

Lab Two

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1 PROBLEM ONE - DRAGON

1.1 LEXICAL ANALYSIS

The first step the compiler executes is to take an input of characters from the source language and output them in a stream of tokens, which are called lexemes.

1.2 EXERCISE 3.3.4

Most languages are *case sensitive*, so keywords can be written only one way, and the regular expressions describing their lexeme is 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 case-insensitive language. Illustrate the idea by writing the expression for "select" in **SQL**.

1.2.1 ANSWER FOR 3.3.4

select -> [Ss][Ee][Ll][Ee][Cc][Tt]

2 PROBLEM TWO - CAC

2.1 EXERCISE 3.3

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

2.1.1 ANSWER FOR 3.3

(a) $(ab^*a) \mid (ba^*b)$

(b) $a|a((c|bc)da)^*$

(c) $\text{It}|(ab^*c)$

2.2 EXERCISE 3.4

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

(a) $(a \mid (bc)^*d)^{+}$

(b) $((0|1)^*(2|3)^{+}) \mid 0011$

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

2.2.1 ANSWER FOR 3.4

(a)

`(https://www.debuggex.com/r/h7YCz8oJm30ZT4PU)`

(b)

`(https://www.debuggex.com/r/YfxLcINP_8hGjXp9)`

(c)

`(https://www.debuggex.com/r/sZvY8PQnIWERCRLK)`