CS3231 : Tutorial - 8

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25-Oct-2010

Q1 : Show that EQ_{CFG} is undecidable. Show that EQ_{CFG} is co-Turing-recognizable.

Q2 : Show that no computable function reduces A_{TM} to E_{TM}.

Q3 : Show that if A is Turing-recognizable and $A \leq_m \overline{A}$, then A is decidable.

Q4 : Show that the Post Correspondence Problem is decidable over the unary alphabet $\Sigma = \{1\}$. In the Silly Post Correspondence Problem, SPCP, in each pair the top string has the same length as the bottom string. Show that the SPCP is decidable.

Q5 : Prove that there exists an undecidable subset of $\{1\}^*$.

Q6 : Show that A is decidable iff $A \leq_m 0^*1^*$.

Q7 : Let $S = \{\langle G \rangle : G \text{ is a } \mathsf{CFG} \text{ and } L(G) \text{ is unambiguous}\}$. Show that S is not decidable.

Q8 : Consider the problem of determining whether a PDA accepts some string of the form $\{ww : w \in \{0,1\}^*\}$. Use the computation history method to show that this problem is undecidable.