Exercise 2.33.

Let x be a string of length n in $\{a, b\}^*$, and let $L = \{x\}$.

How many equivalence classes does $\equiv_L$ have? Describe them.

Exercise 2.36.

For a certain language $L \subseteq \{a, b\}^*$, $\equiv_L$ has exactly four equivalence classes. They are $[\Lambda]$, $[a]$, $[ab]$ and $[b]$.

It is also true that the three strings a, aa, and abb are all equivalent,
and that the two strings b and aba are equivalent.

Finally, $ab \in L$, but Λ and a are not in L, and b is not even a prefix of any element of L.

Draw an FA accepting L.

Exercise 2.37.

Suppose $L \subseteq \{a, b\}^*$ and $\equiv_L$ has three equivalence classes. Suppose they can be described as the three sets $[a]$, $[aa]$, and $[aaa]$, and also as the three sets $[b]$, $[bb]$, and $[bbb]$.

How many possibilities are there for the language L? For each one, draw a transition diagram for an FA accepting it.

Exercise 2.38.

a.

Exercise 2.40.

Exercise 2.55.

For each of the FAs pictured in Fig. 2.45 (on the blackboard), use the minimization algorithm described in Section 2.6 to find a minimum-state FA accepting the same language. (It's possible that the given FA is already minimal.)

c.

a.