

# CSE 531

## Assignment 7

Due Tuesday, November 21, 2000

1. It is known that  $\text{SPACE}(n) \subset \text{SPACE}(n^2)$  (this is proper containment). Use this fact to show that  $\text{SPACE}(n) \neq \text{NP}$ . (Hint: It will be a proof by contradiction. Consider a language  $A$  in  $\text{SPACE}(n^2) - \text{SPACE}(n)$ . Construct a new language  $A' = \{w\#^{|w|^2} : w \in A\}$  where  $\#$  is a new symbol. Show that  $A' \in \text{SPACE}(n)$ . Then move on to a contradiction.)
2. Show that the set  $\text{PAREN} =$  the set of matched parentheses is in  $\text{SPACE}(\log n)$ . Examples:  $((())) \in \text{PAREN}$  but  $() \notin \text{PAREN}$ .