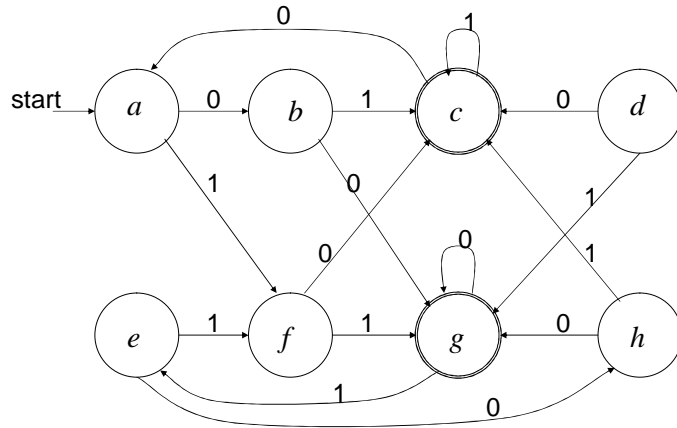


1. (10%) List 7 steps of a compiler process. Which of them are machine independent ? Which of them are machine dependent ?

2. (10%) For the following NFA, find the corresponding DFA with the minimum number of states.



3. (10%) Reduce the following transition table.

δ	Input		
	a	b	c
1	2	5	
2	3	4	1
3	5	2	
States 4	3	2	1
5	1	4	1
6	1		1
7	3	6	3

4.(10%). Is the following grammar LL(1) ? Explain why ?

$S \rightarrow ABBA$

$A \rightarrow a$

$A \rightarrow \epsilon$

$B \rightarrow b$

$B \rightarrow \epsilon$

5. (20%) Lab.

請用“簡短的”敘述回答以下問題（寫出重點即可，不需寫得太複雜）。

- (1) 在 main() 中呼叫哪個 function 程式才會去執行辨認 token 的動作？
- (2) 在 lex 中，被 regular expression 辨認出來的 token 會存放到哪個變數中？
- (3) 你如何處理 String 中的 " " ？
- (4) 你如何處理規格書中沒有定義的字元(例如 #)？
- (5) 當符合哪一個 regular expression 時，你會把辨認出來的 token 放到 symbol table 中？(請寫出該 regular expression)

6. (10%) Suppose that a grammar has the following productions:

$S \rightarrow aBc$

$B \rightarrow bXb$

$B \rightarrow bX$

$X \rightarrow a$

$X \rightarrow ab$

- (a) Is the string "ababc" in the language generated by the grammar?
- (b) Is the grammar ambiguous? Justify your answer.

7.(30%) For the following grammar:

$\langle E \rangle ::= \langle T \rangle \langle E' \rangle$

$\langle E' \rangle ::= + \langle T \rangle \langle E' \rangle \mid \epsilon$

$\langle T \rangle ::= \langle F \rangle \langle T' \rangle$

$\langle T' \rangle ::= * \langle F \rangle \langle T' \rangle \mid \epsilon$

$\langle F \rangle ::= (\langle E \rangle) \mid id$

- (a) Find First and Follow sets (for each nonterminal symbol). (10%)
- (b) Create its parsing table. (10%)
- (c) Shows the move made by predictive parser on input $id + id * id$ (based on a stack). (10%)