Formal Language Theory
Regular Language Supplementary Exercises
COMP 2230
Spring 2024
prof. stucki…

1) For each of the following languages over the alphabet Σ = {0, 1} construct

   a) a regular expression
   b) a finite state automaton
   c) a regular grammar

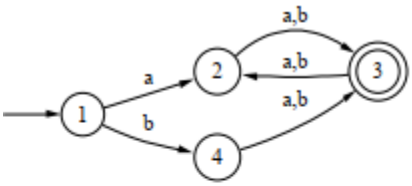
i. {*w* : *w* consists of any number of 0s and an even number of 1s}
ii. {*w* : the length of *w* is 4*i*+1 for some $i \geq 0$}
iii. {*w* : the length of *w* is 4*i*+1 for some $i \geq 0$ and *w* ends with a 0}
iv. {*w* : *w* does not contain either 00 or 11 as substrings}
v. {*w* : *w* contains 00100 as a substring}
vi. {001, 1, 1010}

2) Describe in concise English the property or properties shared by all of the strings in the languages described by the following regular expressions. For example (0+1)(0+1) is the language of all strings of length 2 over the alphabet Σ = {0, 1}.

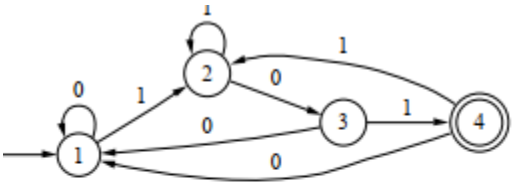
i. (0+1)*01
ii. 1*01*
iii. (11)*
iv. (0+1)*1100(0+1)*
v. 1*0*
vi. 0(0+1)*0 + 1(0+1)*1

3) Describe the languages accepted by the following automata. You may use English or regular expressions to express your answer.

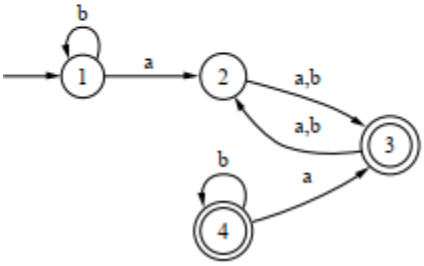
i.



iii,



ii.



iv.