CSE 6321 - Problem Set 7
Due beginning of lecture on April 20th

Problem numbers are from the third edition of Sipser's book. If unsure about which problem to solve, ask. Collaboration is permitted; looking for solutions from external sources (books, the web, material from previous years, etc.) is prohibited. Printed version is preferred, otherwise please make sure your handwriting is readable.

1. 8.1

2. Read the definition of MIN-FORMULA from Problem set 4.

   (a) Show that $MIN - FORMULA \in PSPACE$.
   (b) Explain why this argument fails to show that $MIN-FORMULA \in coNP$: If $\phi \notin MIN - FORMULA$, then ϕ has a smaller equivalent formula. A NTM can verify that $\phi \in \overline{MIN - FORMULA}$ by guessing that formula.

3. 8.10 (8.10 in second edition, about go-moku)

4. An undirected graph is *bipartite* if its nodes may be divided into two sets so that all edges go from a node in one set to a node in the other set. Show that a graph is bipartite if and only if it doesn't contain a cycle that has an odd number of nodes. Let $BIPARTITE = \{\langle G \rangle : G \text{ is a bipartite graph}\}$. Show that $BIPARTITE \in NL$.