编译原理 第2次作业

> 学号:

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;
```

解:

```
1 <Reserved words, function>, <Identifiers, max>, <Punctuation, ( >,
  <Identifiers, i>, <Punctuation, , >, <Identifiers, j>, <Punctuation, : >,
  <Reserved words, integer>,  <Punctuation, ) >,  <Punctuation, : >, <Reserved
  words, integer>,  <Punctuation, ;>,
2 <Reserved words, begin>,
3 <Reserved words, if>, <Identifiers, i>, <Operators, > >, <Identifiers, j>,
  <Reserved words, then>, <Identifiers, max>,  <Operators, := >,<Identifiers,
  i>, <Reserved words, else>, <Identifiers, max>,  <Operators, := >,
  <Identifiers, j>,
4 <Reserved words, end>, <Punctuation, ;>
```

https://www.cnblogs.com/xspss/archive/2011/10/24/2222185.html

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*

解:

- a (a | b)* a：以a开头和结尾，中间由任意多个（包括0个）的a和b组成的字符串
- a* b a* b a* b a*：有且仅有三个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.

解:

$r_{select} = (s|S)(e|E)(l|L)(e|E)(c|C)(t|T)$

Exercise 3. 4

- Given the following regular expression

$$1^*(0 \mid 01)^*$$

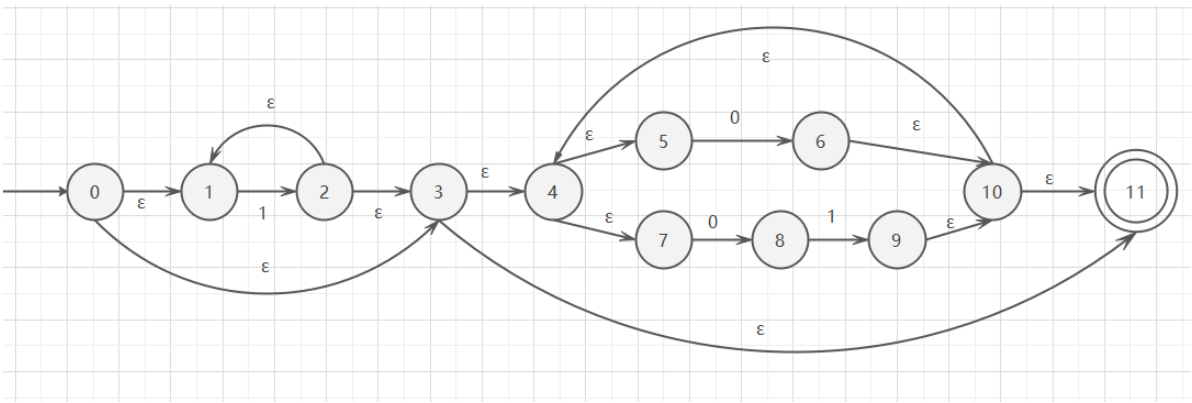
(1) Transform it to an equivalent finite automaton.

(2) Construct an equivalent DFA for the result of exercise (1).

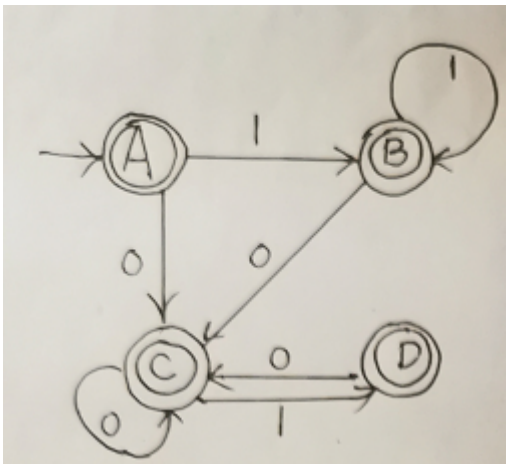
(3) Reduce the result of (2) and get a reduced DFA.

解:

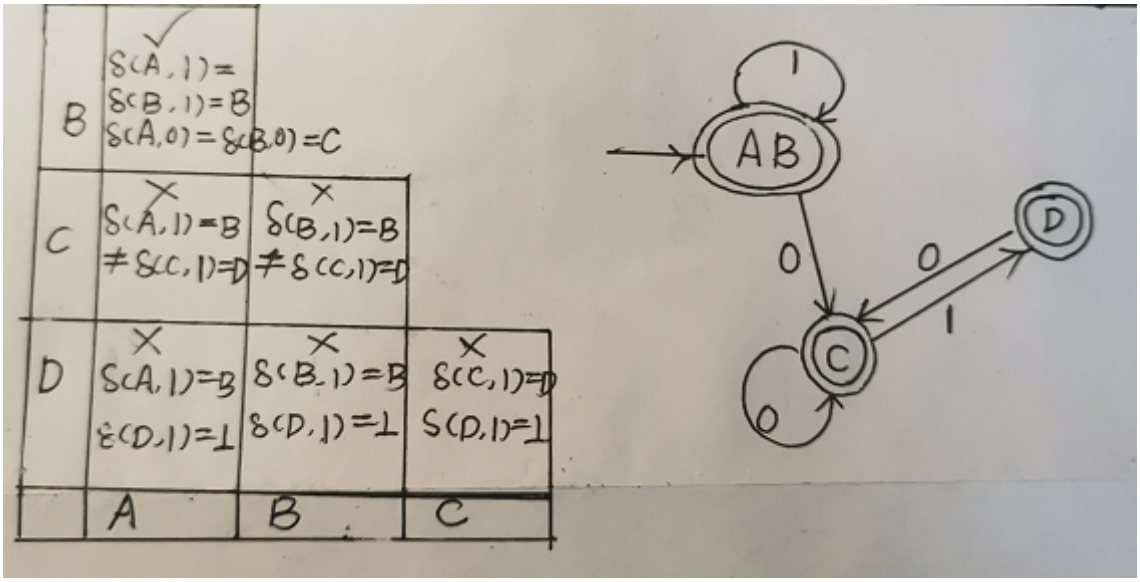
(1)



(2) A = {0,1,3,4,5,7,11}；B = {2,1,3,4,5,7,11}；C = {8,6,10,11,4,5,7}；D = {9,10,11,4,5,7}



(3){0,1,2,3,4,5,6,7,8,9,10} {11} (终止状态和非终止状态)



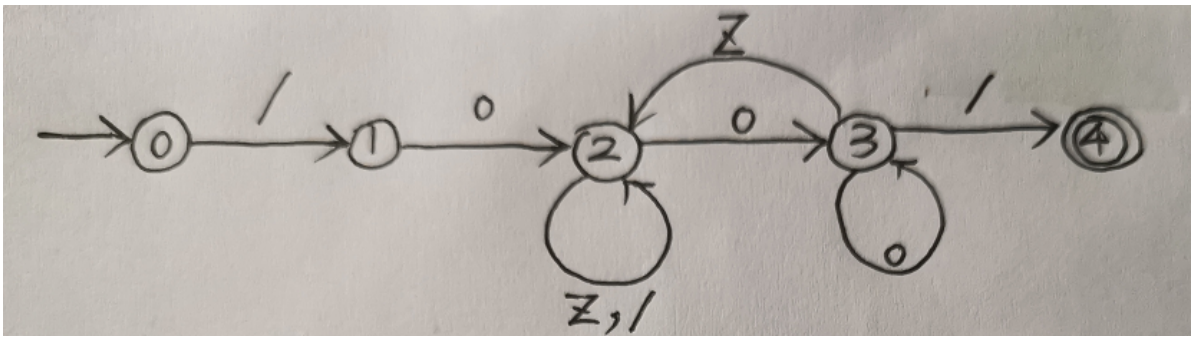
Exercise 3. 5

- 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.

解:

由题目可知，对于comments的识别，只识别第一个 `/o` 作为开始标志，第一个 `o/` 作为结束标志，不存在嵌套的结构。

(1)



(2)