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Assignment 3

QUESTION (1)

a)   Relation SAP

i) Candidate keys:

- SID (Salesman ID)

- (SID, area)

ii) Functional dependencies:

- SID -> name, area, comm

- (SID, area) -> comm

- PID -> qty

iii) Normal form:

The relation SAP has the following functional dependencies:

- SID -> name, area, comm

- (SID, area) -> comm

- PID -> qty

There are no partial dependencies, but there is a transitive dependency: (SID, area) -> comm, where area is not a candidate key. Thus, the relation SAP is in 2nd Normal Form (2NF) but not in 3NF.

iv) Normalization:

Decompose based on (SID, area) -> comm:

- First: (SID, area, comm)

- Second: (SID, PID, qty)

b) Relation ATLANTA:

i) Candidate keys:

- PID (Player ID)

- GID (Game ID)

ii) Functional dependencies:

- PID -> name

- GID -> position

iii) Normal form:

The relation ATLANTA has the following functional dependencies:

- PID -> name

- GID -> position

Since there are no partial or transitive dependencies, the relation ATLANTA is in 3NF but not in 5NF because there's a multivalued dependency between PID and GID -> position.

iv) Normalization:

we decompose it to remove the multivalued dependency.

Decompose based on the multivalued dependency PID -> position:

- First: (PID, name)

- Second: (PID, GID, position)

c) Relation GRADE:

i) Candidate keys:

- (SID, CRN)

ii) Functional dependencies:

- SID -> Cname

- CRN -> grade

iii) Normal form:

The relation GRADE has the following functional dependencies:

- SID -> Cname

- CRN -> grade

Since there are no partial or transitive dependencies, the relation GRADE is in 3NF but not in 5NF because there's a dependency between SID and Cname.

iv) Normalization:

Decompoose based on the functional dependency SID -> Cname:

- First: (SID, Cname)

- Second: (CRN, grade)

d) Relation EXAM:

i) Candidate keys:

- (S, J)

ii) Functional dependencies:

- (S, J) -> P

iii) Normal form:

The relation EXAM has the following functional dependencies:

- (S, J) -> P

Since there are no partial or transitive dependencies, the relation EXAM is in 3NF but not in 5NF because there's a dependency between (S, J) and P.

iv) Normalization:

Decompose based on the functional dependency (S, J) -> P:

- First: (S, J, P)

    e) Relation PHD:

i) Candidate keys:

- P (patient)

ii) Functional dependencies:

- P -> H, D

iii) Normal form:

The relation PHD has the following functional dependencies:

- P -> H, D

Since there are no partial or transitive dependencies, the relation PHD is in 5NF.

iv) Normalization:

Since PHD is already in 5NF, no further normalization is required.

QUESTION (2)

a)

```
GRANT SELECT, UPDATE
ON EMPLOYEE, DEPARTMENT, DEPT_LOCATIONS, PROJECT,
WORKS_ON
TO ACCOUNTA
WITH GRANT OPTION;
```

b)

```
CREATE VIEW EMPS AS
SELECT FNAME, MINIT, LNAME, SSN, BDATE, ADDRESS, SEX
SUPERSSSN, DNO
FROM EMPLOYEE;

GRANT SELECT ON EMPS
TO ACCOUNTB;

CREATE VIEW DEPTS AS
SELECT DNAME, DNUMBER
FROM DEPARTMENT;

GRANT SELECT ON DEPTS
TO ACCOUNTB;
```

c)

```
GRANT SELECT, UPDATE
ON WORKS_ON
TO ACCOUNTC;

CREATE VIEW EMP1 AS
SELECT FNAME, MINIT, LNAME, SSN
FROM EMPLOYEE;

GRANT SELECT ON EMP1
TO ACCOUNTC;

CREATE VIEW PROJ1 AS
SELECT PNAME, PNUMBER
FROM PROJECT;
```

```
GRANT SELECT ON PROJ1
TO ACCOUNTC;
```

d)

```
GRANT SELECT ON EMPLOYEE, DEPENDENT
TO ACCOUNTD;
GRANT UPDATE ON DEPENDENT
TO ACCOUNTD;
```

e)

```
CREATE VIEW DNO3_EMPLOYEES AS
SELECT * FROM EMPLOYEE
WHERE DNO = 3;
GRANT SELECT ON DNO3_EMPLOYEES
TO ACCOUNTE;
```