

Database Systems (CS2005)

Midterm1 Exam

Date: September 21st 2024

Course Instructor(s)

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Total Time (Hrs.): 1

Total Marks: 35

Total Questions: 3

Roll No

Section

Student Signature

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Note: Please ensure that you attempt all questions and their respective parts in the given order.

Consider the following simplified database schema for a part-supply system.

In the DB schema given below :

- The supplier table stores information about suppliers and *sno* is the primary key.
- The part table stores information about parts and *pno* is the primary key.
- The catalog table stores information about parts supplied by suppliers. Primary key of this table is a composite of *sno* and *pno* columns.

CREATE TABLE Supplier (sno VARCHAR(255) Not Null Primary Key, sname VARCHAR(255) Not Null, address VARCHAR(255));	CREATE TABLE Part (pno VARCHAR(255), pname VARCHAR(255), color VARCHAR(255));	CREATE TABLE Catalog (sno VARCHAR(255), Pno VARCHAR(255), cost INT);
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CLO # 4: Use SQL for database definition and manipulation in any DBMS.

Q. No 1: Add the following constraints in the above-mentioned DB schema [1+2+2= 5]

- Primary Key constraint on part table.
ALTER Table part ALTER COLUMN pno VARCHAR(255) NOT NULL;
ALTER TABLE part ADD CONSTRAINT PK_part PRIMARY KEY(pno);
- Primary Key constraint on catalog table.
ALTER Table catalog ALTER COLUMN sno VARCHAR(255) NOT NULL;
ALTER Table catalog ALTER COLUMN pno VARCHAR(255) NOT NULL;
ALTER TABLE catalog ADD CONSTRAINT PK_catalog PRIMARY KEY(sno, pno);
- Foreign key constraints on catalog table (*The columns sno and pno in catalog table are the foreign keys*) and referential integrity constraint is on delete cascade.
ALTER TABLE catalog ADD CONSTRAINT FK_sno_catalog
FOREIGN KEY(sno) REFERENCES supplier(sno) ON DELETE CASCADE;
ALTER TABLE catalog ADD CONSTRAINT FK_pno_catalog
FOREIGN KEY(pno) REFERENCES part(pno) ON DELETE CASCADE;

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CLO # 4: Use SQL for database definition and manipulation in any DBMS.

Q. No 2: Consider the above-mentioned DB schema, write the following queries in SQL [15]

- a. List the *sno* of suppliers who supply some *red* parts and some *blue* parts.

```
SELECT C.sno FROM part P JOIN catalog C ON P.pno = C.pno WHERE P.color = 'red'
INTERSECT
SELECT C.sno FROM part P JOIN catalog C ON P.pno = C.pno WHERE P.color = 'blue';
```

- b. List all the suppliers who supply at most one part or do not supply any part.

```
SELECT sno FROM catalog GROUP BY sno HAVING COUNT(*)= 1
UNION
(SELECT sno FROM supplier EXCEPT SELECT sno FROM catalog);
```

Alternate Solution:

```
SELECT sno FROM supplier
EXCEPT
(SELECT sno FROM catalog GROUP BY sno HAVING COUNT(*)>1);
```

- c. List the *pno* with the *sno* of parts supplied by at least two different suppliers.

```
SELECT DISTINCT C1.pid, C1.sid
FROM catalog C1 JOIN catalog C2 ON C1.pid = C2.pid
WHERE C1.sid <> C2.sid;
```

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CLO # 4: Use SQL for database definition and manipulation in any DBMS.

Q. No 3: Write the result of the following queries for database state given below. [15]

Supplier		
Sno	Sname	address
S1	Smith	London
S2	Jones	Paris
S3	Blake	Paris
S4	Clark	London
S5	Adams	Athens

Part		
Pno	Pname	Color
P1	Nut	Red
P2	Bolt	Green
P3	Screw	Blue
P4	Screw	Red
P5	Cam	Blue
P6	Cog	Red

Catalog		
Sno	Pno	Cost
S1	P1	3000
S1	P2	2000
S1	P3	4000
S1	P4	2000
S1	P5	1000
S1	P6	1000
S2	P1	3000
S2	P2	4000
S3	P2	2000
S4	P2	2000
S4	P4	3000
S3	P3	1000
S3	P4	2000
S4	P5	4000

a. SELECT DISTINCT pname FROM part P JOIN catalog C ON P.pno=C.pno;

pname
Bolt
Cam
Cog
Nut
Screw

b. SELECT sno, MAX(cost) AS MAC
FROM catalog C JOIN part P ON C.pno=P.pno
WHERE color IN ('Red', 'Green')
GROUP BY sno;

sno	MAC
S1	3000
S2	4000
S3	2000
S4	3000

c. SELECT C.pno FROM supplier S JOIN catalog C ON S.sno = C.sno
EXCEPT
SELECT C.pno FROM supplier S JOIN catalog C ON S.sno = C.sno
WHERE sname <> 'Smith';

pno
P6