COMPUTER SCIENCE



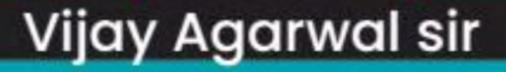
Database Management System

FD's & Normalization

Minimal Cover

Part-1









Equality between FD Set

Minimal Cover





RDBMS Concept

FD Concept

FD type

Keys Con Cest

Super key

Candidate key Poinaly key

Alternate @ Secondary

Key



Condidate key: Minimal of Subserkey.

Primary key:

Brown the Condidate One is select as Primary

By

The we have 5 Condidate key then I select as

Primary key

Remaining y Canolidate keys ove Alternate/ Secondally key Pointelpey Attorbute Non Pointe Non Key Attorbute

Poinary Key.

Drique

Not NULL.

2 at most 1 fringey (cey (o@) max 1)
is possible fee Relation



R(ABCDEFG) $\{AB \rightarrow CDEF, C \rightarrow ADE, D \rightarrow EBF, F \rightarrow DA, BE \rightarrow AF\}$



Find candidate keys for the relation R?



ABG BEG ABG OG



R(ABCDEDFGH) $\{A\rightarrow BC, B\rightarrow DEF, DE\rightarrow AGH\}$



Find candidate keys for the relation R?



Are



R(ABCDE) $\{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$ Find candidate keys for the relation R?



Prime | cey Attribute = CA, B, C, D, E)

Non Poine Non Key = In this Question No Non Pointe Attorbute UCK A CB CB Q.16

R(ABCDEFGH)



 $\{AB \rightarrow CD, D \rightarrow EG, F \rightarrow H, C \rightarrow EF, H \rightarrow A, G \rightarrow B, A \rightarrow B\}$

Find candidate keys for the relation R?

Non key Non Boine Attorbute. (B, D, E, G)

4 Nor Prime Non key Attribute.

4 Candidate key

A

H

F



Consider the relation scheme R(A,B,C) with the following W functional dependencies



 $AB \rightarrow C$

 $C \rightarrow A$

Determine the minimal keys of relations R. [1995: 2 Marks]

RIABC) [AB -c, C-A)

2 Candidate kays. AB AB CB Arg



Let R = (A,B,C,D,E,F) be a relation scheme with the following dependencies $C \rightarrow F$, $E \rightarrow A$, $EC \rightarrow D$, $A \rightarrow B$. Which of the following is a key for R?

[2009: 1 Mark]

[ISRO-2015]

A CD B EC

C AE D AC

AB (B)



The relation scheme student Performance (name course No, W) rollNo, grade) has the following functional dependencies:

name, courseNo \rightarrow grade

RollNo, courseNo \rightarrow grade

name \rightarrow rollNo

 $rollNo \rightarrow name$

Find candidate keys?

2 Condidate Keys: (1) Name Course No, (2) vall No Course No.

Composite lay: key with Two @ More Attorbute.

[1999: 1 Mark]

Performance (Name, Cno, 500, grade)



Consider a relation scheme R = (A, B, C, D, E, H) on which of the W following functional dependencies hold:

 $\{A \rightarrow B, BC \rightarrow D, E \rightarrow C, D \rightarrow A\}$

What are the candidate keys of R? [2005: 2 Marks]

- A AE, BE
- B AE, BE, DE





- C AEH, BEH, BCH
- AEH, BEH, DEH



Let R(A,B,C,D,E,F,P,G) be a relational schema in which of the W following functional dependencies are known to hold:

 $A \rightarrow BCD$, $DE \rightarrow P$, $C \rightarrow E$, $P \rightarrow C$ and $B \rightarrow G$.

Find candidate key of Relations R?

(GATE & ISRO. 3 Mers)

(RSI) Candidate key - [AF] As (RSI) RIABCD(=PG) [A>CD, DE>P, C>E, P>C, R>G]

(AB) - (ABCDEPG)

AB is Candidate | Cay | Amp

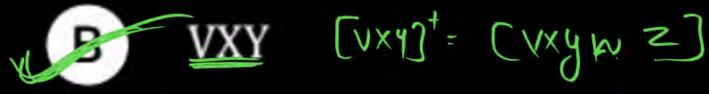


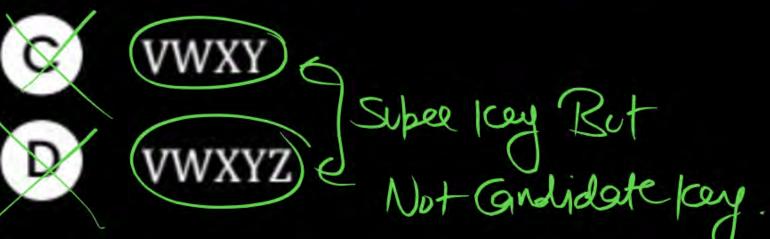
Consider a relation R with five attributes V, W, X, Y, and Z. The following functional dependencies hold: $VY \rightarrow W$, $WX \rightarrow Z$, and $ZY \rightarrow V$. Which of the following is a candidate key for R?

R(NMXYZ) [Vy-)W, WX-)Z, Zy-)V)

[2006: 2 Marks]





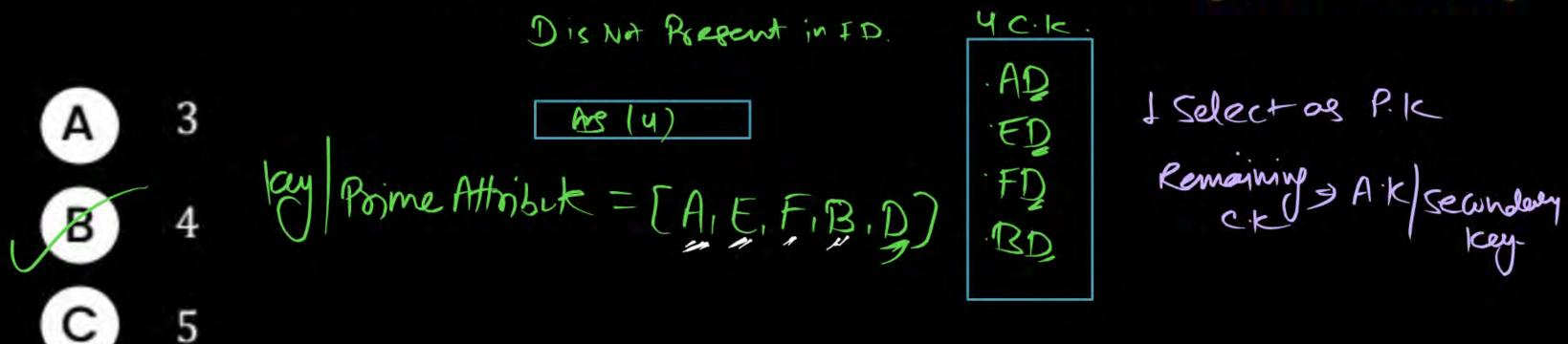




Relation R has eight attributes ABCDEFGH. Fields of R contain only atomic values.

 $F = \{CH \rightarrow G, A \rightarrow BC, B \rightarrow CFH, E \rightarrow A, F \rightarrow EG\}$ is a set of functional dependencies (FDs) so that F is exactly the set of FDs that hold for R.

How many candidate keys does the relation R have? [2013: 2 Marks]





Consider the relation scheme R = (E, F, G, H, I, J, K, L, M, N) and \mathbb{W} the set of functional dependencies{ $\{EF\} \rightarrow \{G\}, \{F\} \rightarrow \{I,J\}, \{E,H\} \rightarrow \{K,L\},\{K\} \rightarrow \{M\},\{L\} \rightarrow \{N\}$ no R. What is the key of R?

A {E,F}

(E,F,H)

[2014: 1 Mark] Candidate per

C {E,F,H,K,L}

D {E}

(EFH)= (EFHGIJKLMN)

Number of

MS(B)

Non Prime Attribute [7]

Prime | cey = [F, F, H]

Attribute = [F, F, H]

L 3 Prime Attribute.

Arg



A prime attribute of a relation scheme R is an attribute that W appears [2014: 1 Mark]





In all candidate keys of R.



In some candidate key of R.



In a foreign key of R.



Only in the primary key of R.

RIABCDEFGMIJT

Gudidate lays = [A, E, CD, H]



Which of the following is NOT a superkey in a relational schema with attributes V, W, X, Y, Z and primary key VY? [2016: 1 Mark]

- A VXYZ
- BVWXZ
 - C VWXY
 - D VWXYZ

Avg (B)

Primary key = Vy

Suber key > Any Suber Set of Primary key (Vy)

@ VXYZ -> yes, its Subser long

(VWXZ) -> Not Super (y is Not Present)

- O VWX y gyes, its super key.
- @ VWX42 yes its Super key



Attrobale closure [x3+

Prime/læy Attribute = Which Present in any Condidate key

Key Concept

Non Pointe | Non Key Which Not Prosent in Attribite Any Candidate Keys

Super key

(minimal Candidate (cey)

-> Primary (cy (Non Null + Unique)

-> Afternate | se condary key]

Member ship set

Let F be the Given FD Set, Any $X \rightarrow Y$ FD is Member of FD Set F libb $X \rightarrow Y$ logically implied in F.

X > y logically implied means from the closure of X determinery.

(X3 = [....y] then we can sawy

X > y logically Implied/

Member @ of FD Set F.

Valid FD.

(B) R(ABC) [A→B, B→C]

Check A→C is member of FD Set F@ Not?

(Sor)

[A] = (ABC) yes A>C is logically implied |

Menusel of FD Set F

F: [AB-)C, C-)P, D-)EF)

(i) Check: A>F is Membel at Not

(A) = (A) A > F Not Implied @ Not manufact of FD Set F

(ii) CJF is Member @ Not @ Logically implied @ Not?

[C] = [CDEF] C->F Logically implied.

(S) yes its Member.

Q.

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

$$A \rightarrow B$$
 @ $(CD)^{\dagger} = (CDEAB)$ logically Implied

 $A \rightarrow C$ @ $(BC)^{\dagger} = (BCD)$ logically Implied

 $CD \rightarrow E$ @ $(BD)^{\dagger} = (BD)$ Not logically Implied

 $B \rightarrow D$ $(BC)^{\dagger} = (ABC)$ logically Implied

 $E \rightarrow A$

Which of the following functional dependencies is NOT implied by the above set

C $CD \rightarrow AC$

 $A \qquad BD \rightarrow CD$

 $D BC \to CD BC \to BC$

[MCQ: GATE - 2M]

ISRO-3 maskg)

Q.

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



$$P \rightarrow QR$$

$$RS \rightarrow T$$

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

[MSQ: 2021 - 2M]

$$A PS \rightarrow T$$

$$B R \to T$$

$$C$$
 $P \rightarrow R$

$$D$$
 $PS \rightarrow Q$

Any Doubt?

