - part (e)