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Class:TY(CSE-AIML)

Experiment No. 8

Title: Views, Constraints and Subqueries.

Objective: To study the implementation of view and different operations on it. Also to studyConstraints and Subqueries.

Theory:

View: Syntax: create view viewname

As

< query expression >

e.g. create view marks60 as select rollno, marks from student where marks >60;

Constraints: primary key, foreign key, not null, check, unique clause, on delete cascade.

Creating table using all constraints:

Syntax: create table tablename

(A1D1, …. , AnDn, <integrity_constraint1>,....., <integrity_constraint n>);

Where A1,...., An are attributes, D1,…… , Dn are datatypes.

Sub-queries:

a. **Single row subquery:**

Syntax: select columnlist from tablename where columnname operator

(select columnlist from tablename [where condition]) ;

b. **Multiple row subquery:**

Operators: In, All, any/some

Examples of constraints:

//Primary Key

```
create table department
(dept_name varchar(20) primary key, building varchar(20), budget numeric(15,2));
    insert into department values ('cse', 'new' , 200000);
    insert into department values ('etx', 'new' , 250000)
```

//Foreign key

```
create table instructor
(ID char(5), name varchar(20) not null,
 dept_name varchar(20),
 salary numeric(8,2),
 primary key (ID),
 foreign key (dept_name) references department(dept_name) on delete cascade on update
cascade)

insert into instructor values ('10211', 'Ram', 'cse', 66000);
insert into instructor values ('10212', 'Shourya', 'etx', 60000);

select * from department;
select * from instructor;
```

//To see effect of on delete cascade and on update cascade

```
update department set dept_name='etc' where dept_name='etx';
select * from department;
select * from instructor;
delete from department where dept_name='etc';

select * from department;
select * from instructor;

create table student (
      ID    varchar(5), name  varchar(20) not null,  dept_name  varchar(20),
      tot_cred  numeric(3,0) DEFAULT 5.5, primary key (ID),
      foreign key (dept_name) references department (dept_name));
```

//Setting Default value to column

```
mysql> ALTER TABLE table_name
      ALTER column_name SET DEFAULT default_value;
```

```
mysql> ALTER TABLE table_name
        ALTER column_name DROP DEFAULT;

mysql> create table s1 (rn int, class char(4) default 'TY', marks float(4,2));
Query OK, 0 rows affected, 1 warning (1.26 sec)

mysql> insert into s1(rn, marks) values (1,78);
Query OK, 1 row affected (0.11 sec)

 mysql> select * from s1;
+------+---------+---------+
| rn   | class | marks |
+------+---------+---------+
|    1 | TY    | 78.00 |
+------+---------+---------+
1 row in set (0.00 sec)
```

//Check Constraint

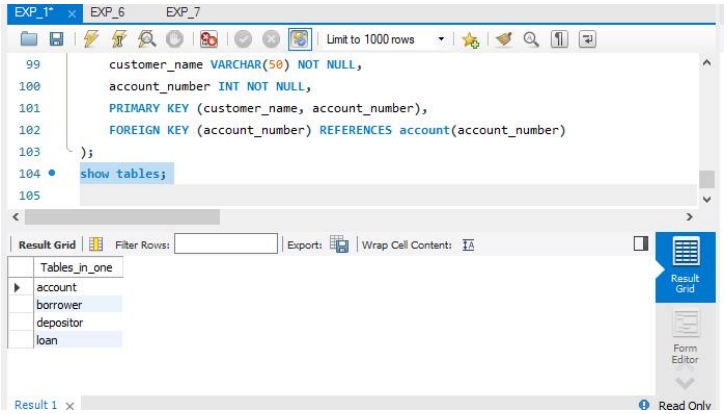
```
 create table account1 (accno int, brnm varchar(10), balance numeric(6,1),
check(balance>20000));

insert into account1 values (11,"shahupuri", 6000);
ERROR 3819 (HY000): Check constraint 'account1_chk_1' is violated.
```

- **Queries to Solve:**

Consider the following schema.

```
 loan (loan_number, branch_name, amount)
 borrower (customer_name, loan_number)
 account (account_number, branch_name, balance )
 depositor (customer_name, account_number)

CREATE TABLE loan (
   loan_number INT PRIMARY KEY,
   branch_name VARCHAR(50) NOT NULL,
```

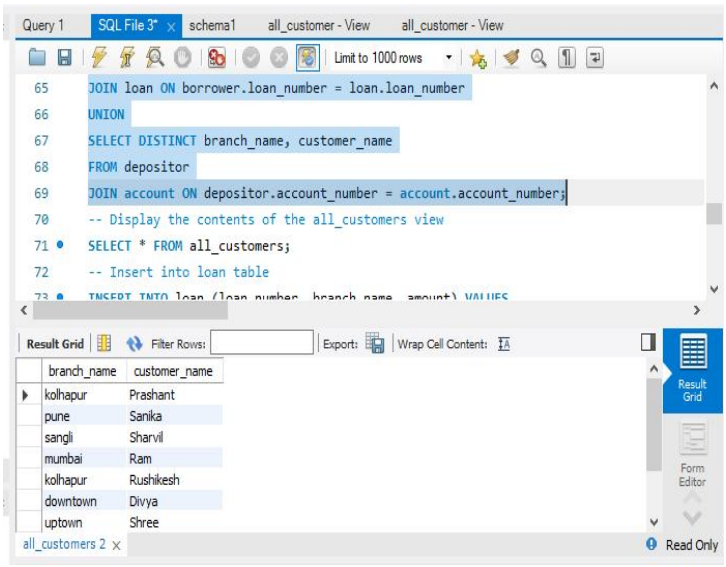
```
    amount DECIMAL(10, 2) CHECK (amount >= 0)
);

CREATE TABLE borrower (
    customer_name VARCHAR(50) NOT NULL,
    loan_number INT NOT NULL,
    PRIMARY KEY (customer_name, loan_number),
    FOREIGN KEY (loan_number) REFERENCES
loan(loan_number)
);

CREATE TABLE account (
    account_number INT PRIMARY KEY,
    branch_name VARCHAR(50) NOT NULL,
    balance DECIMAL(10, 2) CHECK (balance >= 0)
);

CREATE TABLE depositor (
    customer_name VARCHAR(50) NOT NULL,
    account_number INT NOT NULL,
    PRIMARY KEY (customer_name, account_number),
    FOREIGN KEY (account_number) REFERENCES
account(account_number)
);
```



- **Execute the following queries:**

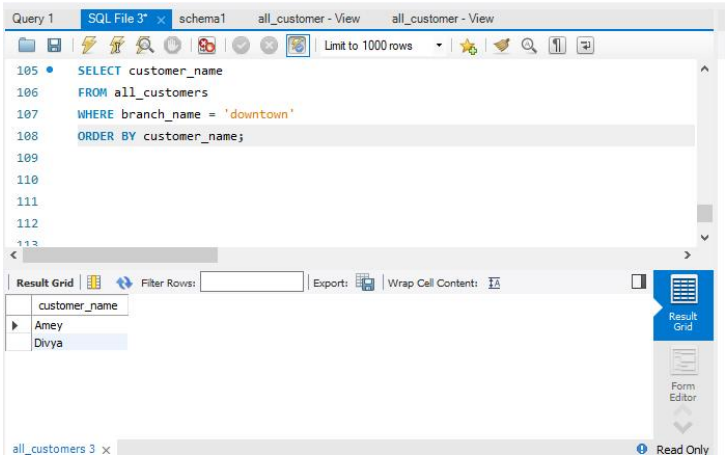
1. Create a view ‘all_customers’ consisting of branch names and the names of customerswho have either an account or a loan or both.

```
CREATE VIEW all_customers AS

SELECT DISTINCT branch_name, customer_name

FROM borrower

JOIN loan ON borrower.loan_number = loan.loan_number

UNION

SELECT DISTINCT branch_name, customer_name

FROM depositor

JOIN account ON depositor.account_number = account.account_number;
```



2. Using view ‘all_customers’, list in alphabetic order, the customers of ‘downtown’ branch.

```
SELECT customer_name
FROM all_customers
WHERE branch_name = 'downtown'
ORDER BY customer_name;
```



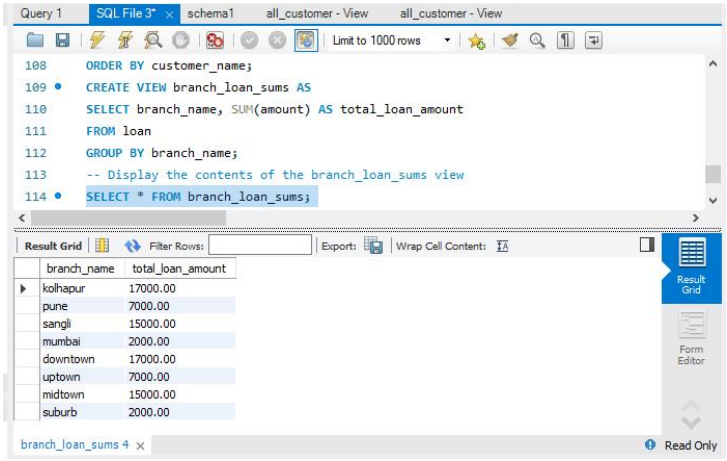
3. Create a view consisting of sum of the amounts of all the loans for each branch.

CREATE VIEW branch_loan_sums AS

SELECT branch_name, SUM(amount) AS total_loan_amount

FROM loan

GROUP BY branch_name;



- **Consider the following schema.**

  branch (branch-name, branch-city, assets)

  borrower (customer-name, loan-number)

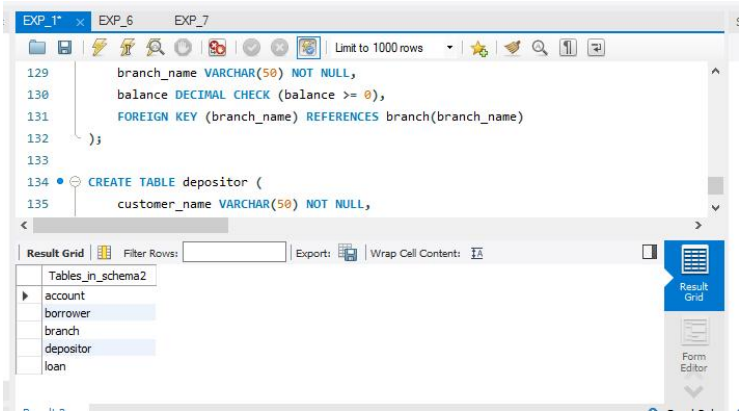
  account (account-number, branch-name, balance)

  depositor (customer-name, account-number)

- **Execute the following queries:**

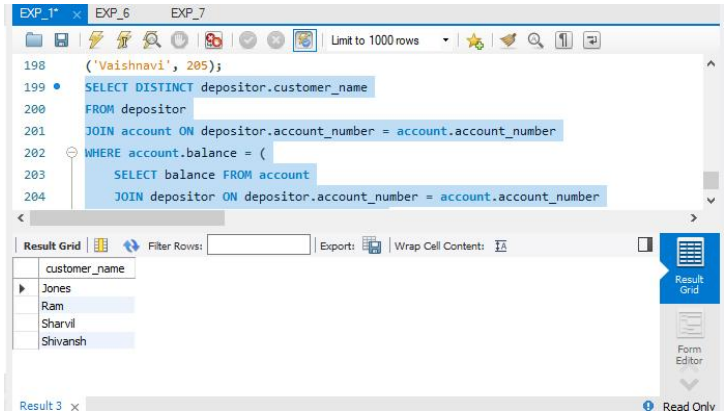
1. **Create above tables using all constraints- primary key, foreign key, not null, check.**

```
CREATE TABLE branch (
   branch_name VARCHAR(50) PRIMARY KEY,
   branch_city VARCHAR(50) NOT NULL,
   assets DECIMAL CHECK (assets >= 0)
);

CREATE TABLE loan (
   loan_number INT PRIMARY KEY,
   branch_name VARCHAR(50) NOT NULL,
   amount DECIMAL CHECK (amount >= 0),
   FOREIGN KEY (branch_name) REFERENCES branch(branch_name)
);

CREATE TABLE borrower (
   customer_name VARCHAR(50) NOT NULL,
   loan_number INT NOT NULL,
   PRIMARY KEY (customer_name, loan_number),
   FOREIGN KEY (loan_number) REFERENCES loan(loan_number)
);

CREATE TABLE account (
   account_number INT PRIMARY KEY,
   branch_name VARCHAR(50) NOT NULL,
   balance DECIMAL CHECK (balance >= 0),
   FOREIGN KEY (branch_name) REFERENCES branch(branch_name)
);

CREATE TABLE depositor (
   customer_name VARCHAR(50) NOT NULL,
   account_number INT NOT NULL,
   PRIMARY KEY (customer_name, account_number),
   FOREIGN KEY (account_number) REFERENCES account(account_number)
);
```



2. Find the customers having same balance as ‘Ram’

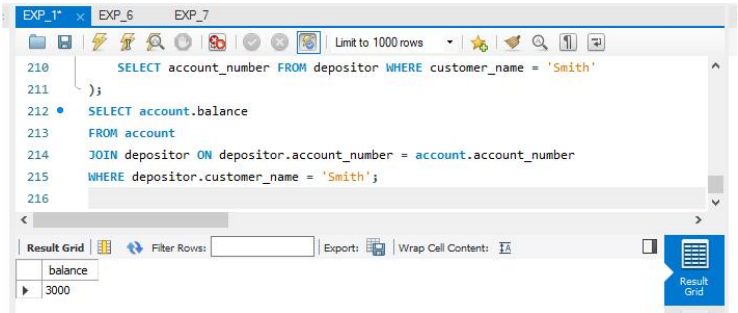
```
SELECT DISTINCT depositor.customer_name
FROM depositor
JOIN account ON depositor.account_number = account.account_number
WHERE account.balance = (
  SELECT balance FROM account
  JOIN depositor ON depositor.account_number = account.account_number
 WHERE depositor.customer_name = 'Ram'
);
```



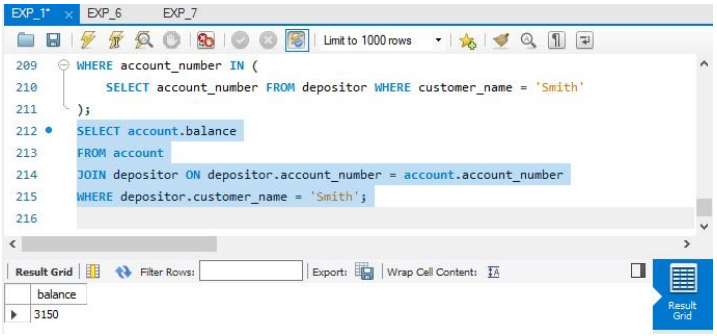
3. Update balance of ‘Smith’ by 5%.

```
UPDATE account
SET balance = balance * 1.05
WHERE account_number IN (
SELECT account_number FROM depositor WHERE customer_name = 'Smith'
);
```

Before:

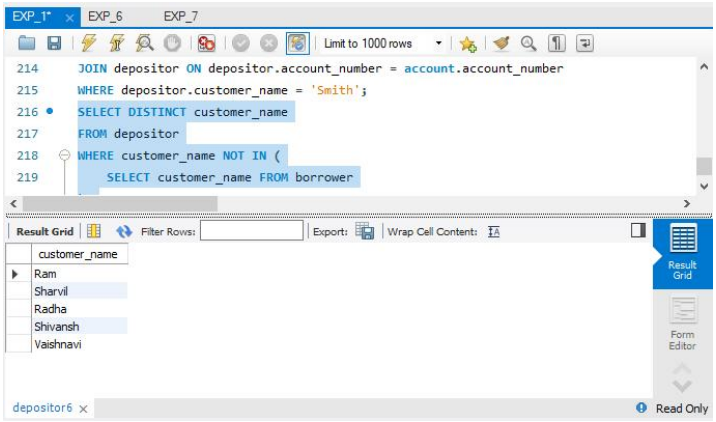


After:



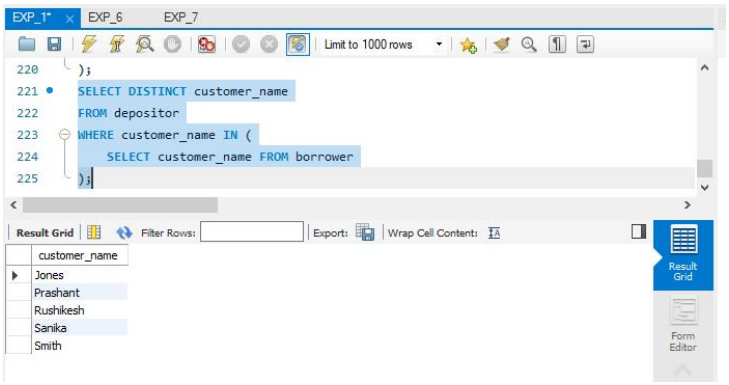
4. By using subquery, find the names of customers who have account but not loan.

```
SELECT DISTINCT customer_name
FROM depositor
WHERE customer_name NOT IN (
  SELECT customer_name FROM borrower
);
```



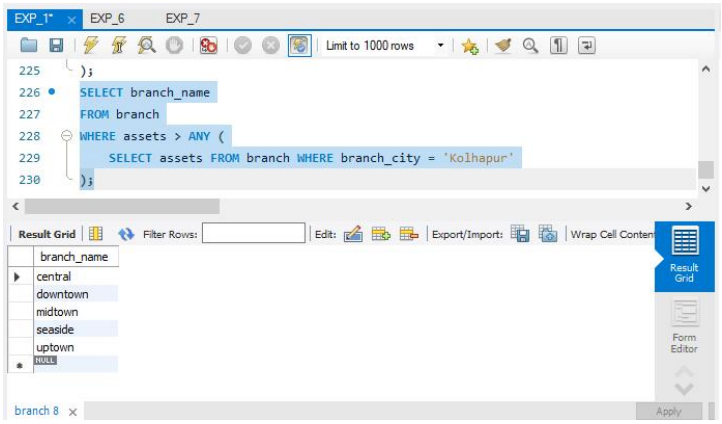
5. By using subquery, find the names of customers who have both account and loan.

```
SELECT DISTINCT customer_name
FROM depositor
WHERE customer_name IN (
  SELECT customer_name FROM borrower
);
```



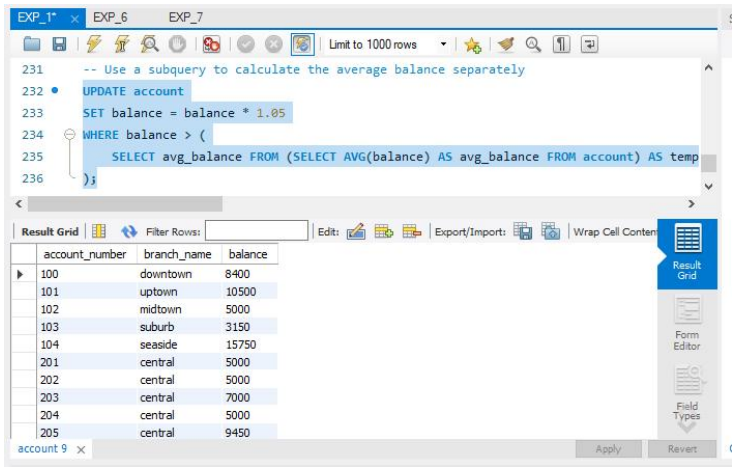
6. Find the names of all branches that have assets greater than those of at least one branchlocated in 'Kolhapur'.

```
SELECT branch_name

FROM branch

WHERE assets > ANY (

SELECT assets FROM branch WHERE branch_city = 'Kolhapur'

);
```



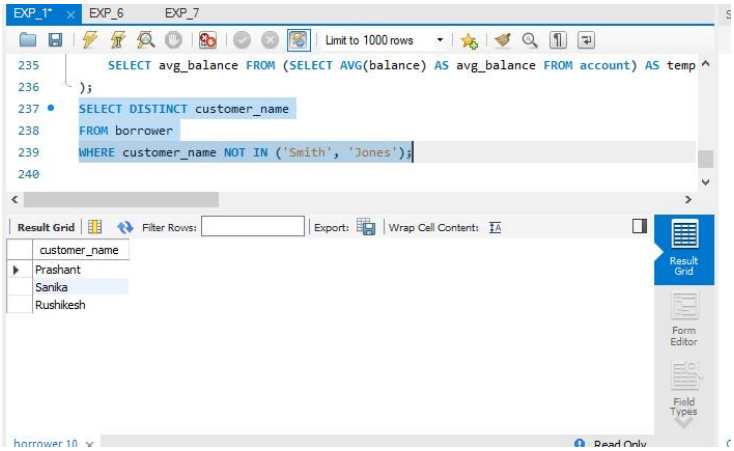
7. Update those accounts whose balance is greater than average balance by 5%.

```
UPDATE account
SET balance = balance * 1.05
WHERE balance > (
  SELECT avg_balance FROM (SELECT AVG(balance) AS avg_balance FROM account) AS temp
);
```



8. Find the customers who have a loan at bank & whose names are neither 'Smith' nor 'Jones'.

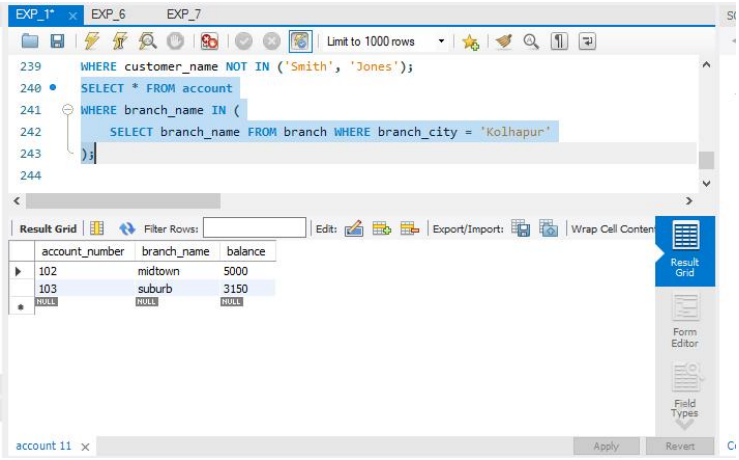
```
SELECT DISTINCT customer_name
FROM borrower
WHERE customer_name NOT IN ('Smith','Jones');
```



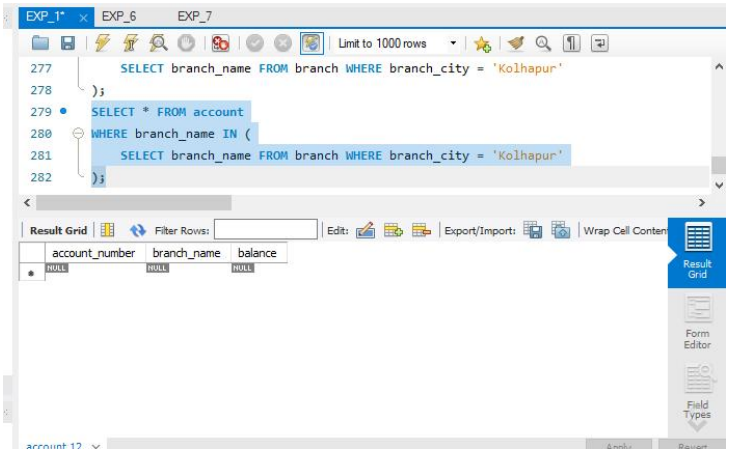
9. Delete all account tuples at every branch located in 'Kolhapur' city.

```
DELETE FROM depositor
WHERE account_number IN (
  SELECT account_number FROM account
  WHERE branch_name IN (
     SELECT branch_name FROM branch WHERE branch_city = 'Kolhapur'
   )
  );
DELETE FROM account
WHERE branch_name IN (
  SELECT branch_name FROM branch WHERE branch_city = 'Kolhapur'
  );
```

Before Deleting:



After Deleting:



Outcome: Students are able to create views. Also Students are able to create the tables usingprimary key, foreign key, not null, check constraint.