Compilation Principle Homework 1

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2.1 Write regular expressions for the following character sets, or give reasons why no regular expression can be written:

(a) All strings of lowercase letters that begin and end in a.

(c) All strings of digits that contain no leading zeros.

(d) All strings of digits that represent even numbers.

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| **Answer:**   1. The normal idea is a[a-z]\*a, but we need to notice that “a” is a special answer, so my result is: a|a[a-z]\*a. 2. [1-9][0-9]\* 3. [0-9]\*(0|2|4|6|8) |

2.8 Draw DFAs for each of the sets of characters of (a),(c) and (d) in Exercise 2.1, or state why no DFA exists.

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| **Answer:**   1. a|a[a-z]\*a       Tips: In final result 1,2 should in one state, here is a miswrite.   1. [1-9][0-9]\*      1. [0-9]\*(0|2|4|6|8) |

2.12 (a) User Thompson's construction to convert the regular expression (a|b)\*a(a|b|ε).

(b) Convert the NFA of part (a) into a DFA using the subset construction.

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| **Answer:**  (a)    (b) |