

Problem Set 3

Please turn in each problem on a separate page with your name.

1. Say that a CFG is *minimal* if none of its rules can be removed without changing the language generated. Let $MIN_{CFG} = \{\langle G \rangle \mid G \text{ is a minimal CFG}\}$. Show that MIN_{CFG} is T-recognizable.
2. Book, 5.13 . [testing for useless states in a TM is undecidable]
3. Book, 5.21 . [testing ambiguity is undecidable]
4. Book, 5.22 and 5.23 . [T-recog iff $A \leq_m A_{TM}$ and decidable iff $A \leq_m 0^*1^*$]
5. Book, 5.27 . [2DIM-DFA]
6. Book, 6.1 . [recursion theorem example]
- 7.* Book, 6.8 . [$EQ_{TM} \not\leq_m \overline{EQ_{TM}}$]

Midterm exam: Tuesday, October 27, 2009, 11:00am – 12:30pm, Walker Memorial.

Final exam: Tuesday, December 15, 2009, 1:30 – 4:30pm, Walker Memorial.