Homework Assignment #7
Due: November 3, 2023 at 7:00 p.m.

1. If L is a language over the alphabet Σ, then $SUPER(L)$ is the set of all superstrings of L. More formally, $SUPER(L) = \{xyz : x, z \in \Sigma^* \text{ and } y \in L\}$. Suppose there is an algorithm DecideL(w) that decides whether a given string w is in L. Show that $SUPER(L)$ is also decidable by giving pseudocode for an algorithm that decides $SUPER(L)$. Your pseudocode can call DecideL as a subroutine, and it can be deterministic or non-deterministic. Explain why your answer is correct.

2. If L is a language over the alphabet Σ, then $SUB(L)$ is the set of all substrings of L. More formally, $SUB(L) = \{y : \exists x, z \in \Sigma^* \text{ such that } xyz \in L\}$. Suppose there is an algorithm RecognizeL(w) that recognizes L. Show that $SUB(L)$ is also recognizable by giving pseudocode for an algorithm that recognizes $SUB(L)$. Your pseudocode can call RecognizeL as a subroutine, and it can be deterministic or non-deterministic. Explain why your answer is correct.