Branch : CSE & IT Batch : Hinglish

DBMS

FD's & Normalization

DPP 01

[MSQ]

1. According to RDBMS rules, choose the correct statement from the following.

(a) A relation in RDBMS can have multiple attributes
(b) A relation in RDBMS is a set of rows and columns
(c) A tuple in a relation can have multiple values for an attribute.
(d) All of the above

[NAT]

2. Consider the student relation shown below with schema stud (Sname, S age, S mail, S marks),

Stud

Sname	Sage	Smail	Smarks
Rohit	28	R@pw.live	68
Kanika	25	K@pw.live	75
Pankaj	25	K@pw.live	75
Rohit	28	R@pw.live	88
Anjali	26	A@pw.live	75

For the above given instance how many 2-set of attributes can determine a row uniquely?

[MSQ]

3. Consider a relation schema R(A, B, C, D, E, F, H) with the given Functional dependency set:

{A → BC, C → AD, DE → F, C → F}

The attribute closure that contains all the attributes of the relation R is?

(a) AE^+
(b) CE^+
(c) AEH^+
(d) All of the above

[NAT]

4. Consider the below relation schema Stud (Rid, name, course, mail, phone) with FD set as:

Rid → {Rid}

Rid → {name, mail}

course → {course, phone}

phone → {phone}

mail → {Rid, course}

name → {phone, mail, course}

The number of non-trivial FD's in the given FD set is/are?

[MCQ]

5. Consider the following set of FD's:

{V → W, W → XZ, X → YZ} for relation R(V, W, X, Y, Z)

Then the attribute closure of YZ^+ contains how many elements?

(a) 0 (b) 1
(c) 2 (d) 3

[MCQ]

6. For the given FD set: {P → QT, Q → SU, V → U} of a relation R (P, Q, T, S, U, V). Find the set of attributes that is Super key but not a Candidate key?

(a) PTQ (b) PV
(c) PQV (d) QV

[MCQ]

7. In a schema with attribute X, Y, Z, W, V, the following set of functional dependencies are given:

{Y → X, Y → Z, ZW → V, X → W, V → X}.

Which of the following FD is not implied by the above set?

(a) YX → ZW
(b) XV → YZ
(c) ZW → V
(d) XV → XW

[MSQ]

8. Choose the correct statement from the following.

(a) The cardinality is defined as the number of attributes in a relation.
(b) Degree of the relation is the number of tuples in the relation.

(c) Relation instance is the set of tuples of a relation at a particular instance of time.

(d) All of the above

Answer Key

1. (a, b)
2. (1)
3. (c)
4. (3)
5. (c)
6. (c)
7. (b)
8. (c)

Hints & Solutions

1. (a, b)

A relation in RDBMS can have multiple attributes/fields/Columns but every tuple should be unique. Thus, according to RDBMS guidelines, A tuple in a relation cannot have multiple values for an attribute.

A relation is a table and a table is a set of rows and columns.

2. (1)

We can clearly observe that none of the attribute can determine a tuple uniquely (Single attribute), if we check for 2-attribute set then only (Sname, Smarks) can determine a row uniquely for the instance. So the answer is 1.

3. (c)

The attribute closure $AE^+ = \{A, B, C, D, E, F\}$.
The attribute closure $CE^+ = \{C, E, A, B, D, F\}$.
But the attribute H is missing from the closure.
The attribute closure $AEH^+ = \{A, B, C, D, E, F, H\}$.
Therefore, C is the correct answer.

4. (3)

Trivial FD's: 2 ie Rid → Rid and phone → phone.

Non-trivial FD's: 3 i.e. Rid → {name, mail}, mail → {Rid, course) and name → {phone, mail, course}.

Semi-non trivial FD's: 1 i.e. course → {course, phone}.

5. (c)

The attribute closure of $YZ^+ = \{Y, Z\}$ no other attribute can be determined by YZ^+. Therefore only 2 elements that is Y and Z are in the YZ^+ closure.

6. (c)

The key for the given FD set.
$\{P \rightarrow QT, Q \rightarrow SU, V \rightarrow U\}$
$PV^+ = \{P, Q, T, V, U, S\}$
$PVQ^+ = \{P, Q, T, V, U, S\}$
$PTQ^+ = \{P, T, Q, S, U\}$
$QV^+ = \{Q, V, S, U\}$
we have PV^+ as the candidate key and also it is the super key. PVQ^+ is the super key but it is not a Candidate Key (not minimal set)

NOTE: A candidate key is minimal set of attributes that determine relational table uniquely. Also, every candidate key is a Super key but every Super key need not be Candidate.

7. (b)

$YX^+ = \{Y, X, Z, W, V\}$
$XV^+ = \{X, V, W\}$
$ZW^+ = \{Z, W, V, X\}$
$XV^+ = \{X, V, W\}$

8. (c)

- Cardinality is defined as the number of tuples in a relation.
- Degree is defined as the number of attributes in a relation.
- Relation instance is the set of tuples of a relation at a particular instance of time.