COMPUTER SCIENCE

Database Management System

FD's & Normalization

Lecture_02

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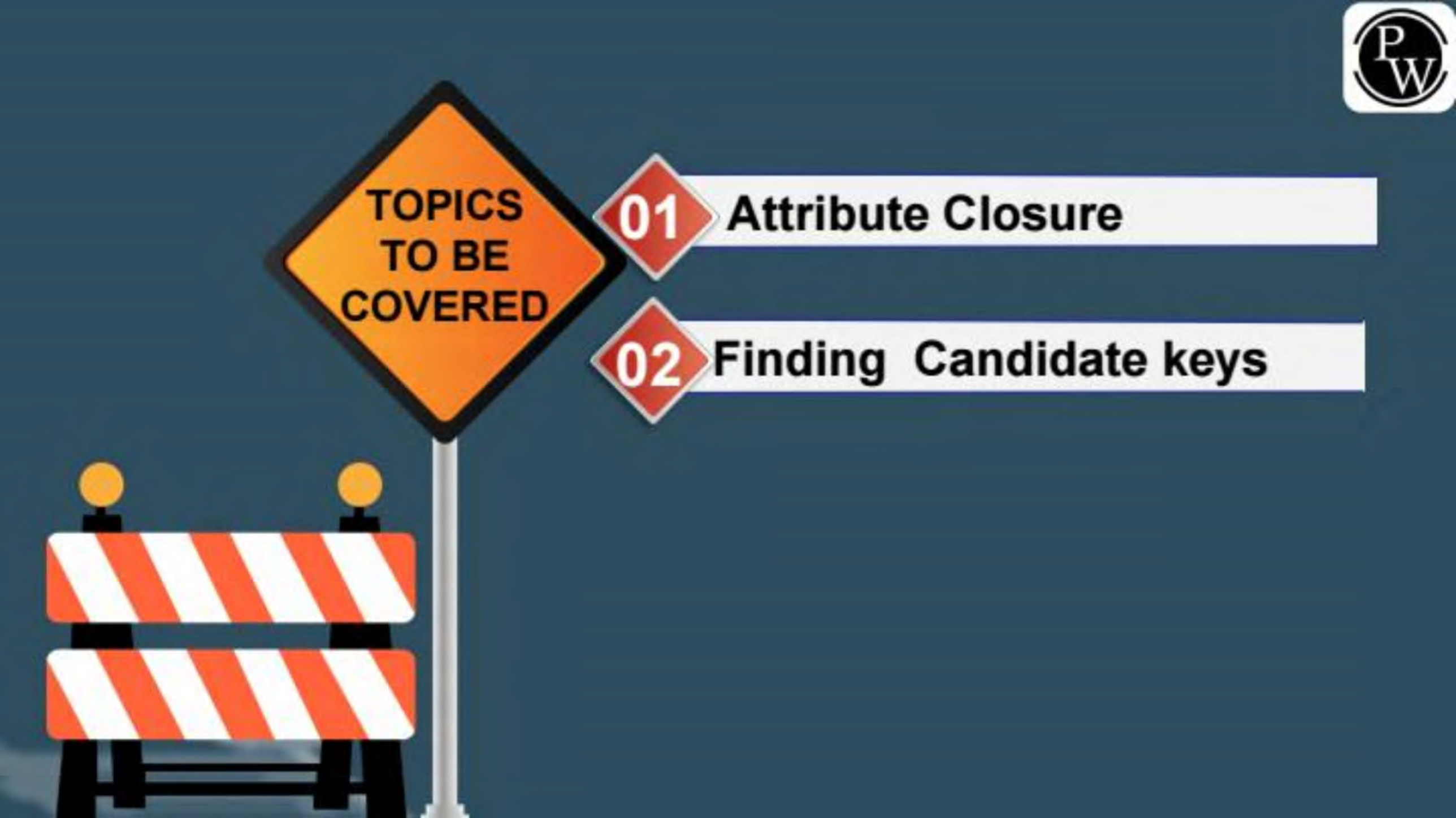

TOPICS
TO BE
COVERED
01
Attribute Closure
02
Finding Candidate keys

RDBMS Concept

- Tuple
- Attribute
- Arity (Degree)
- Cardinality
- Schema
- Instance

FD Concept

Type of FD

1. Trivial FD
2. Non Trivial FD
3. Semi Non Trivial FD

Q.1

X	Y	Z
3	3	7
3	1	7
1	3	7
1	1	7
1	3	7

Q.2

How many FD are satisfied by the Instance.

Consider the following relation:

A	B	C	TUPLE#
10	b1	c1	1
10	b2	c2	2
11	b4	c1	3
12	b3	c4	4
13	b1	c1	5
14	b3	c4	6

✗ I. $A \rightarrow B$

✓ II: $B \rightarrow C$

✗ III : $C \rightarrow B$

✗ IV $B \rightarrow A$

✗ V $C \rightarrow A$

Given the extension (state), which of the following dependencies May hold in the above relation? If the dependency cannot hold, explain why by Specifying the tuples that cause the violation.

I. $A \rightarrow B$, II. $B \rightarrow C$, III. $C \rightarrow B$, IV. $B \rightarrow A$, V. $C \rightarrow A$

Q.3

Trivial FD always valid

$ABC \to A$
$AB \to B$
$ABC \to C$

A	B	C
1	1	1
1	2	1
2	1	2
2	1	3
1	3	3

$CB \to A$
OR
$BC \to A$

(a) 4
(b) 3
(c) 2
(d) 1

How many FD are satisfied by the above Instances ?

$A \to B$
$A \to C$
$A \to BC$

$B \to A$
$B \to C$
$B \to AC$

$C \to A$
$C \to B$
$C \to AB$

$AB \to C$
$BC \to A$
$AC \to B$

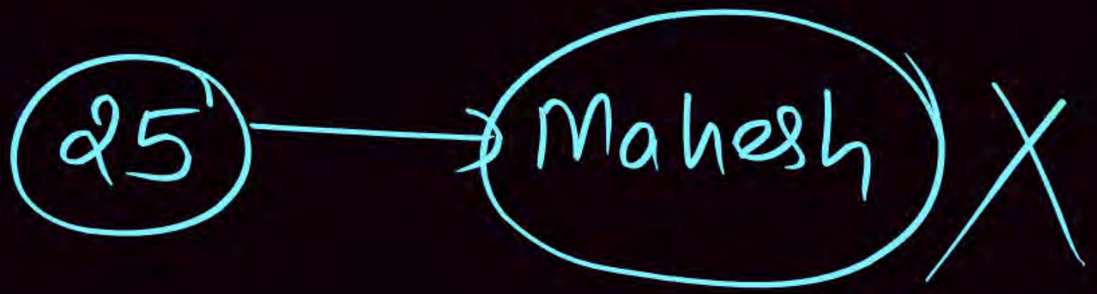
Note Trivial FD are always Valid.

$X \rightarrow Y$ exists

If $t_1.X = t_2.X$ then $t_1.Y = t_2.Y$ Must be Same

Note In $X \rightarrow Y$ Whenever X Value Repeat Corresponding Y Value Must be Same.

25 → Deepak 98%



X

35%

Q.4

P	Q	R
6	6	7
6	7	7
7	3	4 ✓
8	3	4 ✓

PQ → P

PQ → Q

PQ → PQ

(a) 1

(b) 2

(c) 3

(d) 4

PQ → Q

How Many Non Trivial FD's are Satisfied by above given instance?

P → Q	Q → P	R → P	~~PQ → R~~
~~P → R~~	~~Q → R~~	R → Q	PR → Q
P → QR	Q → PR	R → PQ	QR → P

P → R

Q → R

PQ → R

Q.5

A	B	C
7	5	6
7	7	6
7	5	7
7	7	7
9	5	6

Ans (0)

How many Non Trivial FD are Satisfied by the above Instance ?

$A \to B$	$B \to A$	$C \to A$	$AB \to C$
$A \to C$	$B \to C$	$C \to B$	$BC \to A$
$A \to BC$	$B \to AC$	$C \to AB$	$AC \to B$

Q.6

A	B	C
2	2	4
2	3	4
3	2	4
3	3	4
3	2	4

$X \to Y$

$X \cap Y = \phi$

(a) 1

(b) 2

~~(c) 3~~

(d) 4

$A \to C$

$B \to C$

$AB \to C$.

Ans

How Many Non Trivial FD's are Satisfied by above Instance ?

$A \to B$ $B \to A$ $C \to A$ $AB \to C$

$A \to C$ $B \to C$ $C \to B$ $BC \to A$

$A \to BC$ $B \to AC$ $C \to AB$ $AC \to B$

Q.7

Given the following relation instance.

X	Y	Z
4	4	4
4	7	4
7	4	7
7	4	9
4	9	9

yz → X

44 → 4

74 → 4

47 → 7

49 → 7

99 → 4

zy → X

44 → 4

47 → 4

74 → 7

94 → 7

99 → 4

yz → X Ans

The number of non trivial FD's are satisfied by the instance ___

yz → X

or

zy → X

BSNL ⇒ JTO LICE ⇒ 35 years +

(a) CC with Enjoying Concept

(b) CC

(c) C

(d) Doubt

Q.8

Given the following relation instance. [2000: 2 Marks]

X	Y	Z
1	4	2
1	5	3
1	6	3
3	2	2

Which of the following functional dependencies are satisfied by the instance?

A. $XY \rightarrow Z$ and $Z \rightarrow Y$

B. $YZ \rightarrow X$ and $Y \rightarrow Z$

C. $YZ \rightarrow X$ and $X \rightarrow Z$

D. $XZ \rightarrow Y$ and $Y \rightarrow X$

Q.9 From the following instance of a relation scheme R (A, B, C), we can conclude that:

[2002: 2 Marks]

[MCQ]

A	B	C
1	1	1
1	1	0
2	3	2
2	3	2

A → B

B does not determine C.

(A) A functionally determines B and B functionally determines C

(B) A functionally determines B and B does not functionally determines C

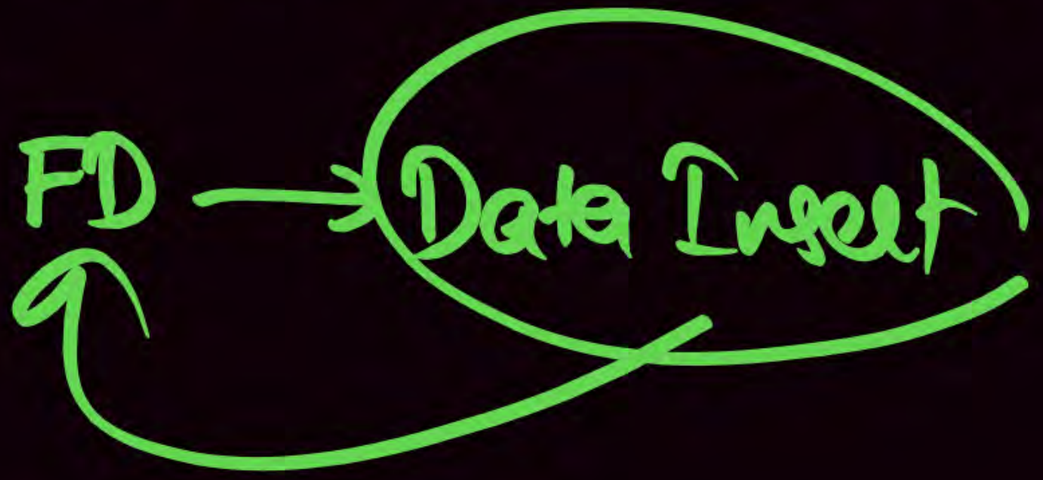
(C) B does not functionally determines C

(D) A does not functionally determines B and B does not functionally determines C

Conclude

Note (1) Trivial FD's are always Valid.

Note (2) Rule out the FD Based on given Data.



Mukesh → I st Round

THANK YOU!