NFA - Example-2

L = { Set of all strings that start with 0 }

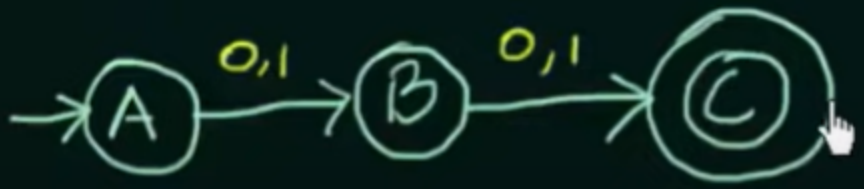
= { 0, 00, 01, 000, . . . }

Eg.

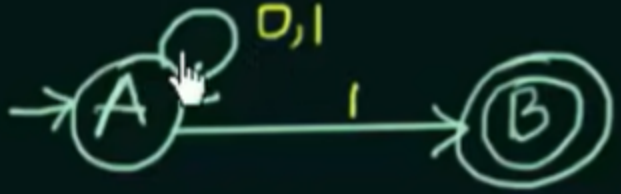
>> Construct a NFA that accepts sets of all strings over {0,1} of length 2

$\Sigma = \{0,1\}$

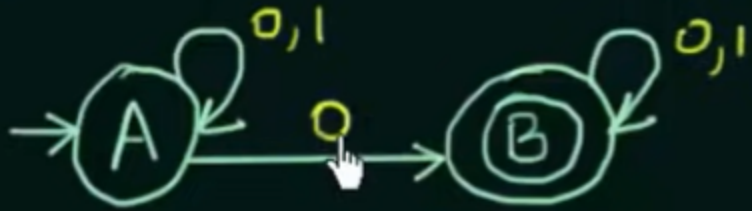
$L = \{00, 01, 10, 11\}$



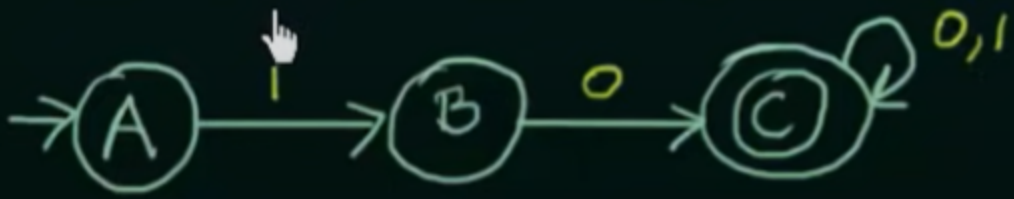
Ex 1) L1 = { Set of all strings that ends with '1' }



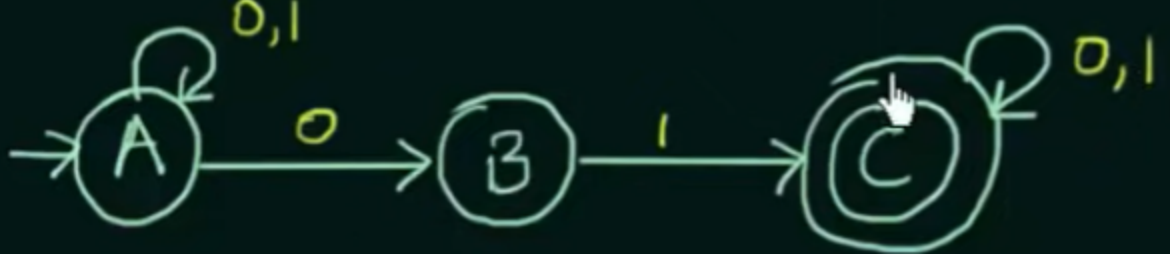
Ex 2) L2 = { Set of all strings that contain '0' }



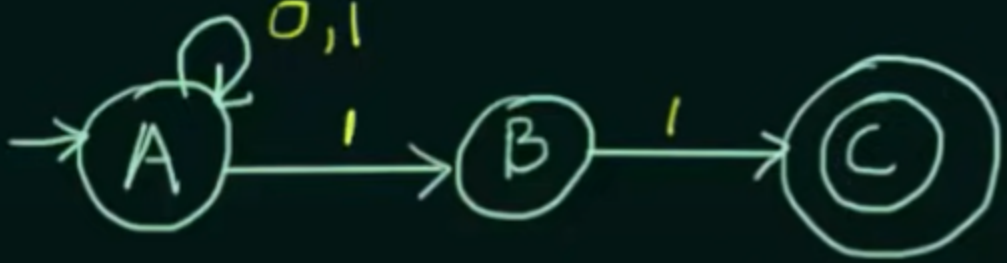
Ex 3) L3 = { Set of all strings that starts with '10' }



Ex 4) L4 = { Set of all strings that contain '01' }



Ex 5) L5 = { Set of all strings that ends with '11' }



Conversion of NFA to DFA

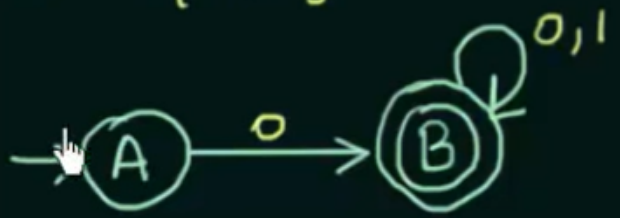
Every DFA is an NFA, but not vice versa

But there is an equivalent DFA for every NFA

L = { Set of all strings over (0,1) that starts with '0' }

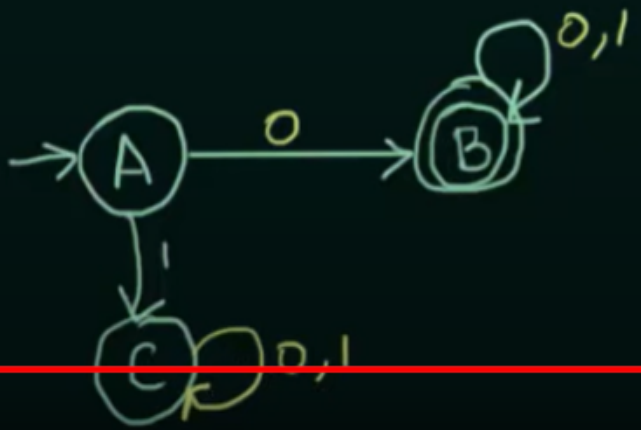
$\Sigma = \{0,1\}$

NFA



	0	1
A	B	ϕ
B	B	B

DFA



	0	1
A	B	C
B	B	B
C	C	C

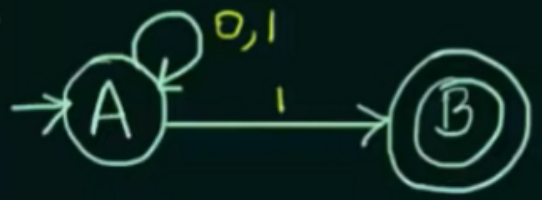
C - Dead State / Trap State

Conversion of NFA to DFA - Examples (Part 1)

L = { Set of all strings over (0,1) that ends with '1' }

$\Sigma = 0, 1$

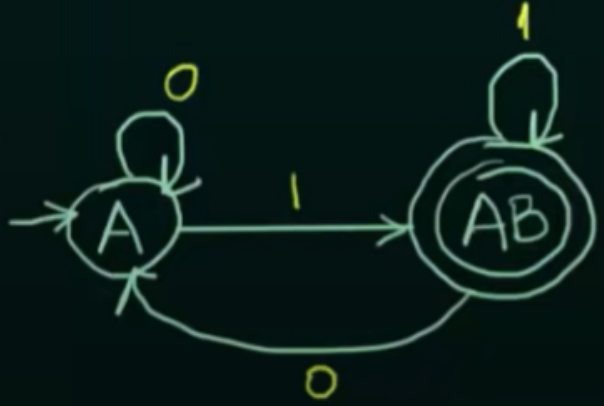
NFA



	0	1
A	{A}	{A, B}
B	ϕ	ϕ

Sul

DFA



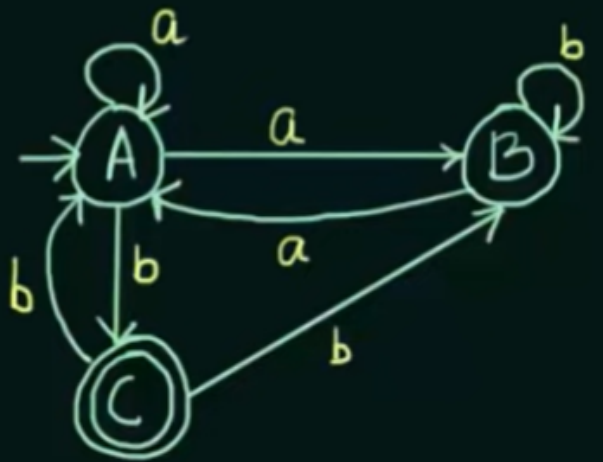
	0	1
A	{A}	{AB}
AB	{A}	{AB}

AB - single state

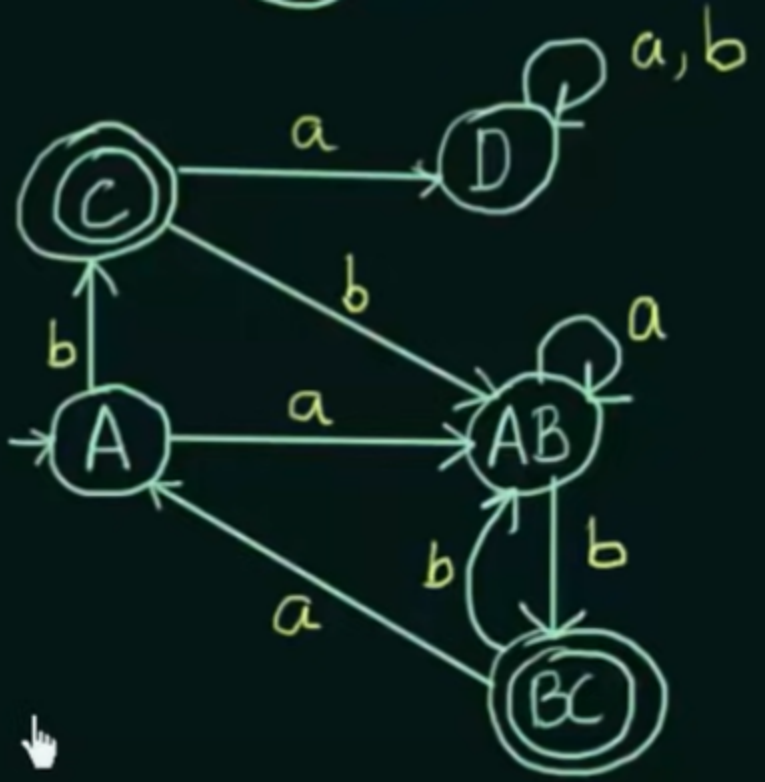
Conversion of NFA to DFA - Examples (Part-2)

Find the equivalent DFA for the NFA given by $M = [\{A,B,C\}, (a,b), \delta, A, \{C\}]$ where δ is given by:

	a	b
→A	A,B	C
B	A	B
(C)	–	A,B



	a	b
→ A	AB	C
AB	AB	BC
(BC)	A	AB
(C)	D	AB
D	D	D

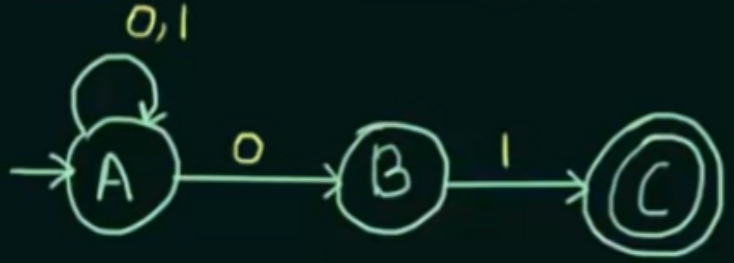


Conversion of NFA to DFA - Examples (Part-3)

Given below is the NFA for a language

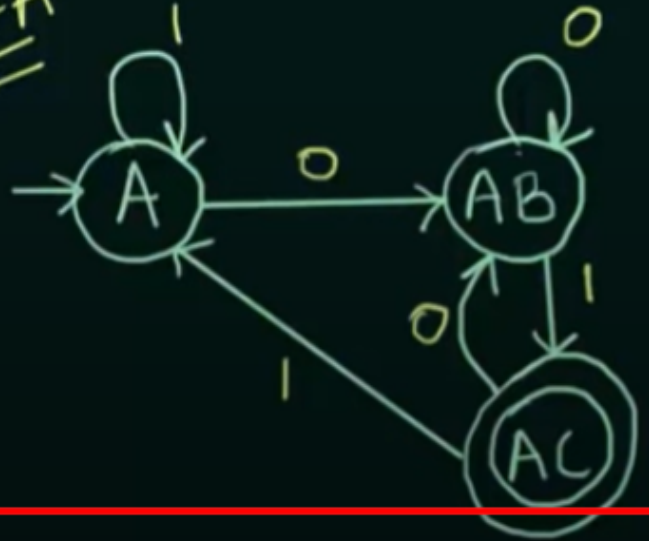
L = { Set of all strings over (0,1) that ends with '01' }. Construct its equivalent DFA

NFA



	0	1
→A	A, B	A
B	ϕ	C
(C)	ϕ	ϕ

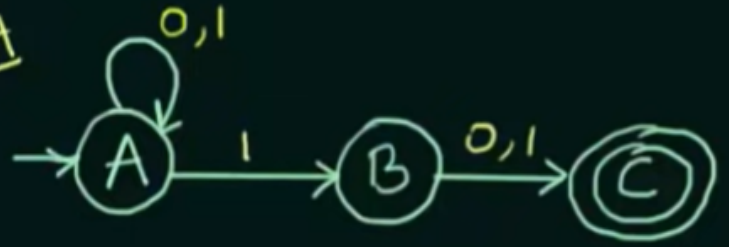
DFA



	0	1
→ A	AB	A
AB	AB	AC
(AC)	AB	A

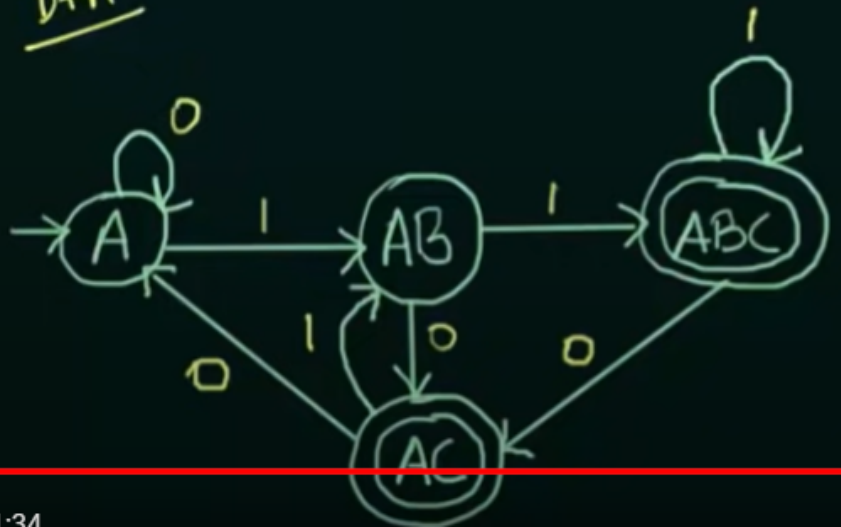
Eg. 1010
110
1101010

NFA



	0	1
→A	A	A,B
B	C	C
(C)	ϕ	ϕ

DFA



	0	1
→A	A	AB
AB	AC	ABC
(AC)	A	AB
(ABC)	AC	ABC

Minimization of DFA

Minimization of DFA is required to obtain the minimal version of any DFA which consists of the minimum number of states possible

If $|X| = 0$, then A and B are said to be 0 equivalent

If $|X| = 1$, then A and B are said to be 1 equivalent

If $|X| = 2$, then A and B are said to be 2 equivalent

If $|X| = n$, then A and B are said to be n equivalent

0 Equivalence : {A, B, C, D} {E}

1 Equivalence : {A, B, C} {D} {E}

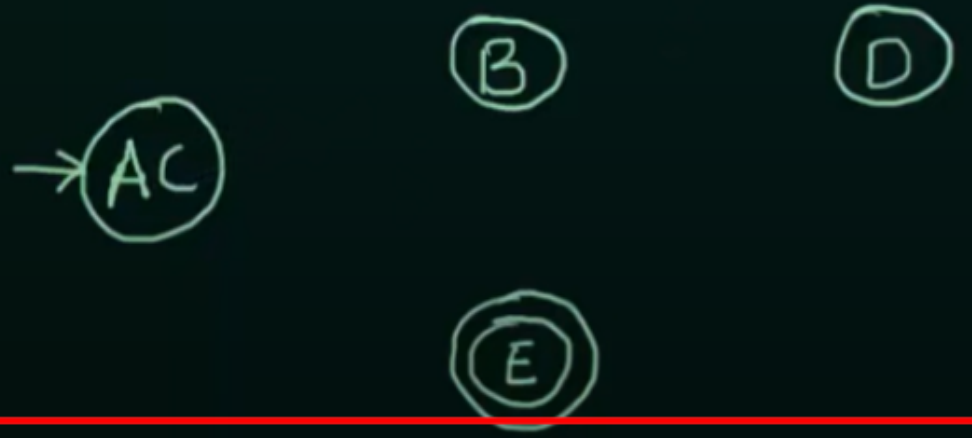
2 Equivalence : {A, C} {B} {D} {E}

3 Equivalance : {A, C} {B} {D} {E}

A, B ✓

A, C ✓

C, D ✗



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
(E)	B	C

A state is said to be Unreachable if there is no way it can be reached from the Initial State