

Due: Friday, February 16, beginning of tutorial

NOTE: Each problem set counts 10% of your mark, and it is important to do your own work. You may consult with others concerning the general approach for solving problems on assignments, but you must write up all solutions entirely on your own. Copying assignments is a serious academic offense and will be dealt with accordingly.

Do not use Rice's theorem in solving the following problems.

1. Let $A = \{\langle M_1, M_2 \rangle \mid M_1, M_2 \text{ are Turing machines and } L(M_1) \cap L(M_2) = \emptyset\}$
Is A semidecidable? Is \overline{A} semidecidable? Justify your answers.
2. Let $B = \{\langle G, G' \rangle \mid G \text{ and } G' \text{ are context-free grammars and } L(G) \subseteq L(G')\}$.
Is B semidecidable? Is \overline{B} semidecidable? Justify your answers.
3. Let $C = \{\langle M \rangle \mid M \text{ is Turing machine and } L(M) \in \text{CFL}\}$.
Is C semidecidable? Is \overline{C} semidecidable? Justify your answers.