Exercise 2.1

We did the tutorial, but are so kind to only upload the pdf without all the .jff files ;)

Exercise 2.2

(a) This is the graphical representation of the DFA $M = \langle \{ q_0, q_1, q_2, q_3 \}, \{ a, b \}, \delta,\ q_0, \{ q_2 \} \rangle$.
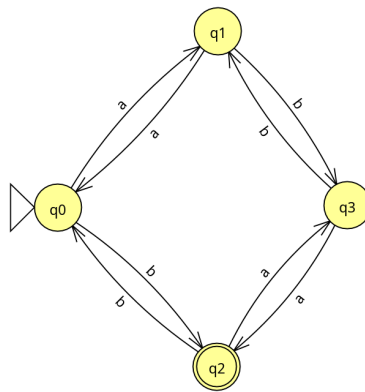

Figure 1: Graphical representation of DFA M

(b) For the sequence "abbab", we visit the following states:

$$q_0 \to q_1 \to q_3 \to q_1 \to q_0 \to q_2$$

As you can see, we end up at q_2 which is actually one, and the only, final state of the DFA M.

(c) M recognizes every language that has an odd number of "b"'s in it (at least one) and that has 0 or an even number of "a"'s. So the minimal length of the words of the language has to be 1, since you have to reach q_2 from q_0.
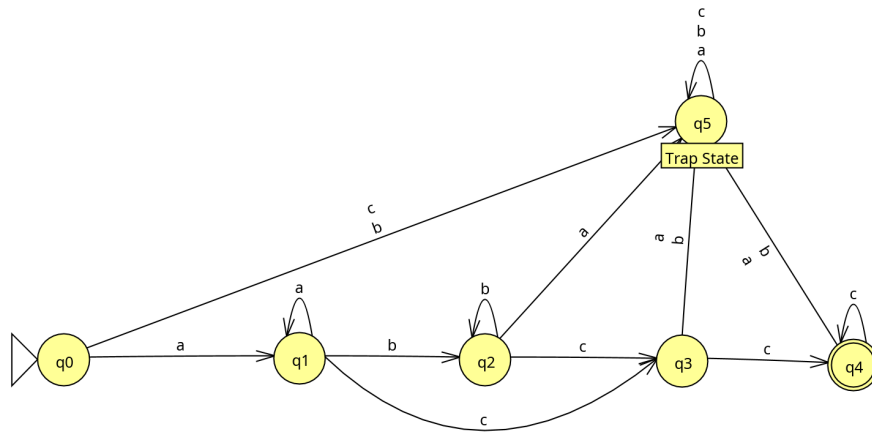
Theory of Computer Science
Spring semester 2023
Exercise 2

Nico Bachmann
Ruben Hutter
Page 2 of **??**

Exercise 2.3

Figure 2: The DFA for the language $L = \{\, a^x\, b^y\, c^z \mid x \geq 1,\ y \geq 0,\ z \geq 2 \,\}$

Theory of Computer Science
Spring semester 2023
Exercise 2

Nico Bachmann
Ruben Hutter
Page 3 of ??

Exercise 2.4

(a) Yes, because if we follow the states given by the word 0101010 we end up at q_2, which is a final state of the NFA.

   After the first 0 we end up at q_2, from which we can go back to q_0 (with ϵ) and then go to q_1 with 1. The following elements 010 we do by staying on q_1; then we go to q_2 with 1 and we end on q_2 with the last 0 passing by q_0.

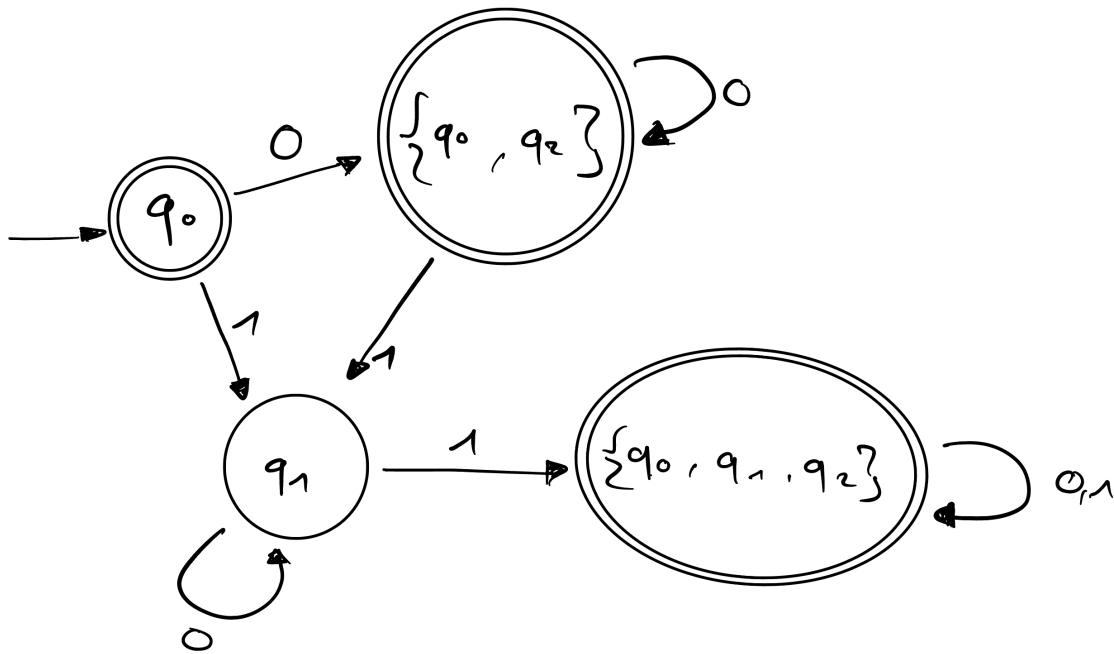(b) This is the DFA equivalent to the NFA on the Exercise sheet:

Figure 3: DFA