

# CSE 6321 - Problem Set 8

## Due beginning of lecture on April 27th

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. Recall that a directed graph is *strongly connected* if every two nodes are connected by a directed path in each direction. Let

$$STRONGLY-CONNECTED = \{\langle G \rangle : G \text{ is a strongly connected graph}\}.$$

Show that *STRONGLY-CONNECTED* is NL-complete.

2. Prove that  $NTIME(n) \subsetneq PSPACE$ .
3. 9.14 (where  $NEXPTIME = \cup_{k \geq 0} NTIME(n^k)$ )
4. 9.9