

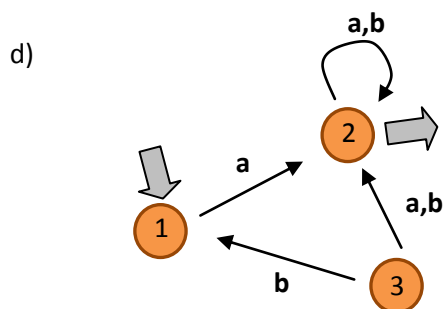
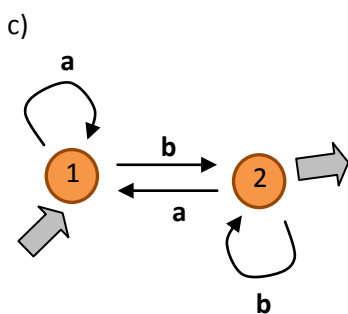
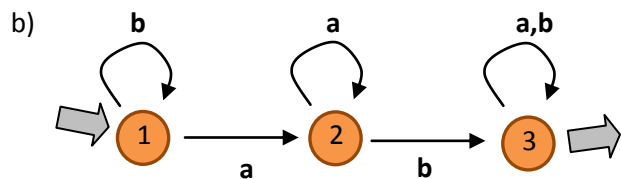
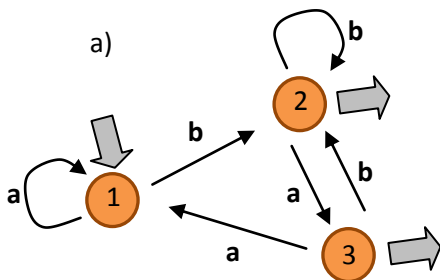
Automata and Grammars

Seminar 5

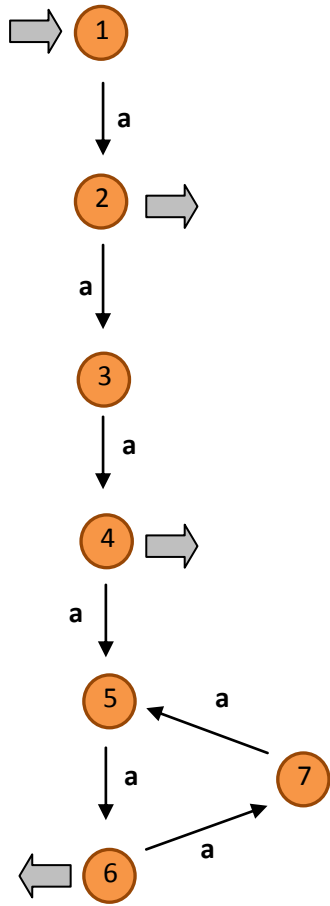
- Construct regular expressions that represent following languages over alphabet $X = \{a, b\}$:
 - a language consisting of strings that contain $aaba$ as a substring
 - a language consisting of strings that have prefix abb and suffix $bbaa$
 - a language consisting of strings where the number of occurrences of a is divisible by 3
 - a language consisting of strings that have the same pair of symbols at the beginning and at the end
 - a language consisting of strings that do not contain substring aa
- Design an algorithm that decides whether a pair of regular expressions is equivalent; that is, whether they represent the same language. Apply the algorithm on the following pair of regular expressions:

$$(a + b)(a + b)^* \quad a \quad a(a + b)^* + b(a + b)^*$$

- Construct finite automata that accept languages represented by following regular expressions:
 - $ab + ba$
 - $a^2 + b^2 + ab$
 - $a + b^*$
 - $(ab + c)^*$
 - $((ab + c)^+ a(bc)^* + b)^*$
 - $((ab + c)^* a(bc)^* + b)^*$
 - $(01^* + 101)^* 0^* 1$
 - $(01)^* 11(01)^* + (0 + 1)^* 00$
- Construct regular expressions that represent languages accepted by following finite automata:



e)



f)

