编译原理 第三次理论作业

何泽 18340052

Exercise 3.1

Give the recognized tokens of the following program in Pascal.

```
function max(i, j: integer): integer;
{return the maximum of integers i and j}
begin
    if i > j then max := i else max := j
end;
```

<Reserved words, function>, <Identifiers, max>, <Punctuation, (>, <Identifiers, i>, <Punctuation, , >, <Identifiers, j>, <Punctuation, : >, <Reserved words, integer>, <Punctuation,) >, <Punctuation, : >, <Reserved words, integer>, <Punctuation, ;>, <Punctuation, { >, <Constants, "return the maximum of integers i and j">, <Punctuation, } >, <Reserved words, begin>, <Reserved words, if>, <Identifiers, i>, <Operators, > >, <Identifiers, j>, <Reserved words, then>, <Identifiers, max>, <Operators, := >, <Identifiers, i>, <Reserved words, else>, <Identifiers, max>, <Operators, := >, <Identifiers, j>, <Reserved words, end>, <Punctuation, ;>

Exercise 3.2

(DBv2, Ch.3, pp.125, ex.3.3.2)Describe the languages denoted by the following regular expressions:

- a (a | b)* a
- a* b a* b a* b a*

- a (a | b)* a

  以a开头和结尾的由a和b组成的字符串

- a* b a* b a* b a*

  只包含三个b的由a和b组成的字符串

Exercise 3.3

(DBv2, Ch.3, pp.125, ex.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 Pascal and SQL, are case insensitive. For example, the SQL keyword **SELECT** can also be written **select**, **Select**, or **sELEcT**.

Show how to write a regular expression for a keyword in a case insensitive language. Illustrate your idea by writing the expression for **SELECT** in SQL.

select —> (s|S)(e|E)(l|L)(e|E)(c|C)(t|T)

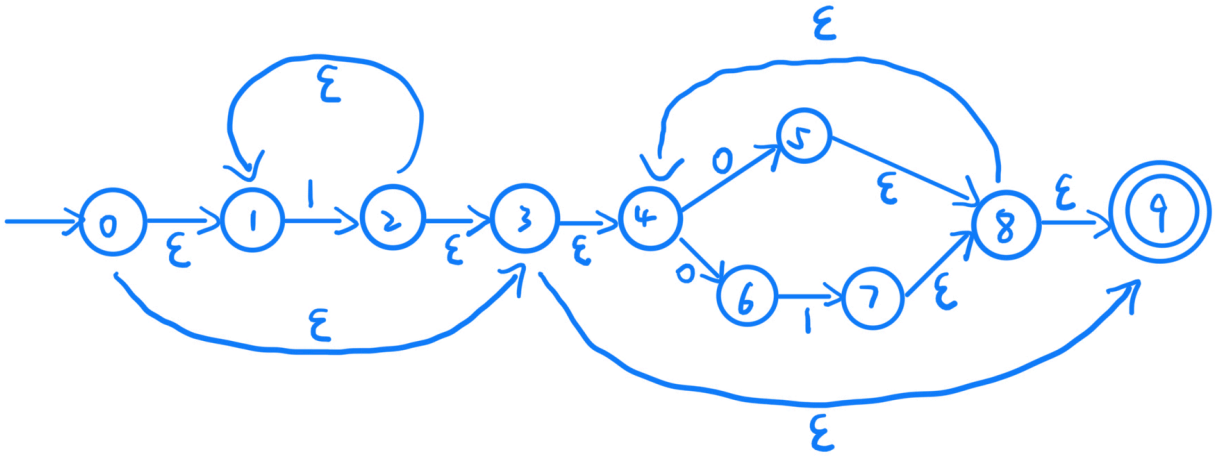
Exercise 3.4

Given the following regular expression

1*(0 | 01)*

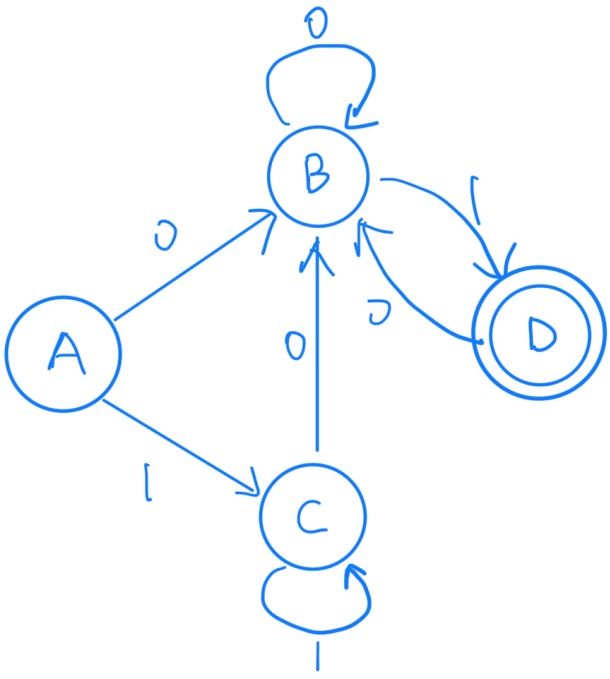
1. Transform it to an equivalent finite automaton.
2. Construct an equivalent DFA for the result of exercise (1).
3. Reduce the result of (2) and get a reduced DFA.

1.



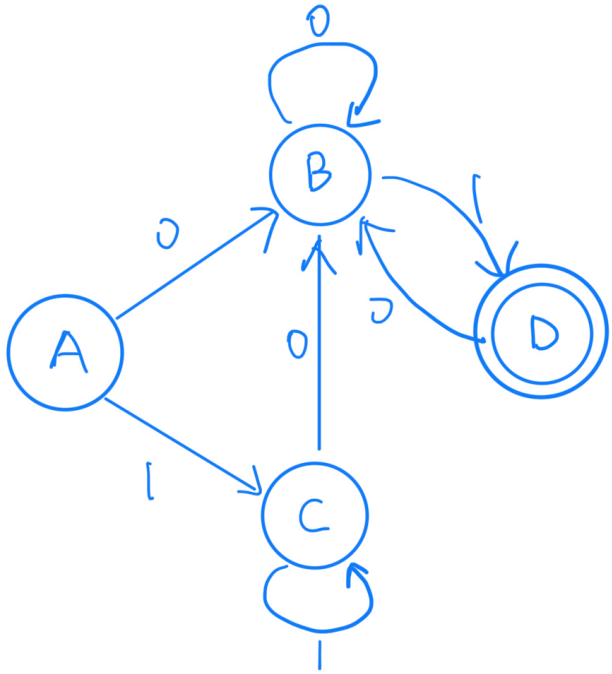
2.

NFA	DFA	0	1
{0,1,3,4,8,9}	A	{4,5,6,8,9}	{1,2,3,4,9}
{4,5,6,8,9}	B	{4,5,6,8,9}	{4,7,8,9}
{1,2,3,4,9}	C	{4,5,6,8,9}	{1,2,3,4,9}
{4,7,8,9}	D	{4,5,6,8,9}	∅



3.

上图已经是最小DFA了：

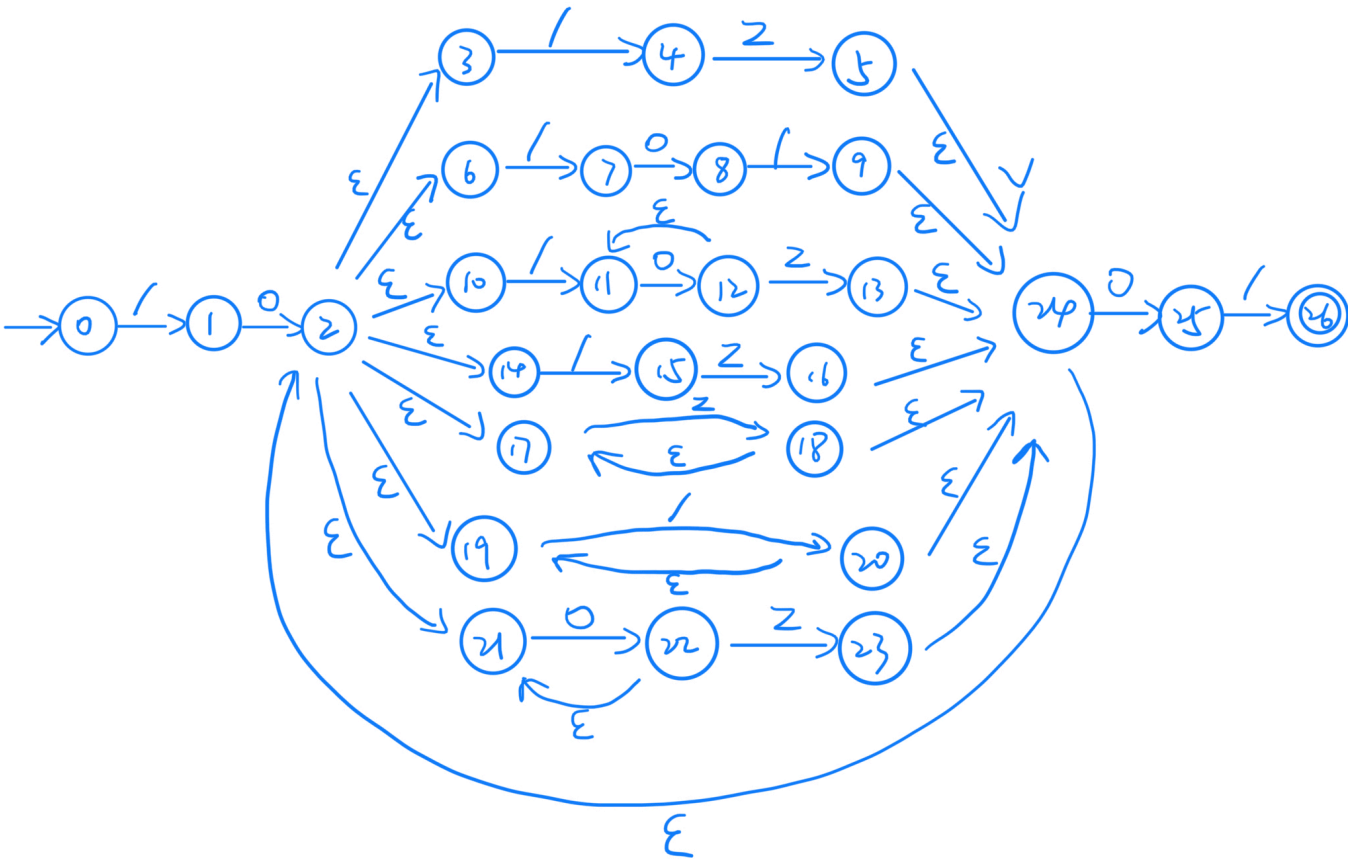


Exercise 3.5

Given the alphabet Σ = { z, o, / }, a comment in a program over Σ begins with "/o" and ends with "o/". Embedded comments are not permitted.

1. Draw a DFA that recognizes nothing but all the comments in the source programs.
2. Write a single regular expression that exactly describes all the comments in the source programs.

1.



2.

begin —> /o

end —> o/

middle —> /z | /o/ | /oo*z | /z | zz* | //* | oo*z

comments —> (begin)(middle)*(end)