CIT 596 Homework 1

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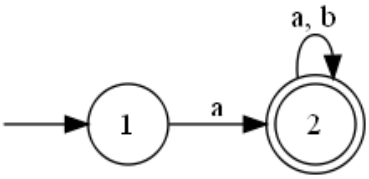
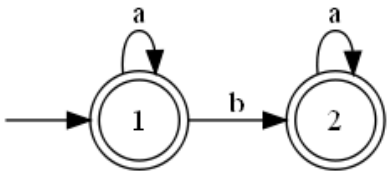
1 Exercise 1.4

1.1 Exercise 1.4 e

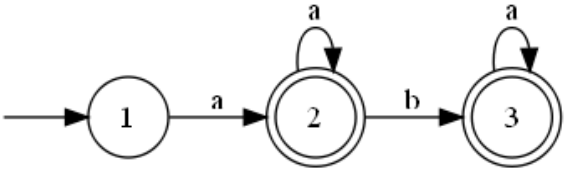
Create a DFA that accepts the language $\{\omega \mid \omega$ starts with an a and has at most one $b\}$.



(a) A accepts $\{\omega \mid \omega$ starts with an $a\}$



(b) B accepts $\{\omega \mid \omega$ has at most one $b\}$

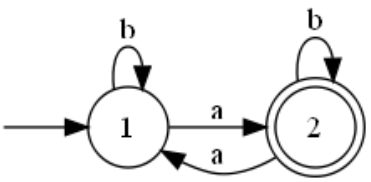


(c) DFA that accepts AB

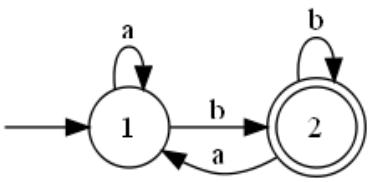
Figure 1: DFA for Exercise 1.4e

1.2 Exercise 1.4 f

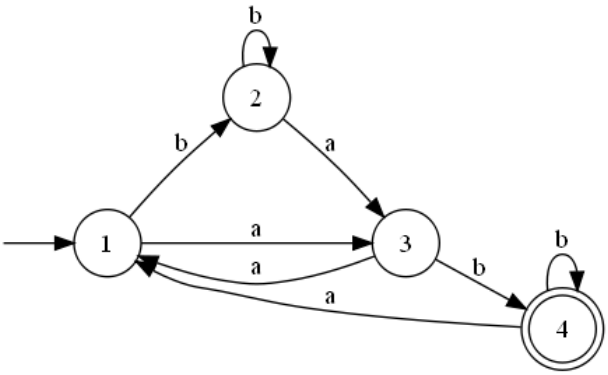
Create a DFA that accepts the language $\{\omega \mid \omega$ has an odd number of a's and ends with a $b\}$.



(a) A accepts $\{\omega \mid \omega$ has an odd number of a's$\}$



(b) B accepts $\{\omega \mid \omega$ ends with a $b\}$

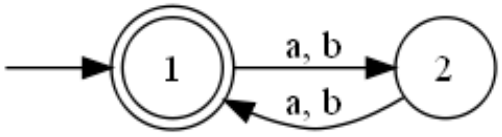


(c) DFA that accepts AB

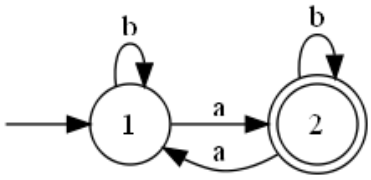
Figure 2: DFA for Exercise 1.4f

1.3 Exercise 1.4 g

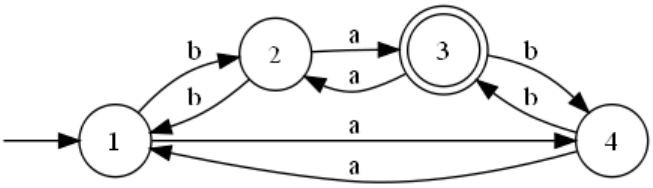
Create a DFA that accepts the language $\{\omega \mid \omega$ has an even length and an odd number of a's$\}$.



(a) A accepts $\{\omega \mid \omega$ has an even length$\}$



(b) B accepts $\{\omega \mid \omega$ has an odd number of a's$\}$



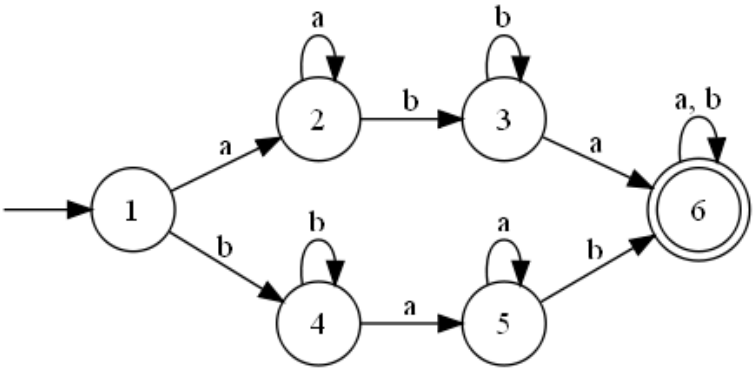
(c) DFA that accepts AB

Figure 3: DFA for Exercise 1.4g

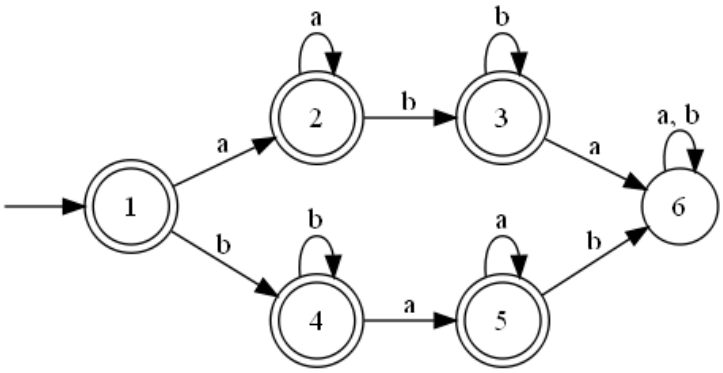
2 Exercise 1.5

2.1 Exercise 1.5 c

Create a DFA that accepts the language $\{\omega \mid \omega$ conains neither the substrings ab nor $ba\}$.



(a) A accepts $\{\omega \mid \omega$ contains ab and $ba\}$

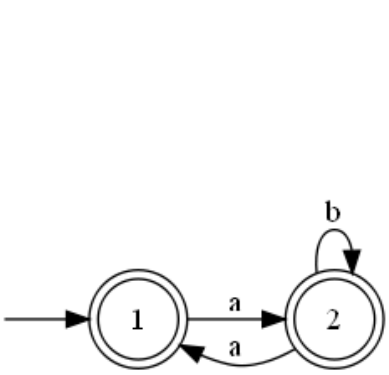


(b) DFA that accepts $\overline{A}$

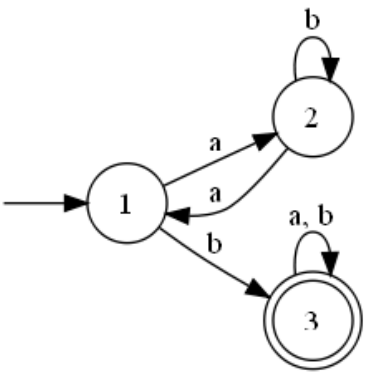
Figure 4: DFA for Exercise 1.5c

2.2 Exercise 1.5 e

Create a DFA that accepts the language $\{\omega \mid \omega \text{ is any string not in } (ab^\star)^\star\}$.



(a) A accepts $\{\omega \mid \omega \text{ is in } (ab^\star)^\star\}$

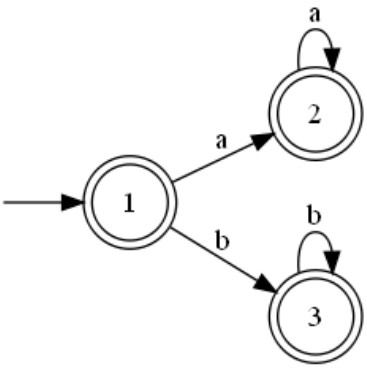


(b) DFA that accepts $\overline{A}$

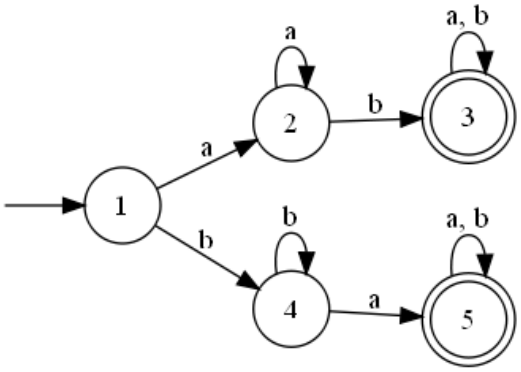
Figure 5: DFA for Exercise 1.5e

2.3 Exercise 1.5 f

Create a DFA that accepts the language $\{\omega \mid \omega \text{ is any string not in } a^\star \bigcup b^\star\}$.



(a) A accepts $\{\omega \mid \omega \text{ is in } a^\star \bigcup b^\star\}$



(b) DFA that accepts $\overline{A}$

Figure 6: DFA for Exercise 1.5f

3 Exercise 1.6

3.1 Exercise 1.6 c

Create a DFA that accepts the language $\{\omega \mid \omega \text{ contains } 0101\}$.

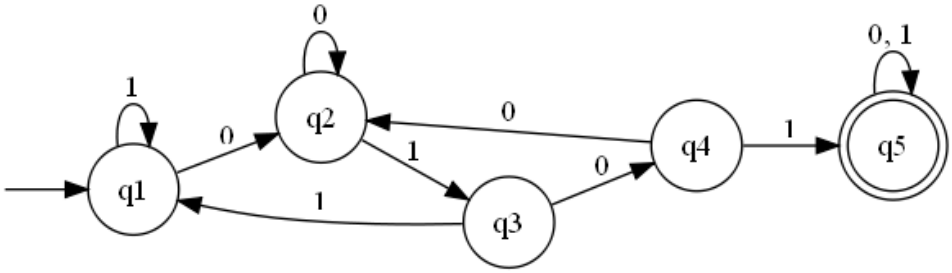


Figure 7: DFA for Exercise 1.6c

3.2 Exercise 1.6 e

Create a DFA that accepts the language $\{\omega \mid \omega$ starts with 0 and has an odd length or ω starts with 1 and has an even length$\}$.

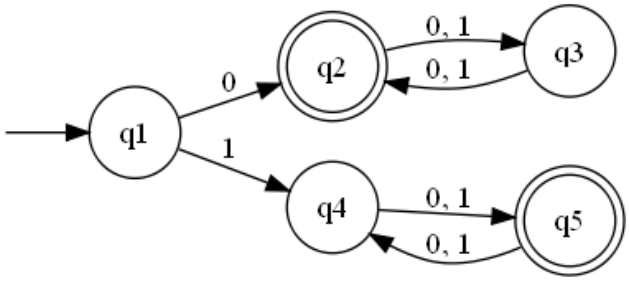


Figure 8: DFA for Exercise 1.6e

3.3 Exercise 1.6 g

Create a DFA that accepts the language $\{\omega \mid$ the length of ω is at least 5$\}$.

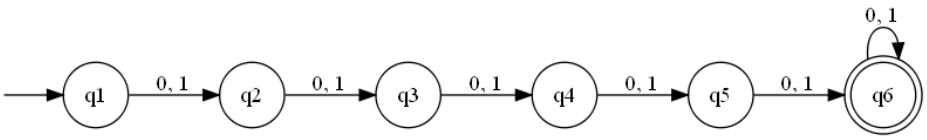


Figure 9: DFA for Exercise 1.6g

3.4 Exercise 1.6 i

Create a DFA that accepts the language $\{\omega \mid$ every odd position of ω is a 1$\}$.

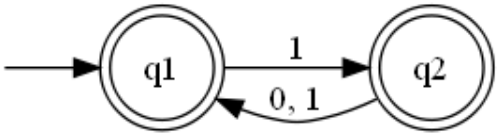


Figure 10: DFA for Exercise 1.6i

3.5 Exercise 1.6 j

Create a DFA that accepts the language $\{\omega \mid$ contains at least two 0s and at most one 1$\}$.

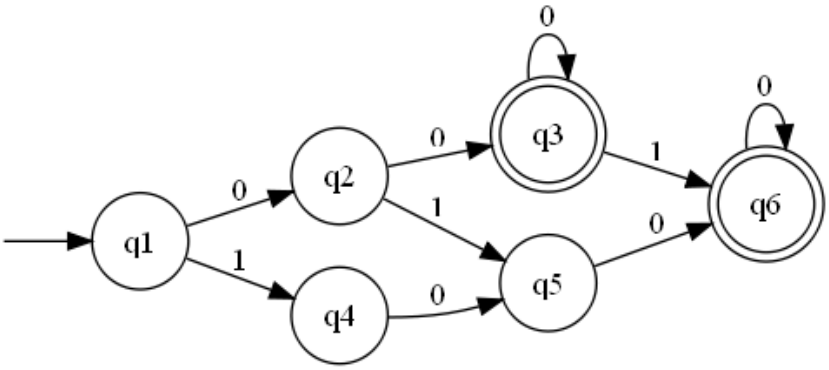


Figure 11: DFA for Exercise 1.6j

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TODO

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TODO