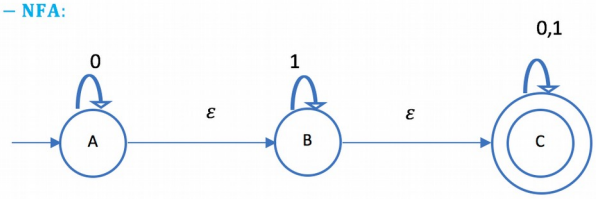
EPSILON NFA TO NFA:

Example : Convert the following ε-NFA to its equivalent NFA

1)

ε – NFA:

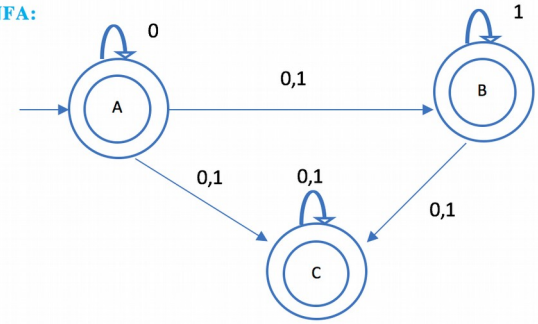


	0	1
→* A	{A, B, C}	{B, C}
* B	{C}	{B, C}
* C	{C}	{C}

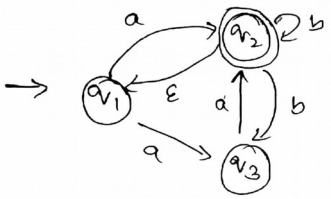
	ε*	0	ε*
A	A B C	A Ø C	A B C
B	B C	Ø C	C
C	C	C	C

	ε*	1	ε*
A	ABC	Ø B C	B C C
B	B C	BC	B C C
C	C	C	C

NFA:



2)



ε-NFA → NFA

ε-closure of $q_1 \rightarrow \{q_1\}$

ε-closure of $q_2 \rightarrow \{q_1, q_2\}$

ε-closure of $q_3 \rightarrow \{q_3\}$

State ε* input ε*

$q_1 \rightarrow q_1 \xrightarrow{a} q_2 \rightarrow \{q_1, q_2\}$

$q_1 \rightarrow q_1 \xrightarrow{a} q_3 \rightarrow \{q_3\}$

$q_1 \rightarrow q_1 \xrightarrow{b} \{\} \rightarrow \{\}$

$q_2 \rightarrow q_1 \xrightarrow{a} q_2 \rightarrow \{q_1, q_2\}$

$q_2 \rightarrow q_1 \xrightarrow{a} q_3 \rightarrow \{q_3\}$

$q_2 \rightarrow q_2 \xrightarrow{a} \{\} \rightarrow \{\}$

$q_2 \rightarrow q_1 \xrightarrow{b} \{\} \rightarrow \{\}$

$q_2 \rightarrow q_3 \xrightarrow{b} q_2 \rightarrow \{q_1, q_2\}$

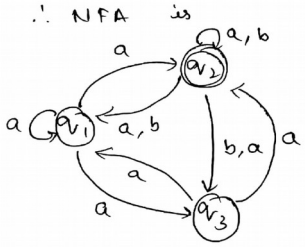
$q_2 \rightarrow q_3 \xrightarrow{b} q_3 \rightarrow \{q_3\}$

$q_3 \rightarrow q_3 \xrightarrow{a} q_2 \rightarrow \{q_1, q_2\}$

$q_3 \rightarrow q_3 \xrightarrow{b} \{\} \rightarrow \{\}$

	a	b
q_1	$\{q_1, q_2, q_3\}$	$\{\}$
q_2	$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3\}$
q_3	$\{q_1, q_2\}$	$\{\}$

∴ NFA is



NFA → DFA

	a	b
q_1	$\{q_1, q_2, q_3\}$	$\{\}$
$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3\}$
$\{\}$	$\{\}$	$\{\}$

∴ DFA is