

**CS 720, Fall 2016**  
**Homework 5**

**Due Date: October 19**

1. (a) Give an  $\omega$ -regular expression for the set of infinite words  $\sigma$  over  $\{A, B\}$  such that  $A$  occurs finitely many times in  $\sigma$  and between any two consecutive  $A$ 's there are an odd number of  $B$ 's.  
(b) Convert your  $\omega$ -regular expression for Part (a) into an equivalent NBA using the method from class. (You can use the method in the book instead if you prefer. The book's method uses a different method to convert an NFA  $\mathcal{A}$  into an NBA  $\mathcal{B}$  with  $\mathcal{L}_\omega(\mathcal{B}) = (\mathcal{L}(\mathcal{A}))^\omega$  and also a different method to convert an NFA  $\mathcal{A}$  and an NBA  $\mathcal{B}$  into an NBA  $\mathcal{C}$  with  $\mathcal{L}_\omega(\mathcal{C}) = \mathcal{L}(\mathcal{A}) \cdot L_\omega(\mathcal{B})$ .)
2. Baier and Katoen, Exercise 4.14.  
(Use the method from class to convert the NBA you give into an  $\omega$ -regular expression.)