CS 720, Fall 2016
Homework 10

Due Date: November 30

1. Baier and Katoen, Exercise 6.14, Parts c,e.

2. (a) Use Theorem 6.18 to show that there is no LTL formula that is
   equivalent to the CTL formula $\exists\square\forall\diamond a$.

   (b) Use the reduct method to show the same result as in Part (a).
   [Note; We probably didn't mention this in class, but when you use
   the reduct method, your reduct has to have no terminal states. This
   is because we have not defined what it means for a formula to be true
   in a transition system that has terminal states.]

3. Give an example of two transition systems $\mathcal{T}_1$ and $\mathcal{T}_2$, and a CTL formula
   Φ such that

   (a) $Traces(\mathcal{T}_1) = Traces(\mathcal{T}_2)$;

   (b) $\mathcal{T}_1$ and $\mathcal{T}_2$ each have only one initial state;

   (c) $\mathcal{T}_1 \models \Phi$;

   (d) $\mathcal{T}_2 \not\models \Phi$.

   [We gave a similar example in class, but $\mathcal{T}_1$ had two initial states. You
   can modify the example from class to get the example you need here.]