0. NFAs 1
(a) Construct an NFA for the language "all binary strings ending in either 011 or 110".

Solution:

(b) Construct an equivalent DFA for the same language.

Solution:
1. NFAs 2

(a) Construct an NFA for the language "all strings from the alphabet $\Sigma = \{0, 1, 2\}$ containing only 0's and 1's, and at most one 1".

For instance, the strings 0000, 0010, 1000, 0, 1, and $\epsilon$ should be accepted. The strings 0101, 2, 000020, 102000, 011, should be rejected.

**Solution:**

![NFA Diagram](image1)

(b) Construct an NFA for the language "all binary strings that have a 1 as one of the last three digits".

**Solution:**

![NFA Diagram](image2)
2. DFA to NFA, DFA Minimization

Let $L$ be the language where the alphabet is $\Sigma = \{0, 1, 3, 9\}$ such that $w \in L$ iff. The string "311" is a substring of $w$.

(a) Give an NFA to accept strings in $L$.

**Solution:**

```
0,1,9,3
q1  3  q2  1  q3  1  q4
```

(b) Give an equivalent DFA for your NFA (using the algorithm from 311).

**Solution:**

```
\{q_1\}  3  \{q_1, q_2\}  1  \{q_1, q_3\}  1  \{q_1, q_4\}
```

(c) Is your DFA minimized? If not, give the minimized DFA using the algorithm from 311.

**Solution:**

```
\{q_1\}  3  \{q_1, q_2\}  1  \{q_1, q_3\}  1  \{q_1, q_4\}
```