NOC23-CS79
Data Base Management System

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Week - 2

Question - 1

Table ACCOUNT is created using the following SQL query:

```
CREATE TABLE ACCOUNT(
AcNo INTEGER,
NAME VARCHAR(20),
PRIMARY KEY (AcNo),
CHECK(NAME LIKE ‘% Y’));
```

Question - 1

Which of the following SQL command(s) will result in an error?

a) INSERT INTO ACCOUNT VALUES(1,‘AKSHAY’);

b) INSERT INTO ACCOUNT VALUES(NULL,‘BIJAY’);

c) INSERT INTO ACCOUNT VALUES(3,‘ABHAY’);

d) INSERT INTO ACCOUNT VALUES(4,‘ANANDI’);

Solution - 1

Solution: (b) and (d)

As per the syntax and semantics of SQL commands. ‘NULL’ cannot be inserted in a primary key field. So, option (b) will lead to an error.

ANANDI does not match ‘% Y’. So, option (d) will lead to an error.

Question - 2

A designer maintains the following relations:

- StyleName(Element, Style)
- PrintStyle(Element, Color)

Which of the following option(s) is/are correct to find the names of the Element that has Style without having any color? Primary keys are underlined in the schemas.

Question - 2

a) SELECT DISTINCT Element FROM StyleName

INTERSECT

SELECT DISTINCT Element FROM PrintStyle;

b) SELECT Element FROM StyleName WHERE Element

NOT IN

SELECT Element FROM PrintStyle;

c) SELECT Element FROM PrintStyle WHERE Element

NOT IN

SELECT Element FROM StyleName;

d) SELECT DISTINCT Element FROM PrintStyle

MINUS

SELECT DISTINCT Element FROM StyleName;

Solution - 2

Solution: (b)

We can use NOT IN or MINUS or EXCEPT operators to solve this type of query.

Option a) finds the names of the Elements that have both Style and Color.

Options c) and d) find the names of the Elements that have Color but do not have any Style.

So, option b) is correct.

Question - 3

Consider two relations Table1(A1,A2) and Table2(A1,A3)

Suppose Table3(A1, A2, A3) is the output of natural full outer join of Table1 and Table2.

Which of the following statement(s) is/are correct?

a) Table3 does not contain (5, 7, null) and (2, 3, 7)

b) Table3 contains (5, 7, 4), (3, null, 7) and (2, 3, null)

c) Table3 contains (5, 7, 4) but not (2, 3, null) and (3, null, 7)

d) Table3 contains (2, 3, 7) and (5, 7, null)

Table1	
A1	A2
2	3
5	7

Table2	
A1	A3
3	7
5	4

Solution - 3

Solution: (a) and (b)

Table3		
A1	A2	A3
2	3	null
5	7	4
3	null	7

Question - 4

A designer maintains the following instances.

What is a possible output if the following SQL Query is executed?

SELECT COUNT(LOC) FROM Project, Module GROUP BY LOC;

a) 8
   4
b) 12
c) 2
   1
d) 3

Project	
PID	PName
A1B	WEB2
A2B	Stockly
A3B	TOD2
A4B	TOD3

Module		
PID	FileName	LOC
A1B	F12	500
A3B	F15	1000
A5B	F65	1000

Solution - 4

Solution: (a)

COUNT() on LOC with GROUP BY LOC will return 8, 4 for the respective counts of “1000” and “500”.

PID	PName	PID	FileName	LOC
A1B	WEB2	A1B	F12	500
A2B	Stockly	A1B	F12	500
A3B	TOD2	A1B	F12	500
A4B	TOD3	A1B	F12	500
A1B	WEB2	A3B	F15	1000
A2B	Stockly	A3B	F15	1000
A3B	TOD2	A3B	F15	1000
A4B	TOD3	A3B	F15	1000
A1B	WEB2	A5B	F65	1000
A2B	Stockly	A5B	F65	1000
A3B	TOD2	A5B	F65	1000
A4B	TOD3	A5B	F65	1000

Question - 5

What is the output of the following SQL statement?

```
select distinct ExperimentLocation from Experiment
where ParticipantCount in(
        select ParticipantCount from Experiment
        where ExperimentLocation='Lab2' );
```

Experiment	
ParticipantCount	ExperimentLocation
12	Lab2
2	Lab7
12	Lab7
2	Lab1
73	Lab2
4	Lab2
73	Lab5

Solution - 5

Solution: Lab2, Lab7, Lab5

The set of ParticipantCount returned by the inner query is: {12,73, 4}. Other Experiment Locations which are associated with ParticipantCount 12, 73 and 4 are Lab7 and Lab5.

Question - 6

Given the schema (primary key is underlined)

budget(month, expense)

describe the result obtained by the following query.

```
SELECT MAX(expense) AS exp FROM budget
WHERE expense < (SELECT MAX(expense) FROM budget);
```

a) Finds the highest expense from budget.

b) Finds second highest expense from budget.

c) Finds all expenses from budget that are less than the highest expense.

d) Finds all expenses from budget that are equal to the highest expense.

Solution - 6

Solution: (b)

There is a sub-query in SQL which finds the maximum budget from the table and then compares the budget which is less than the maximum budget to find the second highest budget.

Question - 7

Which of the following output(s) is (are) displayed by the following SQL query?

```
select NAME from Student
where NAME like '%A%' AND NAME NOT like '%Rathod' ;
```

a) Abhay Singh, Roshan Singh

b) Abhay Singh, Roshan Singh, Smriti

c) Smriti, Akshay Rathod

d) Arijit Ray, Abhay Singh, Roshan Singh

Student		
ID	NAME	ADDRESS
1	Arijit Ray	7 MG Road
2	Abhay Singh	P16 EL Garden
3	Akshay Rathod	12 Tolly City
4	Roshan Singh	RL Lane
5	Smriti	P26 EL Garden

Solution - 7

Solution: (d)

The SQL query selects all names that contain ‘A’ and does not end with ‘Rathod’.

S1: Names that contain ‘A’={Arijit Ray, Abhay Singh, Roshan Singh, Akshay Rathod}.

S2: Names ending with ‘Rathod’={Akshay Rathod}.

Hence, all the names are from S1 − S2.

Question - 8

Consider the following instance of UniversitiesDetails(StateName,#CentralUniversities, #StateUniversities,#Faculties) relation.

UniversitiesDetails			
StateName	#CentralUniversities	#StateUniversities	#Faculties
Assam	2	18	15000
Bihar	4	18	18000
Delhi	7	11	20000
Gujarat	1	29	25000
Kerala	1	15	15000
West Bengal	1	36	40000

Identify the correct statement(s) to get the following output:

UniversitiesDetails		
StateName	#StateUniversities	#Faculties
Delhi	11	20000
Gujarat	29	25000
West Bengal	36	40000

a)
```
SELECT * FROM UniversitiesDetails
WHERE #Faculties>=20000;
```

b)
```
SELECT StateName, #StateUniversities, #Faculties FROM UniversitiesDetails
WHERE #Faculties>=20000;
```

c)
```
SELECT StateName, #StateUniversities, #Faculties FROM UniversitiesDetails
WHERE #Faculties>=20000 AND #CentralUniversities=1;
```

d)
```
SELECT StateName, #StateUniversities, #Faculties FROM UniversitiesDetails
WHERE #Faculties>=20000 OR #CentralUniversities=1;
```

Solution - 8

Solution: (b)

Output table containing tuples whose #Faculties is greater than or equal to 20000.

Question - 9

Consider the following instance of UniversitiesDetails(StateName,#CentralUniversities, #StateUniversities,#Faculties) relation.

UniversitiesDetails			
StateName	#CentralUniversities	#StateUniversities	#Faculties
Assam	2	18	15000
Bihar	4	18	18000
Delhi	7	11	20000
Gujarat	1	29	25000
Kerala	1	15	15000
West Bengal	1	36	40000

Identify the correct SQL command that creates a view as UniversitiesInfo with StateName and #CentralUniversities that enlist members whose StateName has 2nd character 'e'.

a)
```
CREATE VIEW UniversitiesInfo(StateName,#CentralUniversities) OF
SELECT StateName,#CentralUniversities FROM UniversitiesDetails
WHERE StateName LIKE '_e%';
```

b)
```
CREATE VIEW UniversitiesInfo(StateName,#CentralUniversities) AS
SELECT StateName,#CentralUniversities FROM UniversitiesDetails
WHERE StateName LIKE '%e%';
```

c)
```
CREATE VIEW UniversitiesInfo(StateName,#CentralUniversities) ON
SELECT StateName,#CentralUniversities FROM UniversitiesDetails
WHERE StateName LIKE '_e%';
```

d)
```
CREATE VIEW UniversitiesInfo(StateName,#CentralUniversities) AS
SELECT StateName,#CentralUniversities FROM UniversitiesDetails
WHERE StateName LIKE '_e%';
```

Solution - 9

Solution: (d)

As per SQL syntax, LIKE `_e%' matches StateName having 2nd character as `e'. The percent sign represents zero, one, or multiple characters. The underscore sign (_) represents one, single character.

General syntax for creating VIEW is:

```
CREATE VIEW viewName[column1, column2, ...] AS

SELECT column1, column2, ...

FROM tablename

WHERE condition;
```

Question - 10

Consider the following instance of `UniversitiesDetails(StateName,#CentralUniversities, #StateUniversities,#Faculties)` relation.

UniversitiesDetails			
StateName	#CentralUniversities	#StateUniversities	#Faculties
Assam	2	18	15000
Bihar	4	18	18000
Delhi	7	11	20000
Gujarat	1	29	25000
Kerala	1	15	15000
West Bengal	1	36	40000

Identify the correct statement(s) to find the `StateName` whose `#CentralUniversities` is greater than or equal to 2 and `#Faculties` is greater than or equal to 18000 but less than or equal to 25000.

a)
```
SELECT StateName FROM UniversitiesDetails
WHERE #CentralUniversities>=2 AND #Faculties IN(18000,25000);
```

b)
```
SELECT StateName FROM UniversitiesDetails
WHERE #CentralUniversities>=2 AND #Faculties BETWEEN 18000 AND 25000;
```

c)
```
(SELECT StateName FROM UniversitiesDetails
WHERE #CentralUniversities>=2)
INTERSECT
(SELECT StateName FROM UniversitiesDetails
WHERE #Faculties BETWEEN 18000 AND 25000);
```

d)
```
(SELECT StateName FROM UniversitiesDetails
WHERE #CentralUniversities>=2)
INTERSECT
(SELECT StateName FROM UniversitiesDetails
WHERE #Faculties AS(18000,25000));
```

Solution - 10

Solution: (b) and (c)

The BETWEEN operator selects values within a given range. #CentralUniversities greater than 2 can be written as #CentralUniversities>=2.

Question - 11

Consider the following table `Collections` :

Collections		
cid	item	price
11	stickers	50
13	idol	1050
23	postcard	150
2	stamp	500
10	idol	2000
14	stickers	70

How many tuples will be returned by the following query?

```
SELECT item, price FROM Collections
WHERE price>(SELECT MIN(price) FROM Collections);
```

Solution - 11

Solution: 5

The SQL query returns all those tuples which are associated with price more than the minimum price i.e. 50.

Question - 12

Consider the following table `Collections` :

Collections		
cid	item	price
11	stickers	50
13	idol	1050
23	postcard	150
2	stamp	500
10	idol	2000
14	stickers	70

Which of the following options will NOT be present in the output produced by `SELECT MAX(cid) FROM COLLECTIONS GROUP BY item;`?

a) 11

b) 13

c) 23

d) 2

Solution - 12

Solution: (a)

The SQL query returns the highest value of cid for each of the item groups

Question - 13

Consider the following table `Delivery` :

Delivery		
purchaseid	deliverydate	delay
193	12/09/2010	10
183	15/10/2011	0
200	02/09/2011	0
2	30/09/2011	2
60	5/09/2010	4

What will be the output of the following SQL query?

```
SELECT COUNT(purchaseid) FROM Delivery
WHERE deliverydate LIKE '%2011' AND deliverydate NOT LIKE '30/';?
```

Solution - 13

Solution: 3

The SQL query returns the count of tuples having deliverydates ending with 2011.

Question - 14

Consider the following instance of table **Employee** :

Employee			
id	**lastname**	**firstname**	**age**
19	Rai	Rajeev	24
19	Singh	Rajeev	24
20	Roy	Sayan	24
21	Roy	Sayan	29

Identify the correct, "**CREATE**" statement for this table.

a)
```
CREATE TABLE Employee (
    id int NOT NULL,
    lastname varchar(255) NOT NULL,
    firstname varchar(255),
    age int,
    PRIMARY KEY (ID));
```

b)
```
CREATE TABLE Employee (
    id int NOT NULL,
    lastname varchar(255) NOT NULL,
    firstname varchar(255),
    age int,
    PRIMARY KEY (ID,lastName));
```

c)
```
CREATE TABLE Employee (
    id int,
    lastname varchar(255) NOT NULL,
    firstname varchar(255),
    age int,
    PRIMARY KEY (lastName));
```

d)
```
CREATE TABLE Employee (
    id int NOT NULL,
    lastname varchar(255) NOT NULL,
    firstname varchar(255),
    age int,
    PRIMARY KEY (firstname, lastName));
```

Solution - 14

Solution: (b)

It is clear from the above instance that only id or only lastName cannot be a key. Hence, the (id,lastName) pair must be the key.

Attributes in the PRIMARY KEY cannot be NULL, and (firstname,lastName) pair cannot be the PRIMARY KEY.

Question - 15

Consider the following relation instance:

Number_Tab	
Num1	Num2
4	5
5	7
6	7
7	8
3	4

Both attributes `Num1` and `Num2` are integers and do not have null values. `Num1` is the primary key of the table and `Num2` is the foreign key of the same table, `Number_Tab` and references with `on delete cascade` constraints. A tuple `(Num1, Num2)` will be in the table only if Num1 $\leq$ Num2. Which of the following is possible if the tuple `(5, 7)` is deleted from the table?

a) The deletion of `(5, 7)` will be prohibited.

b) Tuple `(4, 5)` and `(3, 4)` also will be deleted.

c) Tuple `(6, 7)` and `(7, 8)` also will be deleted.

d) Only tuple `(7, 8)` will be deleted.

Solution - 15

Solution: (b)

In the Number Tab(Num1, Num2), where Num1 is the primary key, and Num2 is the foreign key which is referencing the primary key Num1 of its own relation. Now if we delete tuple (5,7) then tuple (4,5) should also be deleted (as 5 in the tuple (4,5) references to 5 in the tuple (5,7) which no longer exists; hence, the referencing tuple should also be deleted), and as (4,5) is deleted, tuple (3,4) should also be deleted for the same reason. Therefore, in total, 3 rows have to be deleted if the tuple (5,7) is deleted.

Question - 16

Suppose a bank wants to make a view consisting of the names of customers having loan in 'MUMBAI' branch with the loan amount being more than equal to 50000 but less than equal to 70000.

- loan(loan_number, branch_name, amount)
- borrower(customer_name, loan_number)

Identify the correct query from the following. Primary keys are underlined in the schema.

a)
```
CREATE VIEW v1 AS
SELECT customer_name
FROM loan, borrower
WHERE branch_name = 'MUMBAI'
AND loan.loan_number = borrower.loan_number
AND amount >= 50000 AND amount <= 70000;
```

b)
```
CREATE VIEW v1 AS
SELECT customer_name
FROM loan
WHERE branch_name = 'MUMBAI'
AND amount >= 50000 AND amount <= 70000;
```

c)
```
CREATE VIEW v1 AS
SELECT customer_name
FROM loan, borrower
WHERE branch_name = 'MUMBAI'
AND loan.loan_number = borrower.loan_number
AND amount BETWEEN 50000 AND 70000;
```

d)
```
CREATE VIEW v1 AS
SELECT customer_name
FROM loan, borrower
WHERE branch_name = 'MUMBAI'
AND amount >= 50000, amount <= 70000;
```

Solution - 16

Solution: (a) and (c)

Question - 17

StudentDetails			
StudName	DeptName	Address	Age
Ayush	CSE	Kolkata	28
Priya	CSE	Hyderabad	26
Ankush	IT	Kolkata	30
Rumki	IT	Hyderabad	25
Sujit	ECE	Bangalore	24
Sayan	IEE	Mumbai	28

Identify the correct statement(s) to get the following output:

StudentDetails			
StudName	DeptName	Address	Age
Ayush	CSE	Kolkata	28
Ankush	IT	Kolkata	30
Rumki	IT	Hyderabad	25
Sayan	IEE	Mumbai	28

a)
```
SELECT * FROM StudentDetails
WHERE Age>=28;
```

b)
```
SELECT * FROM StudentDetails
WHERE DeptName='IT';
```

c)
```
SELECT * FROM StudentDetails
WHERE Age>=28 AND DeptName='IT';
```

d)
```
SELECT * FROM StudentDetails
WHERE Age>=28 OR DeptName='IT';
```

Solution - 17

Solution: (d)

Question - 18

StudentDetails			
StudName	DeptName	Address	Age
Ayush	CSE	Kolkata	28
Priya	CSE	Hyderabad	26
Ankush	IT	Kolkata	30
Rumki	IT	Hyderabad	25
Sujit	ECE	Bangalore	24
Sayan	IEE	Mumbai	28

Identify the correct statement(s) to find the `StudName` and Address whose `Age` is greater than the `Age` of all students in the 'IT' department.

a)
```
SELECT StudName, Address from StudentDetails
        where Age >  (select Age
                        from StudentDetails
                        where DeptName = 'IT');
```

b)
```
SELECT StudName, Address from StudentDetails
        where Age > all (select Age
                        from StudentDetails
                        where DeptName = 'IT');
```

c)
```
SELECT StudName, Address from StudentDetails
        where Age >  (select max(Age)
                        from StudentDetails
                        where DeptName = 'IT');
```

d)
```
SELECT StudName, Address from StudentDetails
        where Age > for (select Age
                        from StudentDetails
                        where DeptName = 'IT');
```

Solution - 18

Solution: (b)