

# Exercise 2: Automata Theory

Formal Methods II, Fall Semester 2013

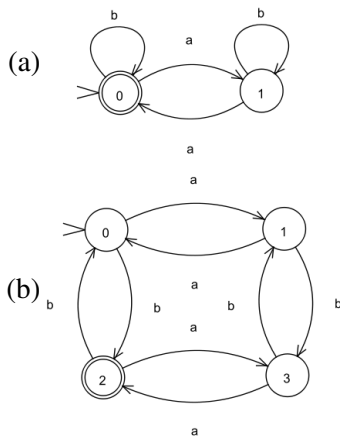
## Solution Sheet

### Finite State Automata – Theoretical Exercises

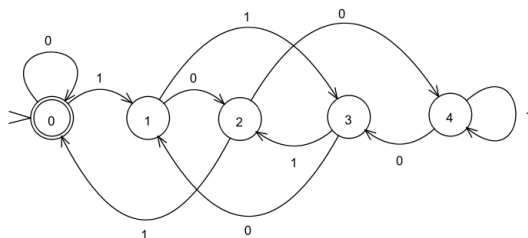
1. (2 points)

- (a) All strings over  $\{0,1\}$  which end with an odd number of 1's.
- (b) All strings over  $\{a,b,c\}$  which contain the substring  $ba$ .

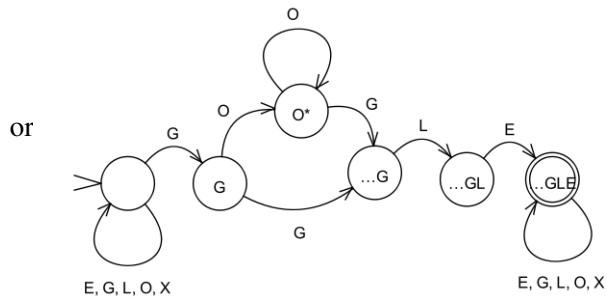
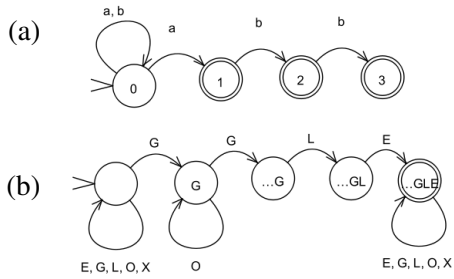
2. (2 points) Note that 0 is an even number!



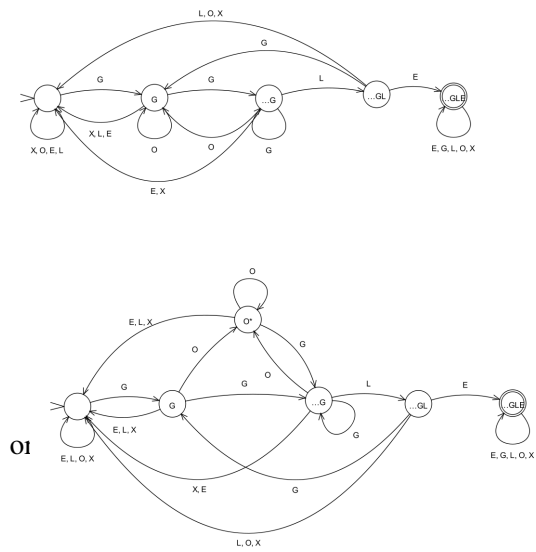
**Bonus** (3 points) Each state indicates the residue class, i.e. the number so far modulo 5. A 0 as input corresponds to “multiply by 2” and a 1 corresponds to “multiply by 2 and add 1”.



3. (6 points)



The simplest possible DFA that corresponds to the NFA of point (b):



<sup>1</sup>No full points for this solution.

## **Parsers – Practical Exercise**

4. The commented solution files can be found on the course website.