## B501 Assignment 5

## Due Date: Friday, March 30, 2012
### Due Time: 11:00pm

1. (10 points) Show that decidable languages are closed under union.

2. (10 points) Show that decidable languages are closed under intersection.

3. (10 points) Show that Turing-recognizable languages are closed under union.

4. (10 points) Show that Turing-recognizable languages are closed under intersection.

5. (10 points) Define a language that is neither Turing-recognizable nor co-Turing-recognizable.

6. (10 points) Let $A$ and $B$ be two disjoint languages. Say that language $C$ *separates* $A$ and $B$ if $A \subseteq C$ and $B \subseteq \overline{C}$. Show that any two disjoint co-Turing-recognizable languages are separable by some decidable language.