

# Lab Two

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## 1 CRAFTING A COMPILER

Exercise 3.3 Write regular expressions that define the strings recognized by the FAs in Figure 3.33 on page 107.

Answer:

A)  $(ab^*a)|(ba^*b)$

B)  $a|(abcda)|(ac^*da)$

C)  $\$(ab^*c)$

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Exercise 3.4 Write DFAs that recognize the tokens defined by the following regular expressions:

(a)  $(a | (bc)^*d)^+$

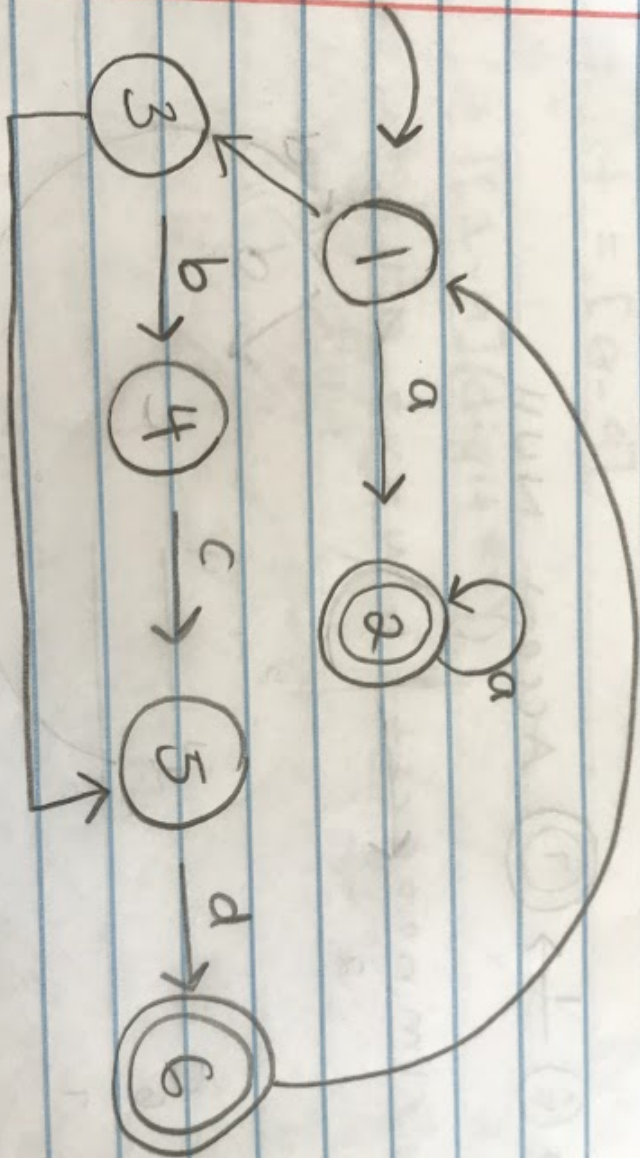
(b)  $((0 | 1)^*(2 | 3)^+ | 0011)$

(c)  $(a \text{ Not}(a))^*aaa$

Answer:

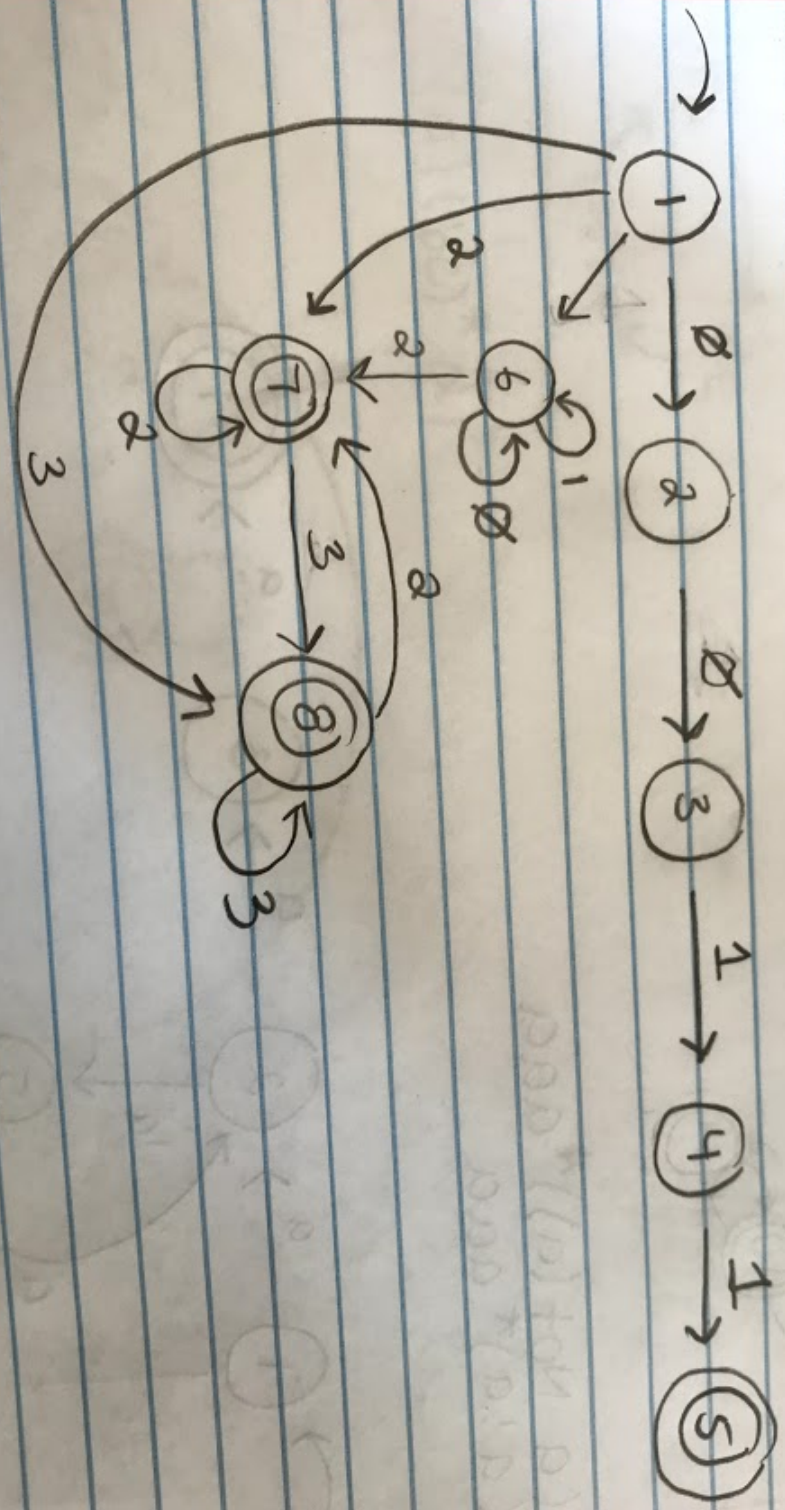
LAB2

$(a|(bc)^*d)^+$



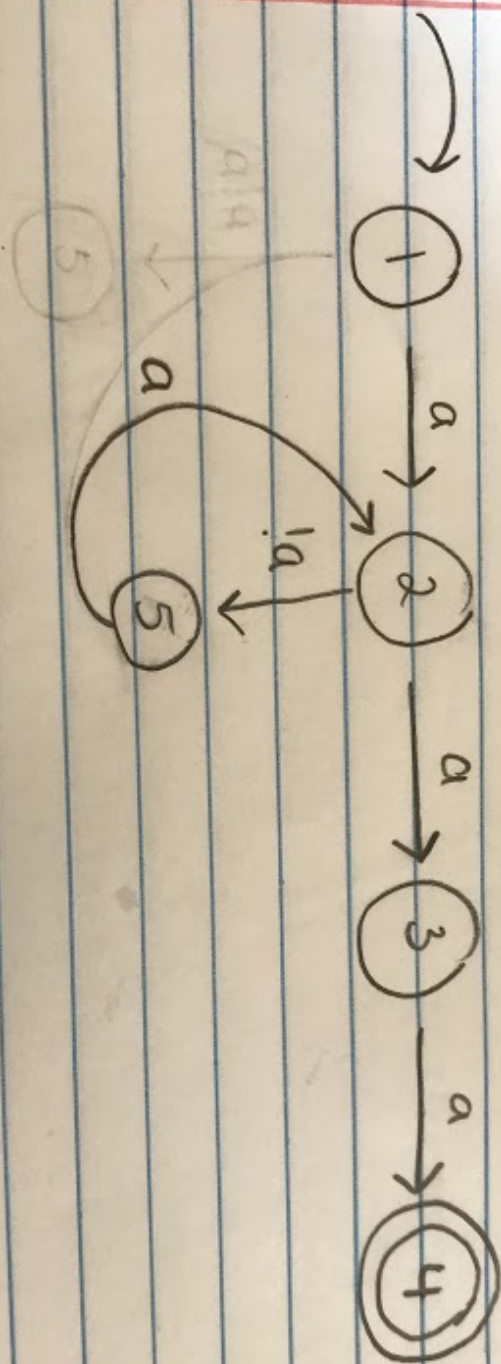
A)

$((\emptyset | 1)^* (2 | 3)^+ | \emptyset \emptyset 11$



B)

$(a \text{ Not } (a))^* a a a$   
 $(a!a)^* a a a$



c)

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Exercise 3.15 Show the NFA that would be created for the following expression using the techniques of Section 3.8:

$(ab^*c) \mid (abc^*)$

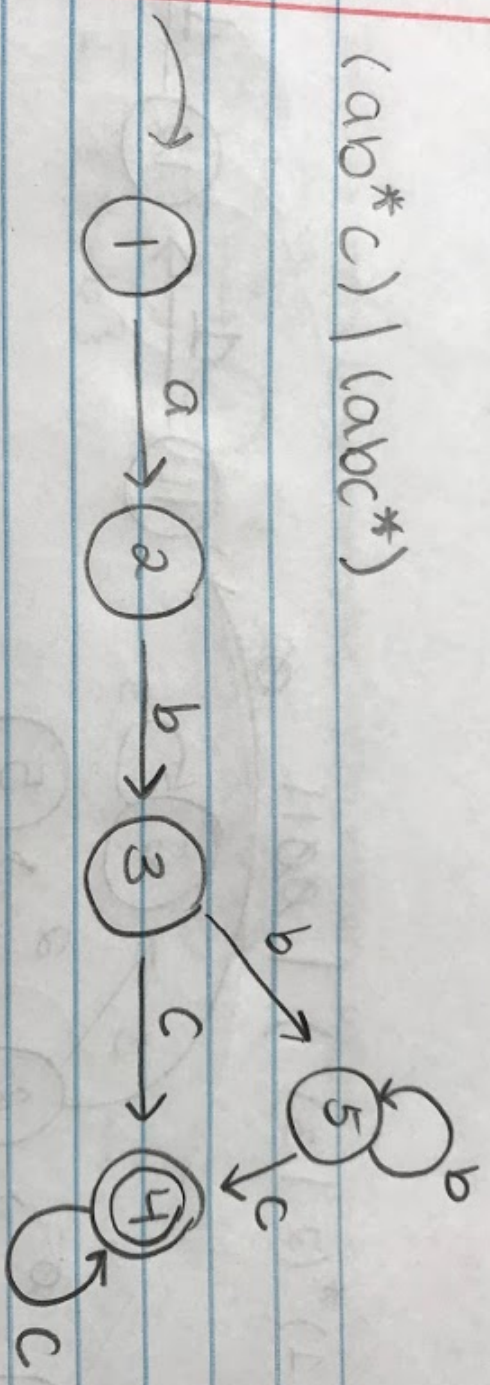
Using MakeDeterministic, translate the NFA into a DFA. Using the techniques of Section 3.8.3, optimize the DFA you created into a minimal state equivalent.

Answer:

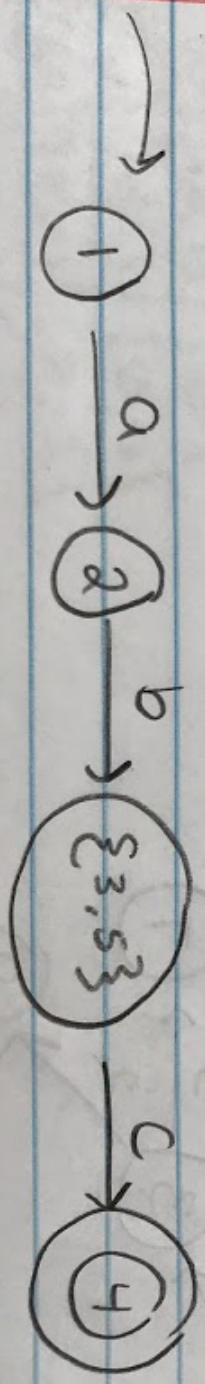


$(ab^*c) | (abc^*)$

NFA



DFA



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## 2 DRAGON

Exercise 3.3.4 Most languages are case sensitive, so keywords can be written only one way and the regular expressions describing their lexemes are very simple. However, some languages, like SQL, are case insensitive, so a keyword can be written either in lowercase or in uppercase, or in any mixture of cases. Thus, the SQL keyword `SELECT` can also be written `select` `Select`, or `sElEcT` for instance. Show how to write a regular expression for a keyword in a caseinsensitive language. Illustrate the idea by writing the expression for `select` in SQL.

Answer:

`[Ss][Ee][Ll][Ee][Cc][Tt]`