You are strongly encouraged to do all of the problems. However, only the ones marked with (*) will be graded.

(*) **Question 1:** Construct an NFA (non-deterministic finite automata) for the following language.

\[ L = \{ x \in \{a, b\}^* \mid \exists y, z \text{ such that } x = yz, y \text{ has an odd number of } 'b' \text{ symbols,} \]
\[ \text{and } z \text{ begins with the string } 'aa' \} \]

(Examples of strings in the language: \( x = babaa \), and \( x = abaabbaa \). However, \( x = bbaababaa \) is not in the language.)

(*) **Question 2:** Convert the NFA from the previous problem into a DFA, as we did in class.

**Question 3:** 9.6 in the book.

**Question 4:** 9.18 in the book.