

Formal Models SS 2017: Assignment 1

Institute for Formal Models and Verification, JKU Linz

Due 15.03.2018

To indicate that you solved an exercise and that you can present it in the exercise group, tick it off in our MOODLE course until **8am on the day of the exercise**.

Exercise 1

Specify an automaton over alphabet $\{0, 1\}$ that accepts exactly those words containing an odd number of 0 and an even number of 1.

1. Graphically specify the automaton which accepts exactly the words described above.
2. Formally specify the automaton as a 5-tuple, including all of its components.

Exercise 2

Draw an FA A with input-alphabet $\Sigma := \{a, b\}$ having *exactly* 2 states such that...

1. ... A is non-deterministic and incomplete.
2. ... A is deterministic and incomplete.
3. ... A is non-deterministic and complete.
4. ... A is deterministic and complete.

Justify each of your solutions.

Exercise 3

Specify an automaton over the alphabet $\{a, b, c\}$ which accepts the words of the language with the following properties:

- (1) a word ends with at least two b
- (2) symbol a is always followed by an odd number of c
- (3) there are no other restrictions on the words

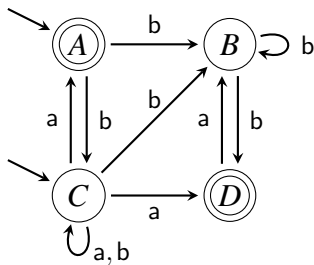
Examples: $bb, acbb, baccbbcbacbbb, \dots$

1. Graphically specify the automaton which accepts exactly the words described above.
2. Is the automaton deterministic?
3. Is the automaton complete?

Exercise 4

Show the product automaton of A_1 and A_2 shown below.

A_1 :



A_2 :

