Problem 1
Construct an automaton whose language is the set of all strings of odd length over alphabet $\Sigma = \{a, b\}$.

Problem 2
Consider again the alphabet $\Sigma = \{a, b\}$.

1. Construct an automaton whose language $L_1$ is the set of all strings that contain at least two $a$’s.
2. Construct an automaton whose language $L_2$ is the set of all strings that contain at most three $b$’s.
3. Construct an automaton whose language $L_3 = L_1 \cap L_2$.

Problem 3
Let alphabet $\Sigma$ be $\{0, 1\}$.

1. Construct a nondeterministic automaton whose language is the set of all strings that contain 010 as a substring.
2. Determinize your solution from part 1.

Problem 4
Let alphabet $\Sigma$ be $\{0, 1\}$. Construct an automaton whose language is the set of all strings where the number of occurrences of the substring 01 is the same as the number of occurrences of the string 10.