1. Construct a DFA and a regular expression for the following languages over \( \{0, 1\} \).
   (a) \( \{ w \mid w \text{ has at least three 1s and at least 2 0s} \} \)
   (b) \( \{ w \mid w \text{ has even length and an odd number of 1s} \} \)
   (c) \( \{ w \mid w \text{ does not contain exactly two 1s} \} \)

2. Show that the following language \( L \) over \( \{0, 1\} \) is regular
\[
L = \{ w \mid w \text{ contains an equal number of occurrences of the substrings 01 and 10} \}.
\]

3. If \( A \) and \( B \) are regular languages over \( \Sigma \), show that
\[
Pshuffle(A, B) = \{ w = a_1b_1\ldots a_kb_k \mid a_1\ldots a_k \in A \text{ and } b_1\ldots b_k \in B \}
\]
is also regular.

4. If \( A \) and \( B \) are regular languages over \( \{0, 1\} \), show that
\[
A \upharpoonright B = \{ w \in A \mid \text{ for some } y \in C, w \text{ and } y \text{ contain an equal number of 1s} \}
\]

5. Minimise the following DFAs.