Problem 1 (Sipser 4.21) Show that the following language is decidable:

\[ L_1 = \{ \langle D \rangle \mid D \text{ is a DFA and } D \text{ accepts } w^R \text{ whenever it accepts } w \} \]

Here \( w^R \) is the character-by-character of the string \( w \), as before.

Problem 2 Show that the following language is decidable:

\[ L_2 = \{ \langle G \rangle \mid G \text{ is a CFG and } L(G) = \{ \epsilon \} \} \]

Problem 3 Show that the following language is decidable:

\[ L_3 = \{ \langle M, w \rangle \mid M \text{ is a Turing machine, } w \text{ is a string, and } M \text{ does not visit any state more than once when run on input } w. \} \]