1. If $A$ is a language, then $\text{PREFIX}(A)$ is the language
   \[
   \{u|uv \in A \text{ for some string } v\}
   \]
   (a) Prove that if $A$ is decidable, then $\text{PREFIX}(A)$ is Turing recognizable.
   (b) Prove that if $A$ is Turing recognizable, then $\text{PREFIX}(A)$ is Turing recognizable.
   [Since every decidable language is Turing recognizable, this part implies the first part, but since the proof is harder, I made it a separate part.]

2. Apply the method from class that decides $E_{DFA}$ to the following DFA and answer the questions below.
(a) List the states you mark in the order they get marked.

(b) Does the DFA belong to $E_{DFA}$?

(c) How does your answer to (b) follow from your answer to (a)?

3. The language $EQ_{NFA}$ is defined as $\{(A, B) | A, B$ are NFAs and $L(A) = L(B)\}$. Prove that $EQ_{NFA}$ is decidable.

4. Let $ALL_{REX} = \{(R) | R$ is a regular expression and $L(R) = \Sigma^*\}$. Show that $ALL_{REX}$ is decidable.