Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam – 603 110

(An Autonomous Institution, Affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Continuous Assessment Test – I

Question Paper

QP Type

Degree & Branch	B.E CSE	**Date & Session** 24/01/2020 & FN	**Semester**	III
Subject Code & Name	UCS1404 Database Management Systems		**Regulation: 2018**	
Time: 90 Minutes	**Answer Key**		**Maximum: 50 Marks**	

Part – A (6×2 = 12Marks)

<K1>	1. What do you mean by database management systems – DBMS? Defining a database –Involves specifying the data types, structures and constraints for the data to be stored in the database. Constructing a database–Process of storing the data itself on storage medium that is controlled by DBMS. Manipulating a database–Includes functions such as querying the DB for retrieval, updating the database to reflect changes in the miniworld and generating the reports, etc.	<CO1>
<K1>	2. What are data models? Mention the different categories of data models. A data model is a collection of concepts to describe:Structure of a database. Operations for manipulating these structures. Constraints the db should obey 1. Conceptual (high-level, semantic) data models 2. Physical (low-level, internal) data models: 3. Implementation (representational) data models	<CO1>
<K1>	3. List out the responsibilities of DBA. Coordinates all the activities of the database system which includes enterprises information resources and needs. Schema definition , Storage structure and access method definition, Schema and physical organization modification, Granting user authority to access the database, Periodical backup to prevent loss of data, Ensuring enough free disk space is available and upgrading diskspace, Monitoring performance and responding to changes in requirements	<CO1>
<K1>	4. Write any four advantages of DBMS over file-processing systems. Self describing nature of database system Insulation between programs and data and data astraction support of multiple views of the data Sharing of multiple views of data	<CO1>
<K2>	5. A key is a superkey, but not vice versa – Justify the statement. From a superkey from which we cannot remove any attributes and still have the uniqueness constraint hold. This minimality property is required for a key but is optional for a superkey.	<CO2>
<K1>	6. Write the difference between nested sub query and correlated subquery. Nested Sub Queries:The inner query executes first and finds a value.	<CO2>

	The outer query executes once, using the value from the innerquery. Correlated Subquery Execution: Get a candidate row (fetched by the outer query).Execute the inner query using the value of the candidate row.Use the values resulting from the inner query to qualify ordisqualify the candidate.Repeat until no candidate row remains.	

Part – B (3×6 = 18 Marks)

<K1>	7. Describe the three-schema architecture for database systems with a neat diagram. Internal schema at the internal level to describe physical storage structures and access paths (e.g indexes). Typically uses a physical data model. Conceptual schema at the conceptual level to describe the structure and constraints for the whole database for a community of users. Describes entities,data types, user operations and constraints Uses a conceptual or an implementation data model. External schemas at the external level to describe the various user views. Usually uses the same data model as the conceptual schema. Explain about physical data independence:changing the conceptual without changing the external schema logical data independence(changing internal without changing the conceptual schema)	<CO1>
<K1>	8. Write the relational algebra expressions for the following using the schema in Question 13. a. Find the names of suppliers who supply some red part. $PARTS1 \leftarrow \sigma\, color='red'(PARTS)$ $RESULT \leftarrow \Pi sname(PARTS1 \bowtie_{pid=pid} CATALOG \bowtie_{sid=sid} SUPPLIERS)$ b. Find the sids of suppliers who supply some red part and some green part. $R1 \leftarrow \Pi sid((\sigma\, color='red'(PARTS)) \bowtie_{pid=pid} CATALOG)$ $R2 \leftarrow \Pi sid((\sigma\, color='green'(PARTS)) \bowtie_{pid=pid} CATALOG)$ $RESULT \leftarrow R1 \cap R2$	<CO2>
<K2>	9. Describe the six clauses in the syntax of an SQL query, and show what type of constructs can be specified in each of the six clauses with suitable schema. 5) SELECT [mandatory] FROM [mandatory] WHERE [optional] GROUP BY [optional] HAVING [optional] ORDER BY [optional]	<CO2>

Part – C (2×10 = 20 Marks)

<table>
<tr><td><K1></td><td>10. Explain the component modules of a DBMS and their interactions with neat diagram.</td><td><CO1></td></tr>
<tr><td colspan="3">(Or)</td></tr>
<tr><td><K2></td><td>11. Discuss the following integrity constraints supported in Relational database : key, entity integrity and referential integrity constraints. Explain each constraint with suitable example. (4+3+3)
a) Explain about superkey,candidate key and primary key with two properties uniqueness and minimal superkey and examples
uniqunees property : in any state relation does not have identical values
minimal superkey: a superkey from which we cannot remove any attributes and still the uniqueness constraint hold
b) entity integrity: states that no primary key can be null. because they used to identify individual tuples in a relation.

c) maintains consistency between two relations. Constraint states that a tuple in one relation that refers to another rrelation must refer to an existing tuple in an relation

Expalin with examples of each case:
{ID, First},{ID, Last},{ID, First, Last},{ID},{First,Last}satisfy uniqueness so super keys
{ID}and{First, Last}- after removal uniqunes does not hold they are candidate keys.
Choose either{ID}or{First, Last}as the Primary Key</td><td><CO2></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td><K3></td><td>12. Consider the following relations for a database that keeps track of student enrollment in courses and the books adopted for each course:
<code>STUDENT(<u>SSN</u>, Name, Major, Bdate)</code>
<code>COURSE(<u>Course#</u>, Cname, Dept)</code>
<code>ENROLL(<u>SSN</u>, <u>Course#</u>, <u>Quarter</u>, Grade)</code>
<code>BOOK_ADOPTION(<u>Course#</u>, <u>Quarter</u>, Book_ISBN)</code>
<code>TEXT(<u>Book_ISBN</u>, Book_Title, Publisher, Author) (4+2+2+2)</code>

1. Specify the foreign keys for this schema, stating any assumptions you make.
ENROLL
1. SSN references STUDENT (SSN)
2. {Course#, Quarter} references BOOK_ADOPTION{Course#, Quarter}
BOOK_ADOPTION
1. Course# references Course(Course#)
2. Book_ISBN references TEXT(Book_ISBN)

2. Create the ENROLL relation with the constraint that the Grade should be from the values (O,A,B,C,F).
<code>CREATE ENROLL(</code>
<code>SSN NUMBER(8) CONSTRAINT EN_FK1 REFERENCES STUDENT(SSN),</code>
<code>COURSENO VARCHAR2(10),</code></td><td><CO2></td></tr>
</table>

```
QUARTER VARCHAR2(6),
GRADE CHAR(1) CONSTRAINT CH_GR CHECK(GRADE
IN('O','A','B','C','F').
CONSTRAINT ENROLL_PK PRIMARY KEY(SSN,COURSENO,QUARTER),
CONSTRAINT EN_FK2 FOREIGN KEY(COURSENO,QUARTER)
REFERENCES BOOK_ADOPTION(COURSENO,QUARTER)
);
```

3. Update the grade to 'A' for the student Manoj Tiwari who registered for the course CS302 during the Spring Quarter.

```
UPDATE ENROLL
SET GRADE='A'
WHERE COURSENO='CS302' AND QUARTER='Spring'
AND SSN = (SELECT SSN
           FROM STUDENT
           WHERE NAME='Manoj Tiwari');
```

4. Delete the book(s) which are not adopted by any of the courses.

```
DELETE FROM TEXT
WHERE BOOK_ISBN NOT IN (SELECT BOOK_ISBN
                  FROM BOOK_ADPOTION );
```

(Or)

<K3> 13. Consider the following schema: <CO2>

Suppliers (*sid*: integer, sname: string, address: string)
Parts (*pid*: integer, pname: string, color: string)
Catalog (*sid*: integer, *pid*: integer, cost: real)

The Catalog relation lists the prices charged for parts by Suppliers. Write the following queries in SQL: (2+2+3+3)

1. Find the sids of suppliers who supply some red or green part.

```
SELECT C.sid
FROM Catalog C, Parts P
WHERE (P.color = 'red' OR P.color = 'green') AND
       P.pid = C.pid;
```

2. Find *pairs of sids* such that the supplier with the first sid charges more for some part than the supplier with the second sid.

```
SELECT C1.sid,C2.sid
FROM Catalog C1, Catalog C2
WHERE C1.pid=C2.pid AND C1.sid!=C2.sid AND
      C1.cost>C2.cost;
```

3. Find the sids of suppliers who supply some red part or are at 221 Packer Street.

```
SELECT S.sid
FROM Suppliers S
WHERE S.address = '221 Packer street'
OR S.sid IN ( SELECT C.sid
              FROM Parts P, Catalog C
              WHERE P.color='red' AND P.pid = C.pid )
```

4. For each part, find the sname of the supplier who charges the most for that part.

```
SELECT P.pid, S.sname
FROM Parts P, Suppliers S, Catalog C
```

	`WHERE C.pid = P.pid AND C.sid = S.sid`
	`AND C.cost = (SELECT MAX (C1.cost)`
	`FROM Catalog C1`
	`WHERE C1.pid = P.pid)`	

7. Query processor, different users and corresponding interface compilers job to be defined.

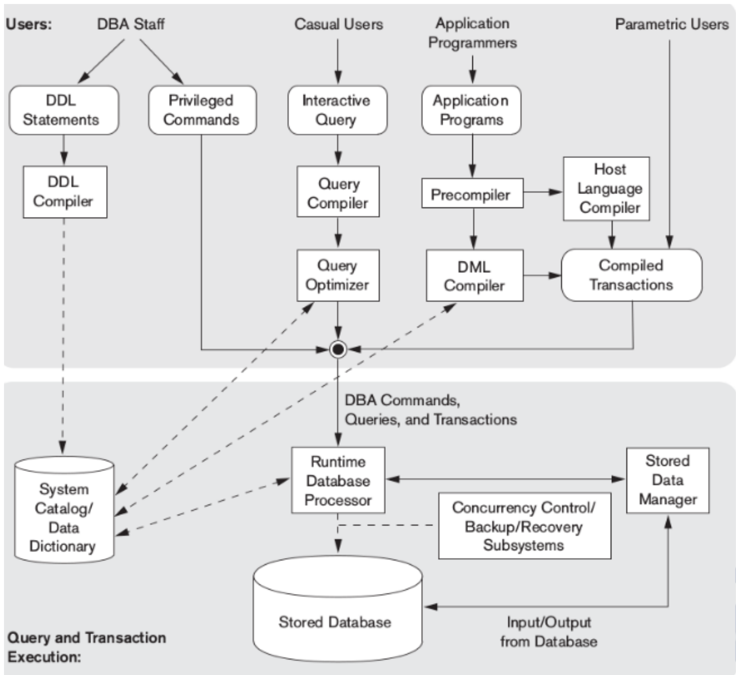

Figure 2.2
The three-schema architecture.