## COMPUTER SCIENCE



Database Management System

FD's & Normalization





Lecture\_05

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Membership Set

Equality between FD Set





#### RDBMS Concept

-> Arity Degree: (# Attoibutes) -> Coordinality: (# Tuples) -> Relational Schema. -> Relational Instance Type of FD

1 Trivial FD

WETNOM Toivial FD

3 semi Non Tovial FD

FD [Functional Dependency]

X-y If tix=tz.x then tiy=tz.y must be same.



Attribute closure [X]<sup>+</sup>

Legg Concept

Super Key

Scandidate Key

Finding Multible C.K

Key/Prime Attorbute Non Icey Non Prime Attorbute

If XAttribute Propose Attribute ]

Multiple cr Possible



@ CC Winn Enjoying Champen Concept

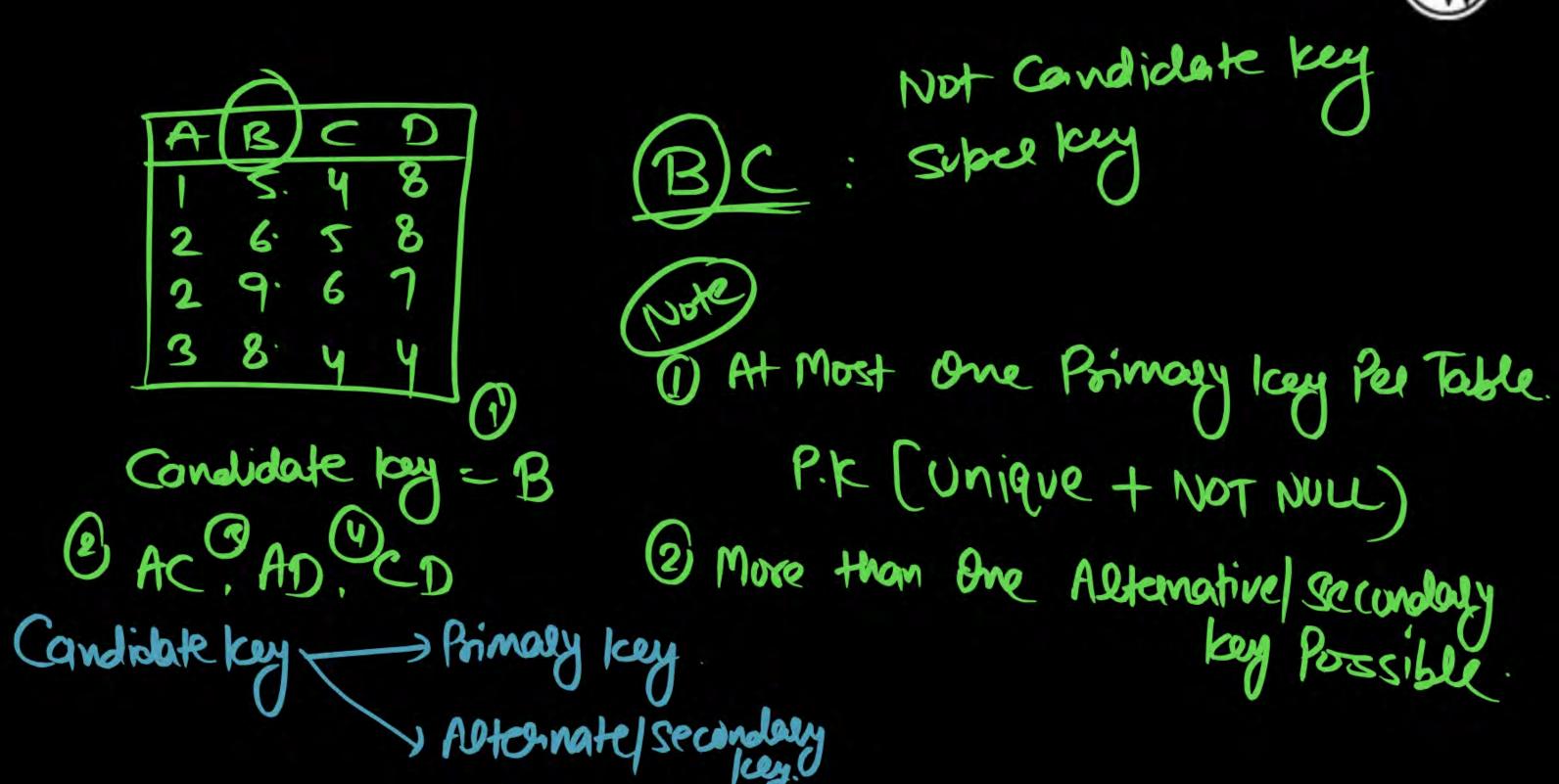
a) Doubt

DE

(R·13

ABG BEG



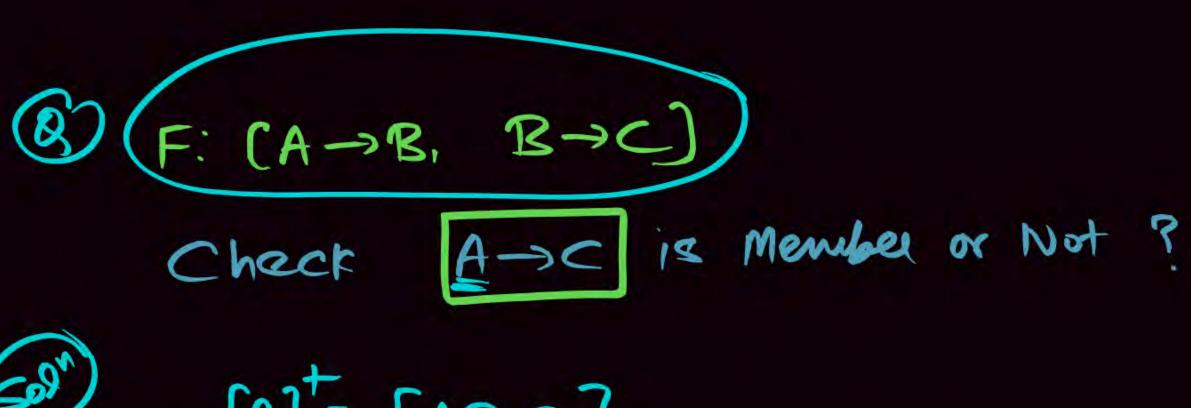


# Membership set: F:[.----]

let F be the Given FD Set. Any X-y FD is a member of FD set F ibb X-y Logically implied in F.

X-> Y Logically implied means (X) thereing y.

then we can sey X-> y is a Member Logically implied which FD in FD Set F.



(A) = [AB] Valid FD]

A -> c is Member logically implied
in FD set F.

.

F: CABOC, DORE, COEA, DOF] [AB] = [ABCE HT AR-> E (D) = CDBEF X(ii) D>C WHITCHA (C) = [CEA... Xliv) BD > A (BD) = [BD:EF Which FD's your logically implied? (i) 4ES (iii) YES

Q.

In a schema with attributes A, B, C, D and E following set of functional dependencies are given

$$A \to B \qquad (CD)^{\dagger} = (CDFAB)$$

$$A \to C \qquad (BD)^{\dagger} = (BD)$$

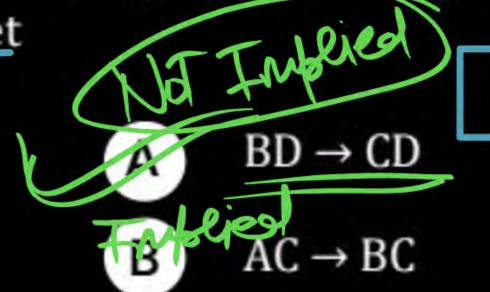
$$ED \to E \qquad (BC)^{\dagger} = (BCD.E.A)$$

$$E \to A \qquad (AC)^{\dagger} = (ABC...$$

Which of the following functional dependencies is NOT implied

by the above set





[MCQ: GATE - 2M]
[ISRO-3M]

Q.

Suppose the following functional dependencies hold on a relation U with attributes P, Q, R, S and T:



(RS)=CRST)

$$P \rightarrow QR$$

$$RS \rightarrow T$$

Which of the following functional dependencies can be inferred/implied from the above functional dependencies?

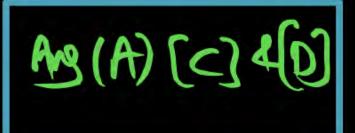
$$PS \rightarrow T \qquad (PS)^{\dagger} = [PQRST]$$

$$R \rightarrow T \qquad (R)^{\dagger} = [R]$$

$$C \rightarrow R \qquad (PS)^{\dagger} = [PQRST]$$

$$PS \rightarrow Q \qquad (PS)^{\dagger} = [PSQRT]$$

[MSQ: 2021 - 2M]



# Equality between &FD set

```
F:[----]
Let F & G be the &FD Set
    [F=G] F&G are equals only is
    F Cover G: True
    Graves F: True.
```



# F Cover all the FD's of G.

All G FD's should be Logically implied in F FD Set.

G cover F: G Cover All the FD's of F.

ALL F FD'8 Should be Logically implied in G FD Set

. 1



FCOVERG: True False Tove False.

G Cover F: False True Tove False.

FDG GDF F=G Uncomparable





Consider relation schema A(PQRS) with two set of FD's



 $F : [P \rightarrow Q, PQ \rightarrow R, PR \rightarrow S, Q \rightarrow R, Q \rightarrow P]$ 

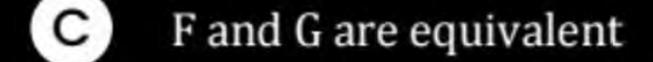
 $G: [PQ \rightarrow S, PR \rightarrow Q, Q \rightarrow S, QS \rightarrow R]$ 

Which of the following is correct?



F Cover G

B G Cover F



D None of these

Ang (A)



F: [P-Q, PQ-)R, PR-)S, Q-)R, Q-)P)
G: [PQ-)S, PR-)B, Q-)S, QS-)P)

## F Covan G

#### G Cover F



Consider relation schema R(A C D E H) with two set of FD's

 $F: [A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H]$ 

 $G: [A \rightarrow CD, E \rightarrow AH]$ 

Which of the following is correct?



F Cover G



G Cover F



F and G are equivalent



None of these



F: [A-)c, AC-)D, E++AD, E->H)

G: [A -> CD, E -> AH]

### FCovenG

LASCD (A)=[ACD

VE > AM (E)= CEADMC]

True

F=G

#### G Cover F

M>C

UAC >D

Z > AD

VE H

True

(AC) = (ACD)

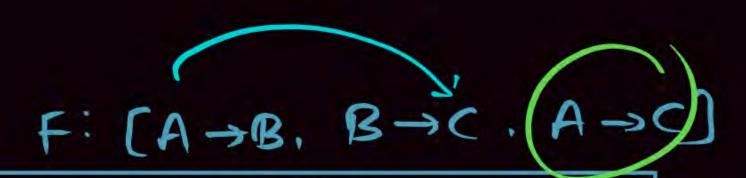
(E) = (EAHCD)



Minimal cover: The objective of Minimal Gover is 4R. Attribute.

Elimination of Redundant FD(R.FD)/Extrog

Redundant FD (R.F.D) is a FD is we Dolete that FD From Original FD Set (F) then After Deletion does not effect the Power of FD Set.



resume Here A->C is R.F.D.;

G: [A >B, B >c]

(A)t- (ABS)

A->c is R.F.D.

Minimal Covel: A>B, B>C

After Deletion of A-JC FD brown Original FD Set. then from New FD Set

> (A) = [...C) them A>C is R.F.D

# F=G3 former F: [A-)B, B->C, A->C]



(1) lets Assume A-3B is RFD(11) Lets Assume B-3C is RFD (1111) Assume A-3C is RFD

G: (B-)C, A-)C) G: (A-)B, A->C) G: (A-)B, B-)C)

FCover G GCover F FCover G

BIC XAIB (A)= (AC) LAIC

: A >B is Not R.F.D.

G Cover F

True

LATER (A) = (ABC) A>B

(A) = (ABC) A>B

 $XB \rightarrow C$  B = (B) = (B) = (B) = (B) = (B) = (B)

False

.: B->C is Not R.F.D

Fovelg

G Cover F

True

(A) = (ABC)

: A -> C is R.F.D

Minimol: A-B, B-10



ib FD Set is given & Minimal Cover is given them How to check ?

## P. C.

#### **Canonical Cover**

- Sets of functional dependencies may have redundant dependencies that can be inferred from the others
  - For example:  $A \rightarrow C$  is redundant in:  $\{A \rightarrow B, B \rightarrow C, A \rightarrow C\}$

Q.

 $AB \rightarrow C$ ,  $D \rightarrow E$ ,  $E \rightarrow C$  is a minimal cover for the set of functional dependencies  $AB \rightarrow C$ ,  $D \rightarrow E$ ,  $AB \rightarrow E$ ,  $E \rightarrow C$ .

F: [AB->c, D->E, AB->E, E->C)

G: [AB >C, D>E, E>C]

Check F=9?

FCOVERG

LAB > C (AB) = [ABS = ..]

LAB > E (DE (E) = (FC)

Time [FAISE]

G Cover F

ARDE (AR) = [ABC]

LOSE (D) = CDEC)

LARDE (AB) = [ABC]

EDC (E) = [EC]



Given the following two statements:



S1: Every table with two single-valued attributes is in 1NF, 2NF, 3NF and BCNF.

S2: AB → C, D → E, E → C is a minimal cover for the set of functional dependencies AB → C, D → E, AB → E, E → C.

Which one of the following is CORRECT?

[MCQ: 2014: 2M]

- A S1 is TRUE and S2 is FALSE.
- B Both S1 and S2 are TRUE.
- C S1 is FALSE and S2 is TRUE.
- Both S1 and S2 are FALSE.

