1. (Sipser Exercise 1.22) Define a comment as a string that begins with the two characters "/*", ends with the two characters "*/" and does not contain a "*/" combination otherwise. For simplicity we consider comments consisting of only characters 'a', 'b', '*' and '/'. Give a (a) DFA (b) regular expression for the language that consists of all comments.

2. Create a DFA for the language \((0 \cup 01)^*\) in alphabet \{0, 1\}. Try to make the DFA as simple as possible. Then construct an NFA for the same language, using the construction for converting a regular expression into an NFA (proof of Lemma 1.55 in Sipser's book). Then convert your NFA into a DFA using the procedure from Sipser's Theorem 1.39. Compare the two DFAs with each other.

3. Convert the following DFA into a regular expression using the method given in Lemma 1.60 of Sipser's book:

![DFA Diagram]

4. (Sipser Problem 1.43) For an arbitrary language \(A\) over alphabet \(\Sigma\), let the language \(\text{DROP-OUT}(A)\) consist of all strings that can be obtained by dropping out one symbol from a string in \(A\). Hence,

\[
\text{DROP-OUT}(A) = \{ uv \mid u, v \in \Sigma^* \text{ and } uav \in A \text{ for some } a \in \Sigma. \}
\]

Prove that if \(A\) is regular, then so is \(\text{DROP-OUT}(A)\). Give the proof on the same level of detail as the proofs of Theorems 1.45, 1.47, and 1.49.