

CSE 725 - Problem Set 2

Due lecture on May 16th

Problem numbers are from the second 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.

1. 5.9

(w^R is the reverse of w)

2. 5.22

3. 5.25 (Hint: 5.24)

4. Prove that the following language is undecidable:

$$A = \{\langle M \rangle : M \text{ is a TM that runs in polynomial time}\}.$$

5. 7.13

6. Let $coNP$ be the class of languages whose complement is in NP . Show that $P \subseteq NP \cap coNP$. Show that if $P = NP$ then $P = coNP$. (Warning: $coNP$ is *not* the complement of NP .)