University of Nevada, Las Vegas Computer Science 456/656 Spring 2015

Assignment 6: Due March 5, 2015

Name:_____

You are permitted to work in groups, get help from others, read books, and use the internet. But the handwriting on this document must be your own. You may attach extra sheets, using a stapler.

1. Let $L = \{a^n b^n c^n \mid n \geq 0\}$. We will prove in class that L is not a context-free language. Show that the complement of L is context-free.

2. True or false:

   (a) _____ If L is a regular language accepted by a DFA with n states, then L^R must be accepted by some DFA with n states.

   (b) _____ If L is a regular language accepted by an NFA with n states, then L^R must be accepted by some NFA with n states.

   Explain your answers.

3. (a) What does it mean to say that a language is in the class $\mathcal{P}$-TIME?

   (b) What does it mean to say that a function is in the class $\mathcal{P}$-TIME?

   (c) What does it mean to say that a language is in the class $\mathcal{NP}$-TIME?

4. True or false:

   (a) _____ If L a language in the class $\mathcal{P}$-TIME, then the complement of L must be in the class $\mathcal{P}$-TIME.

   (b) _____ If L a language in the class $\mathcal{NP}$-TIME, then the complement of L must be in the class $\mathcal{NP}$-TIME.

   Explain your answers.