

# DFA Minimization-1

## Minimization of DFA - Examples (Part-1)



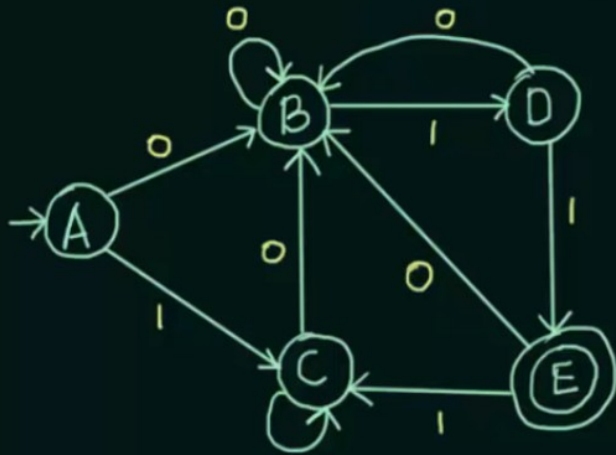
## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C



## Minimization of DFA - Examples (Part-1)

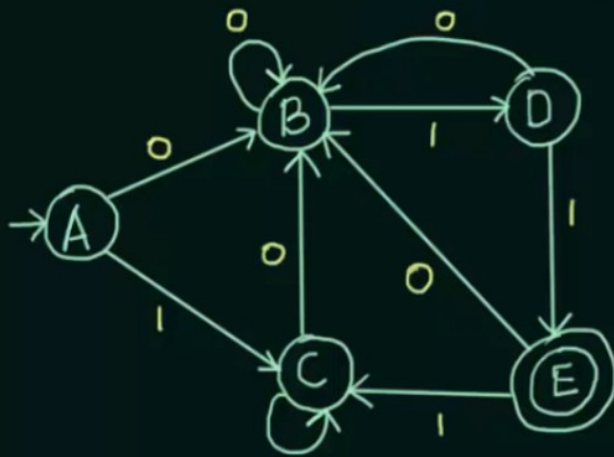


	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

Equivalence:  $\{A, B, C, D\}$   $\{E\}$



## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

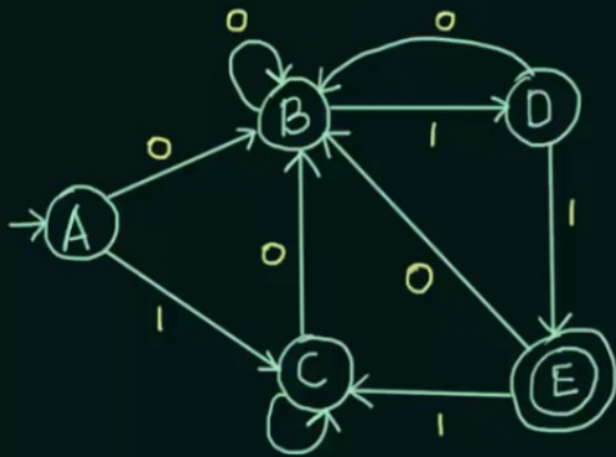
0 Equivalence:  $\{A, B, C, D\}$   $\{E\}$

1 Equivalence:

A, B



## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

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

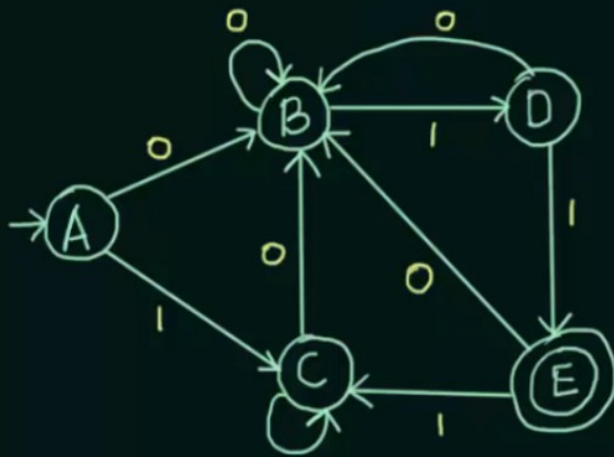
1 Equivalence : {A, B}

A, B ✓

A, C ✓



## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

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

1 Equivalence : {A, B, C}

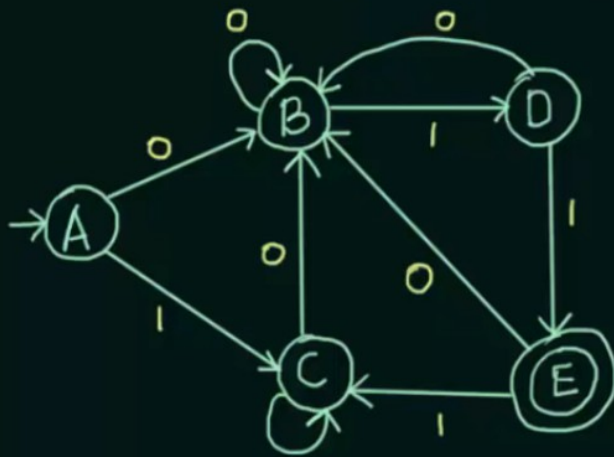
A, B ✓

A, C ✓

C, D ✗



## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

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

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

A, B ✓

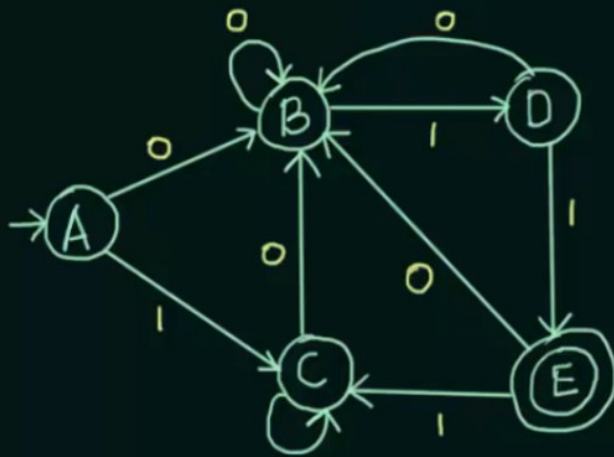
A, C ✓

C, D ✗





## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
ⓔ	B	C

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

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

2 Equivalence :

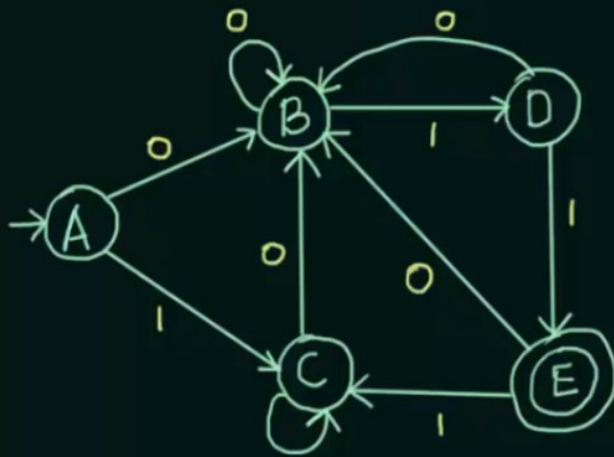
A, B ✓

A, C ✓

C, D ✗



## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

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

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

2 Equivalence :

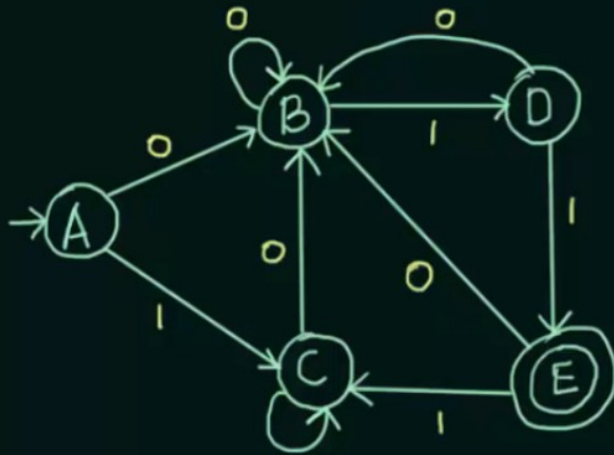
A, B ✓

A, C ✓

C, D ✗



## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

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

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

2 Equivalence :  $\{A\}$   $\{B\}$

A, B ✓

A, C ✓

C, D ✗



## Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C

B and C are not 2 equivalent to each other

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

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

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

A, B ✓

A, C ✓

C, D ✗



# Minimization of DFA - Examples (Part-1)



	0	1
→ A	B	C
B	B	D
C	B	C

B and C are not 2 equivalent to each other

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

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

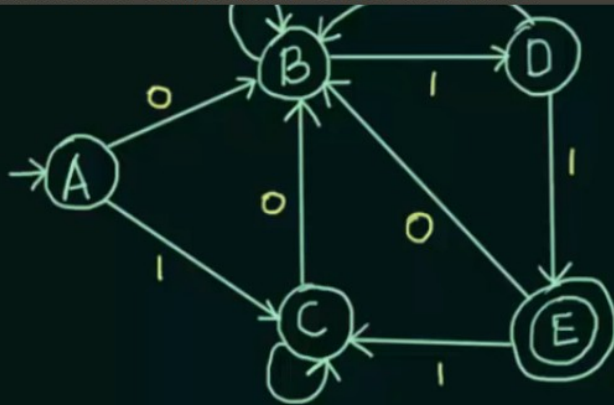
2 Equivalence : {A, C} {B} {D} {E}

A, B ✓

A, C ✓

C, D ✗





	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

- 0 Equivalence : {A, B, C, D} {E}
- 1 Equivalence : {A, B, C} {D} {E}
- 2 Equivalence : {A, C} {B} {D} {E}
- 3 Equivalence : {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
ⓔ	B	C

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

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

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

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

A, B ✓

A, C ✓

C, D ✗



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

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

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

3 Equivalence:  $\{A, C\} \{B\} \{D\} \{E\}$

A, B ✓

A, C ✓

C, D ✗

	0	1
→ A	B	C
B	B	D
C	B	C
D	B	E
ⓔ	B	C





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

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

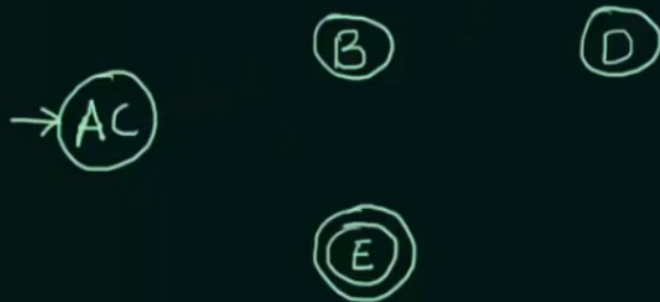
2 Equivalence:  $\{A, C\}$   $\{B\}$   $\{D\}$   $\{E\}$

3 Equivalence:  $\{A, C\}$   $\{B\}$   $\{D\}$   $\{E\}$

A, B ✓

A, C ✓

C, D ✗



	0	1
A	B	C
B	B	D
C	B	C
D	B	E
E	B	C



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

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

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

3 Equivalence:  $\{A, C\}$   $\{B\}$   $\{D\}$   $\{E\}$

A, B ✓

A, C ✓

C, D ✗



	0	1
A	B	C
B	B	D
C	B	C
D	B	E
E	B	C



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

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

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

3 Equivalence:  $\{A, C\}$   $\{B\}$   $\{D\}$   $\{E\}$

A, B ✓

A, C ✓

C, D ✗



	0	1
A	B	C
B	B	D
C	B	C
D	B	E
E	B	C



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

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

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

3 Equivalence:  $\{A, C\}$   $\{B\}$   $\{D\}$   $\{E\}$

A, B ✓

A, C ✓

C, D ✗



	0	1
A	B	C
B	B	D
C	B	C
D	B	E
E	B	C



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

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

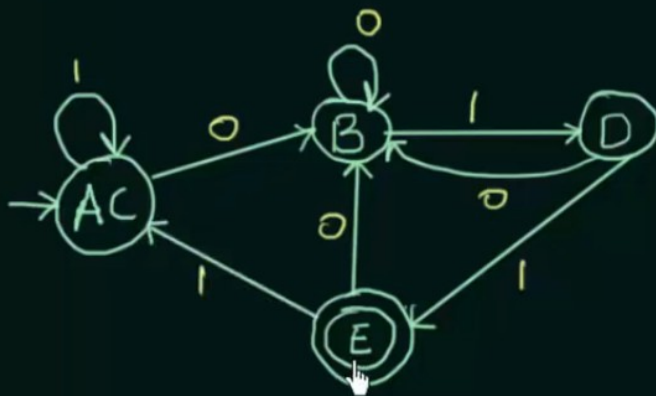
2 Equivalence:  $\{A, C\}$   $\{B\}$   $\{D\}$   $\{E\}$

3 Equivalence:  $\{A, C\}$   $\{B\}$   $\{D\}$   $\{E\}$

A, B ✓

A, C ✓

C, D ✗



	0	1
A	B	C
B	B	D
C	B	C
D	B	E
E	B	C



• **Questions????**