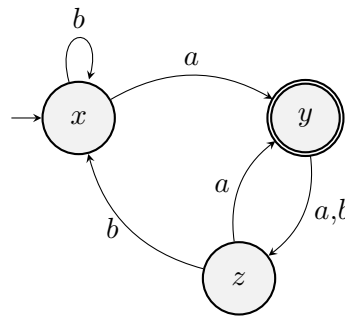


Except for Exercise 8, you are asked to create DFAs (deterministic finite automata) for the listed languages on the alphabet $\Sigma = \{0, 1\}$.

1. Σ^* , the collection of all words, including the empty word ε .
2. The empty language, \emptyset .
3. $\{\varepsilon\}$.
4. $\{\varepsilon, 110\}$.
5. Words of length 4.
6. Words with length a multiple of 4.
7. Nonempty words whose beginning and ending characters differ.
8. Consider the following DFA.



- (i) Give a formal description $(Q, \Sigma, \delta, q_0, F)$ for this language, including a table defining δ .
 - (ii) What language is recognized by this DFA?
9. Construct DFAs A and B such that $L(A)$ is the language of all words with length divisible by 2 and $L(B)$ is the language of all words with length divisible by 3. Use the Cartesian product construction from the text to create a DFA C such that $L(C) = L(A) \cup L(B)$, labeling the states accordingly.
 10. Words with length divisible by either 2 or 3 but not both.
 11. Words with the same number of 0s as 1s.