1. Using the construction in Theorem 4.1 construct ndfa’s that accept
   a. \( L((a + b)a^*) \cap L(baa^*) \)
   b. \( L(ab^*a) \cap L(a^*b^*a) \)

2. Using the facts that if \( L_1 \) and \( L_2 \) are regular languages then \( L_1 \cup L_2, L_1 \cap L_2, L_1L_2, \overline{L_1} \), \( L_1^* \) and \( L_1^R \) are also regular explain why the following are true
   a. For \( L \) a regular language explain why the language \( \{vw \mid v \in L, w \in L^R \} \) is also regular
   b. For \( L_1 \) and \( L_2 \) regular explain why the \( nor \) of two languages defined by
      \[
      nor(L_1,L_2) = \{ w : w \in \overline{L_1} \text{ and } w \in \overline{L_2} \}
      \]
      is regular

3. Show there is an algorithm for determining if \( L_1 \subseteq L_2 \) for any regular languages \( L_1 \) and \( L_2 \) by determining if a certain regular language is empty. What is that language?