

Foundation of Computer Science — FM2
Assignment 3 on the video lectures of “Week 2”

1. Give regular expressions for the following languages:
 - (a) the set of all strings over alphabet $\{a, b, c\}$ that contain an even number of as ,
 - (b) the set of all binary numbers divisible by 4 (with no prefixes consisting of needless digits 0),
 - (c) the set of all strings over $\{a, b, c\}$ *not* containing the substring baa .
2. Give a DFA accepting the language specified by $a^*b(ca^*b)^*d^+e$.
3. Consider the language of all strings that are specified as follows: An underscore ($_$) or one or more as , followed by at most one b .
 - (a) Give a regular expression for this language.
 - (b) Construct from the regular expression an NFA (allowing ϵ -transitions). Use the algorithm from the proof showing equivalence between regular expressions and NFAs with ϵ -transitions.
 - (c) Construct from this NFA an equivalent DFA. Note that, in particular, the ϵ -transitions have to be removed.