Theoretical Computer Science

Winter semester 21/22

Prof. Dr. Georg Schied

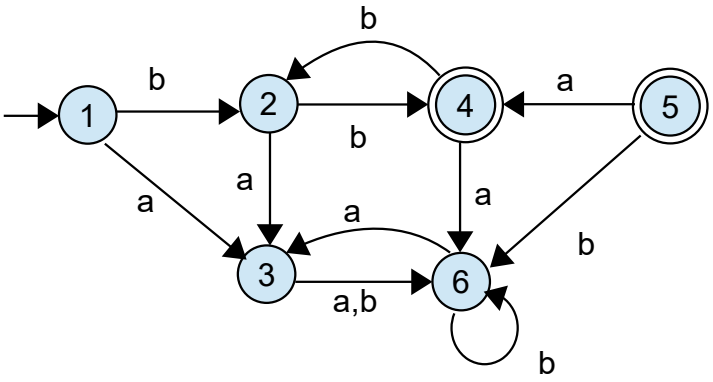
Assignment 6

Deadline: Wednesday, 17 November 2021

9 out of 18 points have to be achieved in order to pass.

Exercise 6.1

Let *A* be the following DFA. Answer the following questions (with short justification).



a) Are states 2 and 4 **equivalent**?

b) Are states 2 and 3 **distinguishable**?

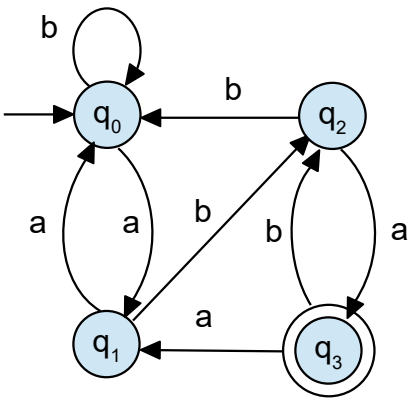
c) Are states 3 and 6 **distinguishable**?

d) Is *A* a **minimal** automaton?

Hint: It is not necessary to compute all equivalent states using the algorithm from lesson 11.

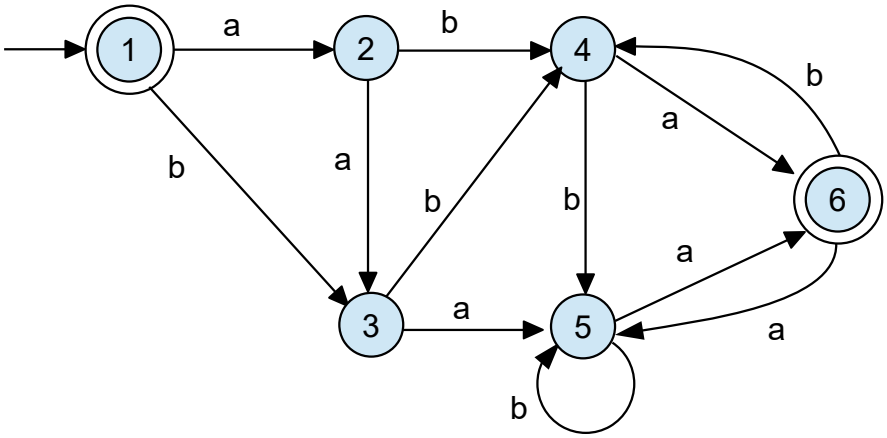
Exercise 6.2

Compute all *equivalent states* of the following DFA, using the table-based algorithm.



Exercise 6.3 – obligatory (10 points)

Let A be the following DFA:

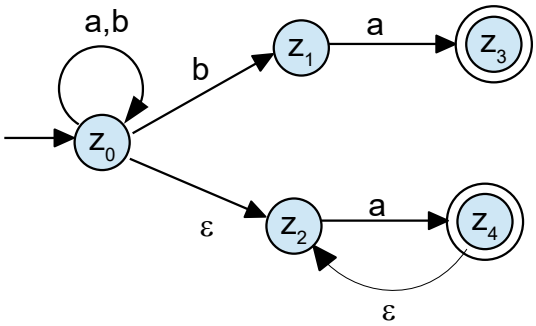


a) Compute all *equivalent states* of the DFA. Show the intermediate steps of the computation.

b) Build an equivalent *minimal automaton*.

Exercise 6.4 - obligatory (4 points)

Let the following ε-NFA *A* be given:



a) Which of the following strings are accepted by *A*?

(1) ε

(2) a

(3) aa

(4) bb

(5) bbaa

(6) aabb

b) Which language is accepted by *A*?

Exercise 6.5 - obligatory (4 points)

Let Σ = {a, b, c, d}. Define an ε-NFA that accepts all strings that *end* with `cddc`, `cdab` or `abab`.