1. Let $\Sigma = \{a, b\}$. Which language is accepted by the TM below?

2. Let $\Sigma = \{a, b\}$. Construct a TM that accepts $\{aaba\}$.

3. Let $\Sigma = \{a, b\}$. Construct a TM that accepts

$$\{a^n b^m \mid n \geq 1, n \neq m\}$$

(i.e., the languages of strings consisting of $n$ a’s followed by $m$ b’s, with $n \neq m$).

4. Is there for each TM another TM with a single final state that accepts the same language?

5. Argue that the family of recursively enumerable languages is closed under union as well as under intersection.

6. Suppose language $L$ is accepted by a TM that halts on every input. Argue that the complement of $L$ is recursively enumerable.

7. Argue by a counting argument that there is a language $L$ such that neither $L$ nor its complement is recursively enumerable.