

Compilers - 416/565 - Fall 15 - HW1 Solutions

- 1a) the set of all combinations (one or more) of digits and letters in range A-F, followed by an x or X
- 1b) the set of all strings with any number of a's and b's (zero or more), including the empty string

2a) $a \mid a[a-z]^*a$

2b) $[1-9][0-9]^*$

2c) $[0-9]^*(0|2|4|6|8)$

2d) $((b|c)^*a(b|c)^*a(b|c)^*)^*$

2e) $(b^*ab^*(ab^*ab^*)^*) \mid (a^*ba^*(ba^*ba^*)^*)$

3a) cc

3b) ababb, bbcab

3c) cc, bbcab

[ab] is an abbreviation for $a|b$

4) $\frac{abbb}{B} \frac{aacc}{\bar{B} C}$

5) $\frac{babac}{B \bar{A} D}$

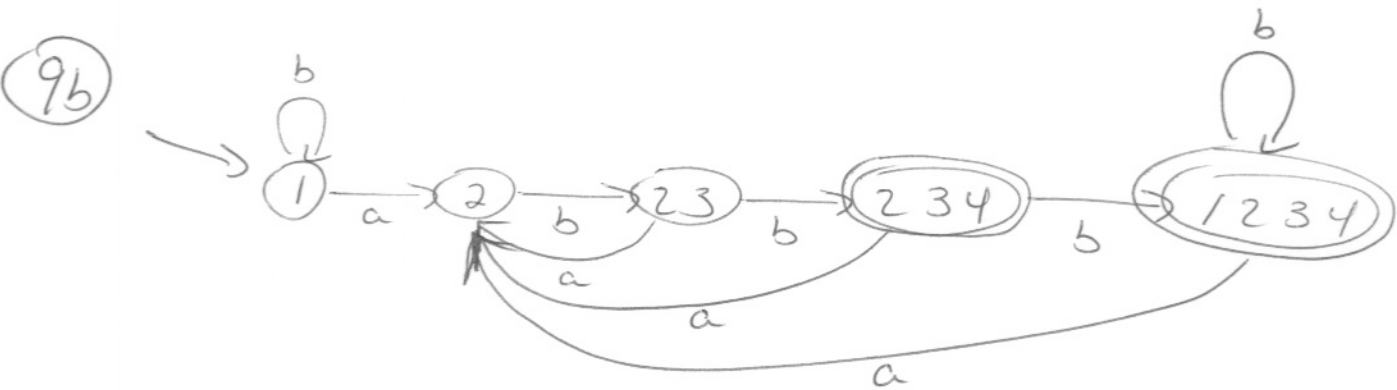
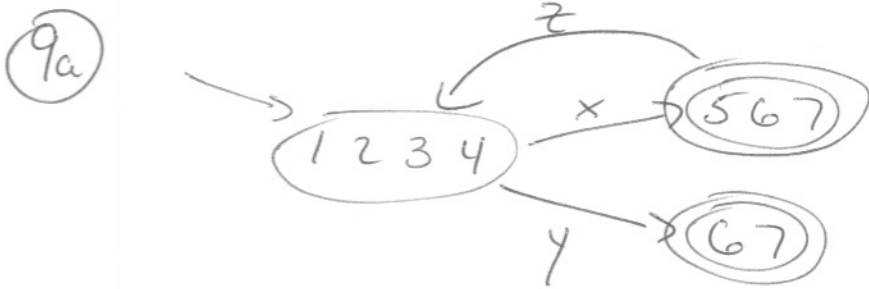
6)

1) <u>10000001</u>	C... gets stuck
2) <u>1110010</u>	ACC
3) <u>01100100</u>	B... gets stuck
4) <u>10011001</u>	DA... gets stuck

7a) the string "a" followed by zero or more multiples of five "a"s

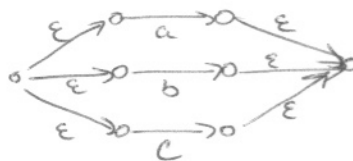
7b) any combination of a's and b's (zero or more), followed by an "a", followed by any four-symbol combination of a's and b's

8) $((a|b)^* a (a|b)^* a (a|b)^*)^+ b$

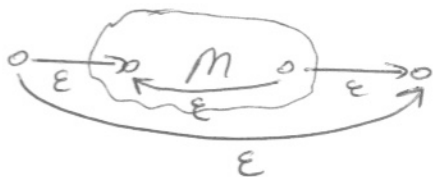


10) using the following Thompson's construction:
 [abc] - alternation (a/b/c)

(ab) - concatenation

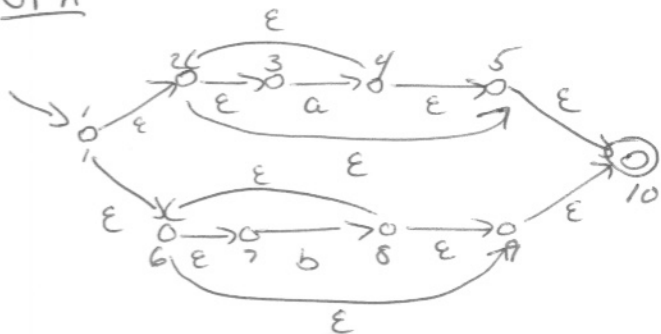


m^* - Kleene closure

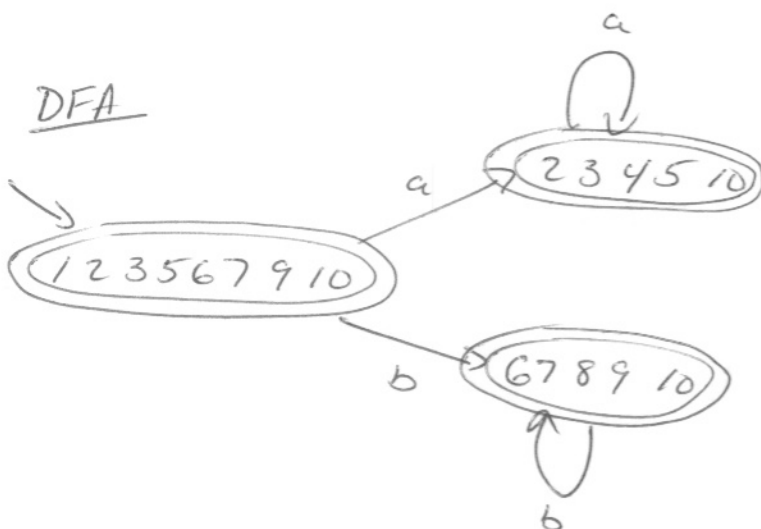


10a) $a^* | b^*$

NFA

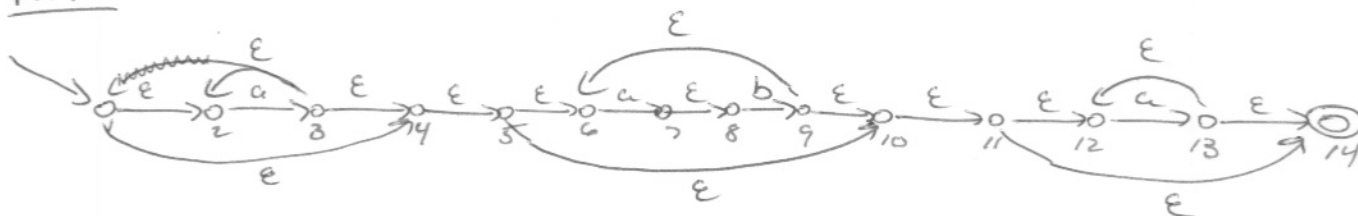


DFA

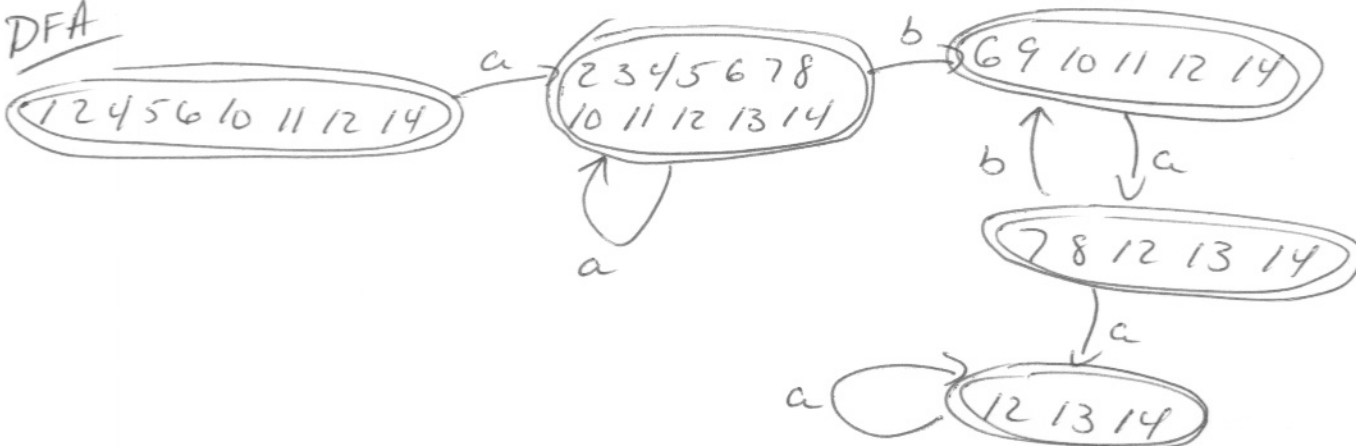


10b) $a^* (ab)^* a^*$

NFA

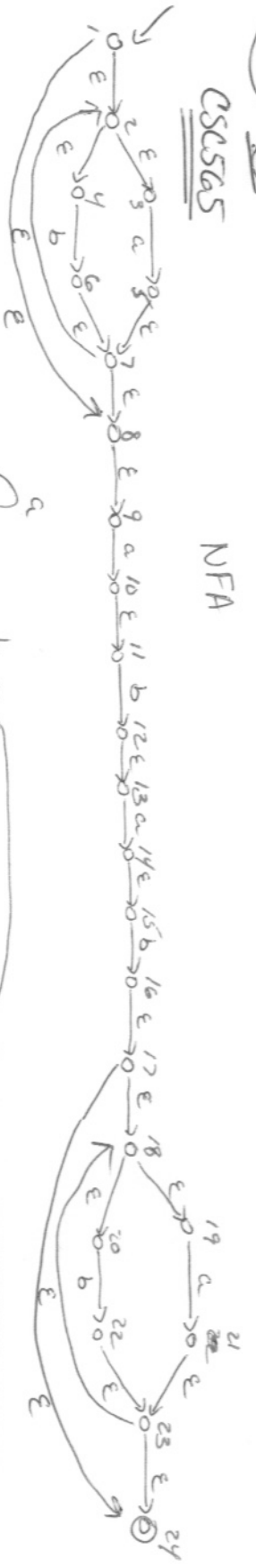


DFA

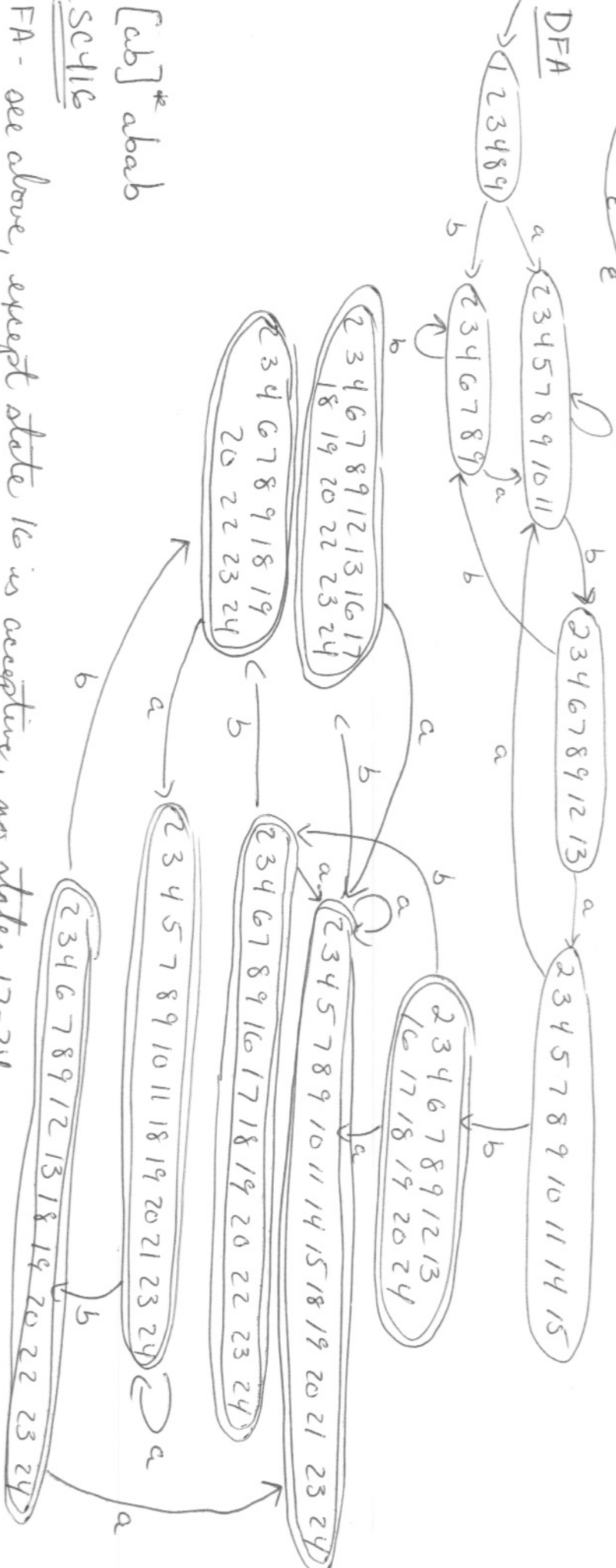


10c ~~10c~~ $[ab]^*abab[ab]^*$

CSC565 NFA



DFA



$[ab]^*abab$

CSC416

NFA - see above, except state 16 is accepting, no states 17-24
DFA

