

1. Show that every infinite language contains an unrecognizable subset.
2. Show that if D is decidable and L is unrecognizable, and $D \cap L = \emptyset$, then $D \cup L$ is unrecognizable.
3. Show that there exists a decidable language L and unrecognizable languages S_1, S_2 such that $S_1 \subseteq L \subseteq S_2$.