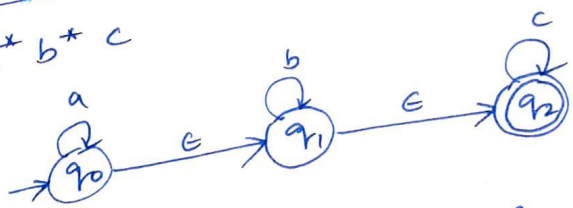
16.8.2021

ε-NFA to DFA

1. $a^* b^* c$



ϵ-closure$(q_0) = \{q_0, q_1, q_2\} = A$

$A \xrightarrow{a} q_0 = \varepsilon$-closure$(q_0) = A$

$A \xrightarrow{b} q_1 = \varepsilon$-closure$(q_1) = \{q_1, q_2\} = B$

$A \xrightarrow{c} q_2 = \varepsilon$-closure$(q_2) = \{q_2\} = C$

$B \xrightarrow{a} \phi = \varepsilon$-closure$(\phi) = D$ (Non-Final state)

$B \xrightarrow{b} q_1 = \varepsilon$-closure$(q_1) = B$

$B \xrightarrow{c} q_2 = \varepsilon$-closure$(q_2) = C$

$C \xrightarrow{a} \phi = D$

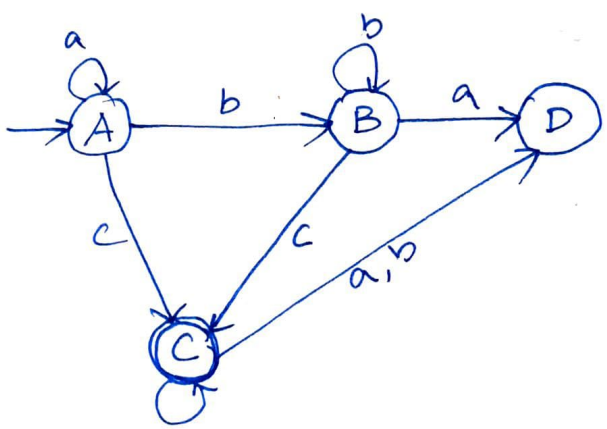
$C \xrightarrow{b} \phi = D$

$C \xrightarrow{c} q_2 = C$

D (Non-Final state) X

DFA

	a	b	c
→ A	A	B	C
B	D	B	C
* C	D	D	C
ϕ D	D	D	D



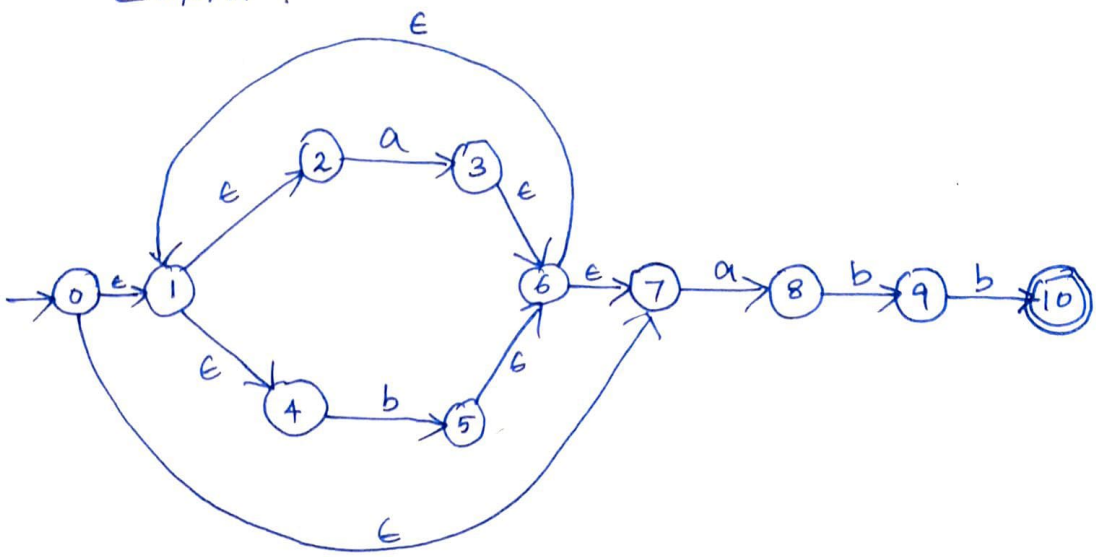
Convert ε-NFA to DFA.

2. $(a|b)^* abb$ ← RE.

1. RE to ε-NFA.

(i) a|b

(ii) $(a|b)^*$



i) ε-closure(0) = {0, 1, 2, 4, 7} = A

ii) A $\xrightarrow{a}$ {3, 8} → ε-closure (3,8) = {1, 2, 3, 4, 6, 7, 8} = B

A $\xrightarrow{b}$ {5} → ε-closure (5) = {1, 2, 4, 5, 6, 7} = C

iii) B $\xrightarrow{a}$ {3, 8} → ε-closure (3, 8) = B

B $\xrightarrow{b}$ {5, 9} → ε-closure (5, 9) = {1, 2, 4, 5, 6, 7, 9} = D

iv) C $\xrightarrow{a}$ {3, 8} → ε-closure (3, 8) = B

C $\xrightarrow{b}$ {5} → ε-closure (5) = C

v) D $\xrightarrow{a}$ {3, 8} → ε-closure (3, 8) = B

D $\xrightarrow{b}$ {5, 10} → ε-closure (5, 10) = {1, 2, 4, 5, 6, 7, 10} = E

vi) E $\xrightarrow{a}$ {3, 8} → B

E $\xrightarrow{b}$ {5} → C

	a	b
→ A	B	C
B	B	D
C	B	C
D	B	E
* E	B	C

← DFA.