Let $A$ be a Turing-recognizable language consisting of descriptions of Turing machines, \{\langle M_1, M_2 \rangle, \ldots \}, where every $M_i$ is a decider. Prove that some decidable language $D$ is not decided by any decider $M_i$ whose description appears in $A$. (Hint: You may find it helpful to consider an enumerator for $A$.)

- Show that the set of undecidable languages are closed under complementation.
- Let $L$ be the language of all Turing machine descriptions $\langle M \rangle$ such that there exists some input on which $M$ makes at least 5 moves. Show that $L$ is decidable.
- Disprove: Every countable language is decidable.
- Let $M$ be a Turing machine which loops on all strings of the form $wwr$. Is $M$ a decider? Is the language recognized by $M$ decidable?