Laboratory Assignments Subject: Introduction to Databases Subject code: CSE 3151

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Sec – I

Assignment 1: Practicing DDL and DML Commands

Objective of this Assignment:

- To create tables and to insert data into these tables.

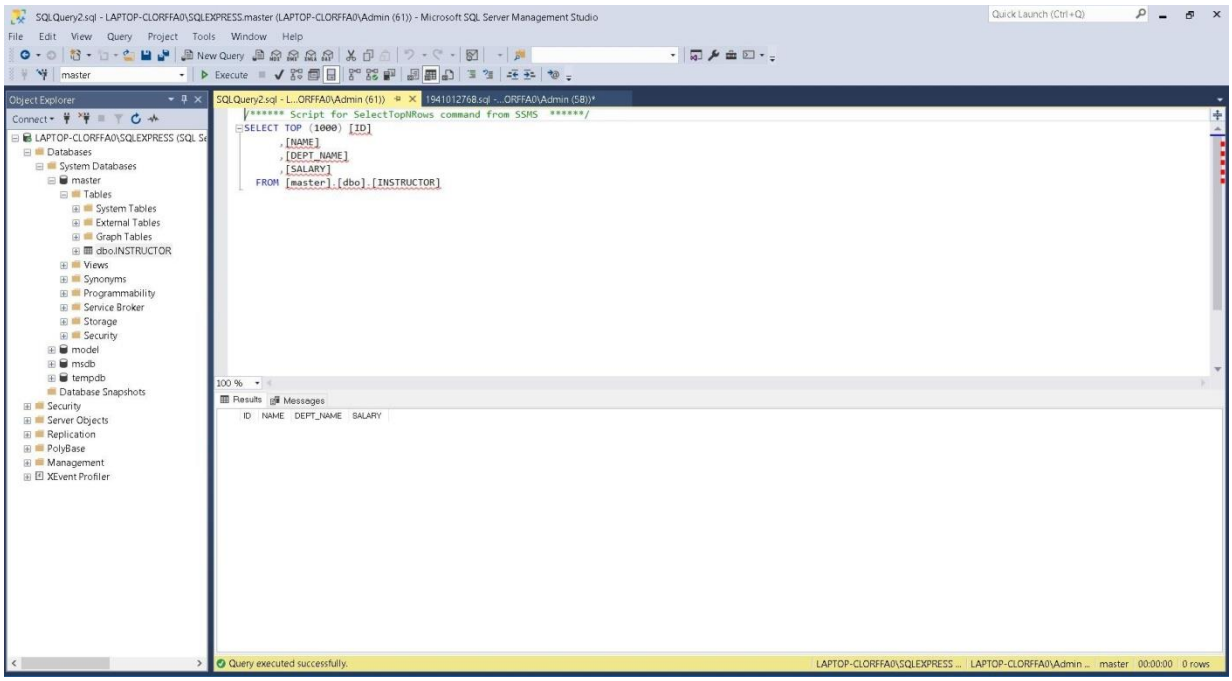
1. Create the following Tables with their respective columns, data types and size.

Table Name	Columns	Datatypes	Size
Instructor	ID	Number	5
	Name	Varchar2	30
	Dept_name	Varchar2	20
	Salary	Number	6

Query:

```
CREATE TABLE INSTRUCTOR(
ID NUMERIC(5),
NAME VARCHAR(30),
DEPT_NAME VARCHAR(20),
SALARY NUMERIC(6)
);
```

Output:



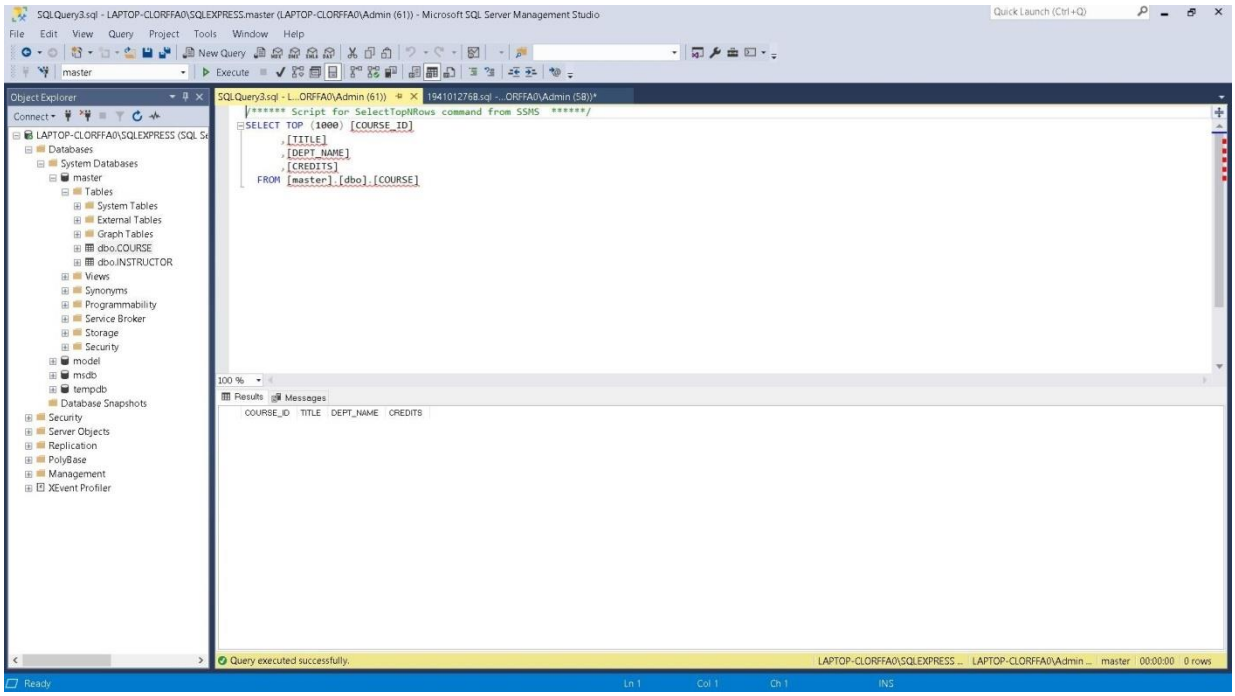
2. Create the following Tables with their respective columns, data types and size.

Table Name	Columns	Datatypes	Size
Course	Course_id	Varchar2	10
	Title	Varchar2	30
	Dept_name	Varchar2	20
	Credits	Number	2

Query:

```
CREATE TABLE COURSE(
COURSE_ID VARCHAR(10),
TITLE VARCHAR(30),
DEPT_NAME VARCHAR(20),
CREDITS NUMERIC(2)
);
```

Output:



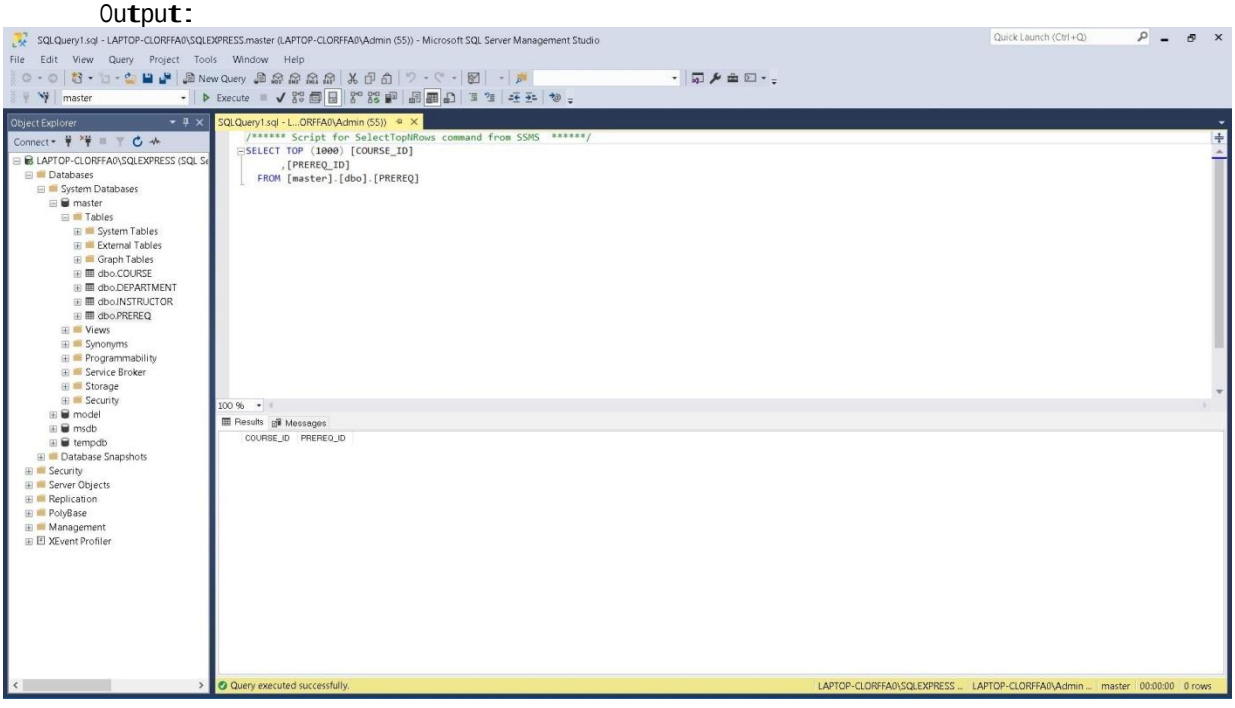
3. Create the following Tables with their respective columns, data types and size.

Table Name	Columns	Datatypes	Size
Prereq	Course_id	Varchar2	10
	Prereq_id	Varchar2	10

Query:

```
CREATE TABLE PREREQ(
COURSE_ID VARCHAR(10),
PREREQ_ID VARCHAR(10)
);
```

Output:



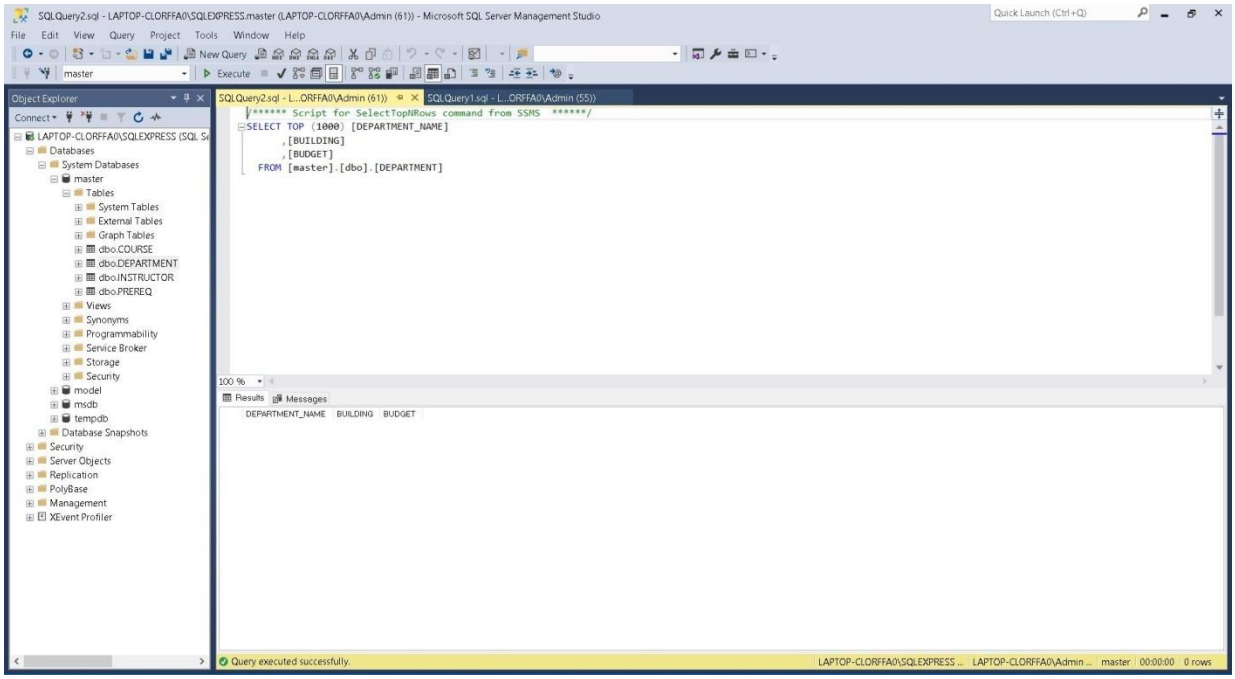
4. Create the following Tables with their respective columns, data types and size.

Table Name	Columns	Datatypes	Size
Department	Dept_name	Varchar2	20
	Building	Varchar2	20
	Budget	Number	10

Query:

```
CREATE TABLE DEPARTMENT(
DEPARTMENT_NAME VARCHAR(20),
BUILDING VARCHAR(20),
BUDGET NUMERIC(20)
);
```

Output:



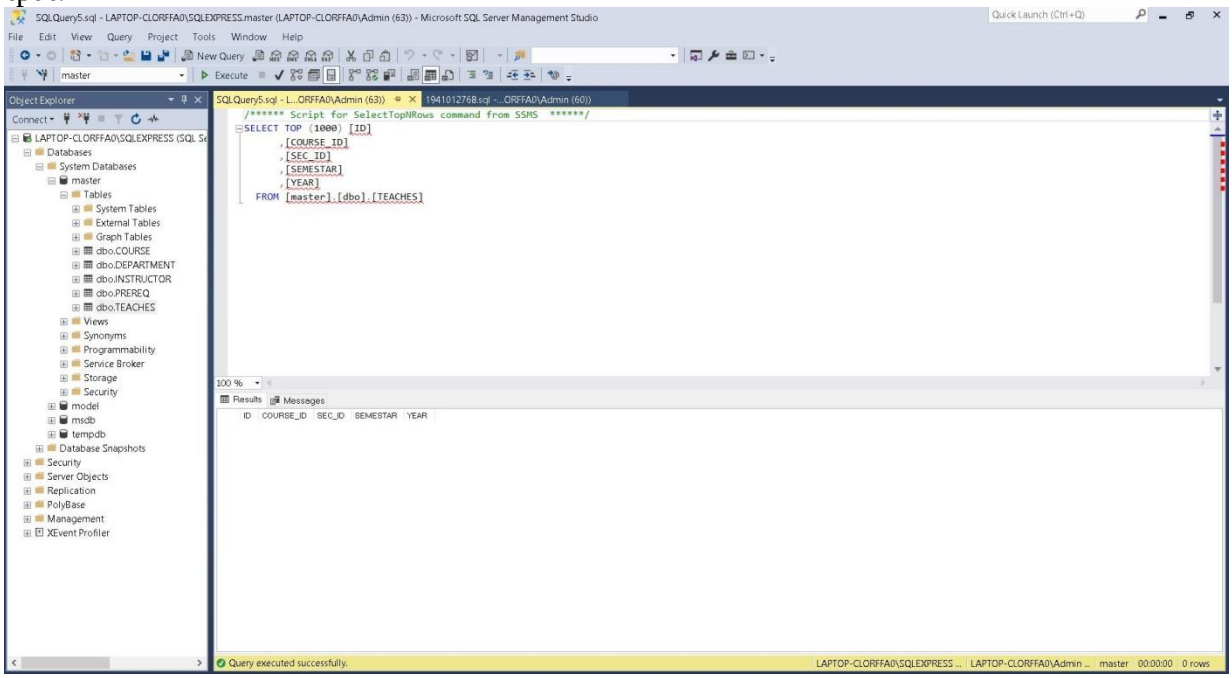
5. Create the following Tables with their respective columns, data types and size.

Table Name	Columns	Datatypes	Size
Teaches	ID	Number	5
	Course_id	Varchar2	10
	Sec_id	Number	2
	Semester	Varchar2	10
	year	Number	4

Query:

```
CREATE TABLE TEACHES(
ID NUMERIC(5),
COURSE_ID VARCHAR(10),
SEC_ID NUMERIC(2),
SEMESTAR VARCHAR(10),
YEAR NUMERIC(4)
)
```

Output:

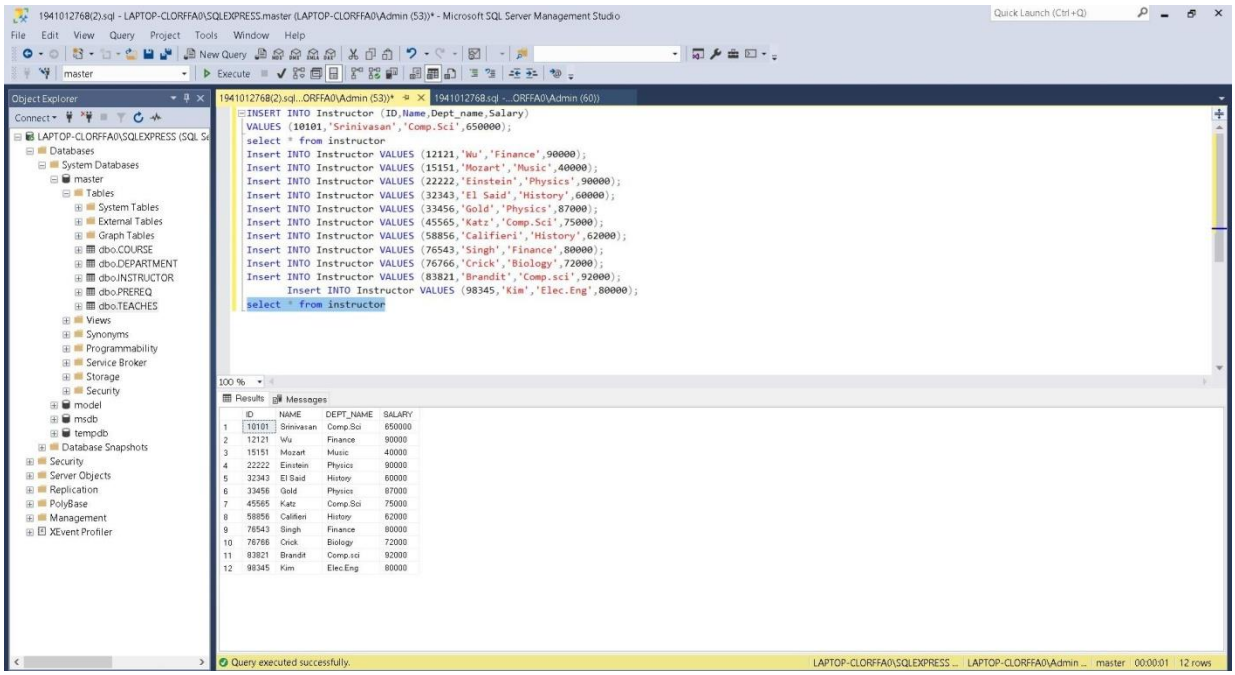


2. Insert data into **Instructor** table with the data below:

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000
12121	Wu	Finance	90000
15151	Mozart	Music	40000
22222	Einstein	Physics	95000
32343	El Said	History	60000
33456	Gold	Physics	87000
45565	Katz	Comp. Sci.	75000
58583	Califieri	History	62000
76543	Singh	Finance	80000
76766	Crick	Biology	72000
83821	Brandt	Comp. Sci.	92000
98345	Kim	Elec. Eng.	80000

Query:

```
INSERT INTO Instructor (ID,Name,Dept_name,Salary)
VALUES (10101,'Srinivasan','Comp.Sci',650000);
select * from instructor
Insert INTO Instructor VALUES (12121,'Wu','Finance',90000);
Insert INTO Instructor VALUES (15151,'Mozart','Music',40000);
Insert INTO Instructor VALUES (22222,'Einstein','Physics',90000);
Insert INTO Instructor VALUES (32343,'El Said','History',60000);
Insert INTO Instructor VALUES (33456,'Gold','Physics',87000);
Insert INTO Instructor VALUES (45565,'Katz','Comp.Sci',75000);
Insert INTO Instructor VALUES (58856,'Califieri','History',62000);
Insert INTO Instructor VALUES (76543,'Singh','Finance',80000);
Insert INTO Instructor VALUES (76766,'Crick','Biology',72000);
Insert INTO Instructor VALUES (83821,'Brandit','Comp.sci',92000);
Insert INTO Instructor VALUES (98345,'Kim','Elec.Eng',80000);
Output:
```



3.Insert data into **Course** table with the data below:

course_id	*title*	*dept_name*	*credits*
BIO-101	Intro. to Biology	Biology	4
BIO-301	Genetics	Biology	4
BIO-399	Computational Biology	Biology	3
CS-101	Intro. to Computer Science	Comp. Sci.	4
CS-190	Game Design	Comp. Sci.	4
CS-315	Robotics	Comp. Sci.	3
CS-319	Image Processing	Comp. Sci.	3
CS-347	Database System Concepts	Comp. Sci.	3
EE-181	Intro. to Digital Systems	Elec. Eng.	3
FIN-201	Investment Banking	Finance	3
HIS-351	World History	History	3
MU-199	Music Video Production	Music	3
PHY-101	Physical Principles	Physics	4

Query:

```
insert into Course Values('BIO-101','Intro. to Biology','Biology',4);
insert into Course Values('BIO-301','Genetics','Biology',4);
insert into Course Values('BIO-399','Computational Biology','Biology',3);

insert into Course Values('CS-101','Intro. to Computer Science','Computer.
Sci.',4);
insert into Course Values('CS-190','Game Design','Computer. Sci.',4);
insert into Course Values('CS-315','Robotics','Computer. Sci.',3);
```

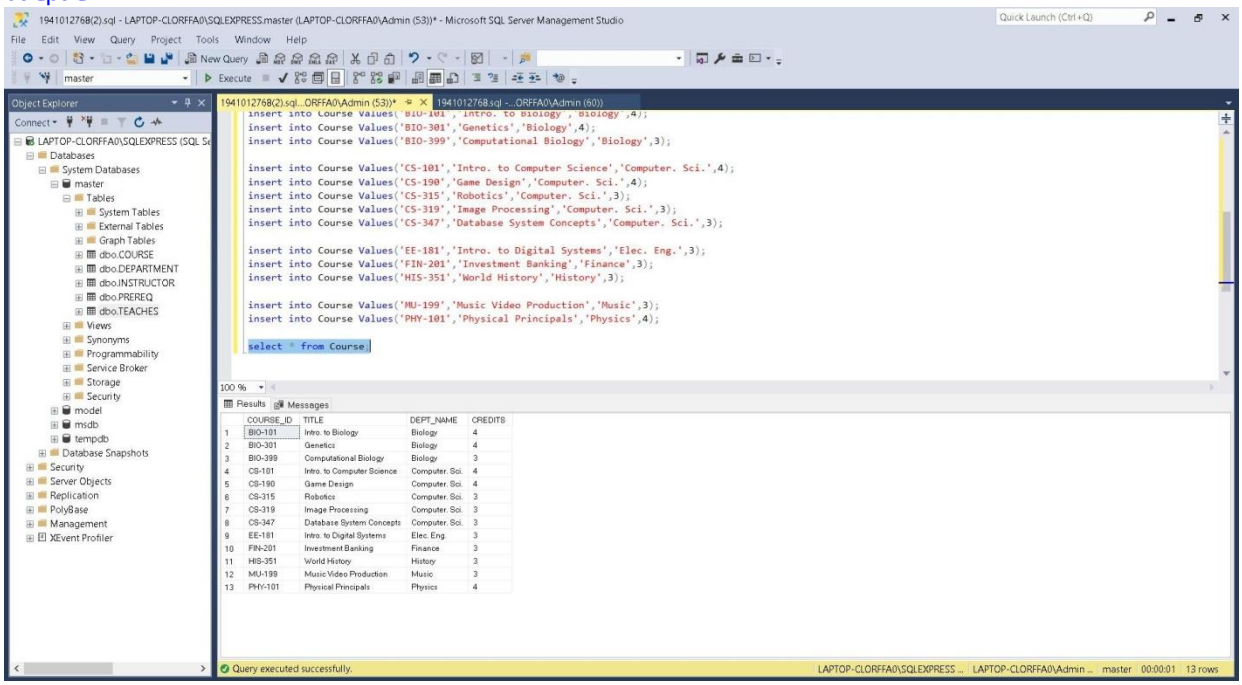
```
insert into Course Values('CS-319','Image Processing','Computer. Sci.',3);
insert into Course Values('CS-347','Database System Concepts','Computer. Sci.',3);

insert into Course Values('EE-181','Intro. to Digital Systems','Elec. Eng.',3);
insert into Course Values('FIN-201','Investment Banking','Finance',3);
insert into Course Values('HIS-351','World History','History',3);

insert into Course Values('MU-199','Music Video Production','Music',3);
insert into Course Values('PHY-101','Physical Principals','Physics',4);

select * from Course;
```

Output:



3. Insert data into **Prereq** table with the data below:

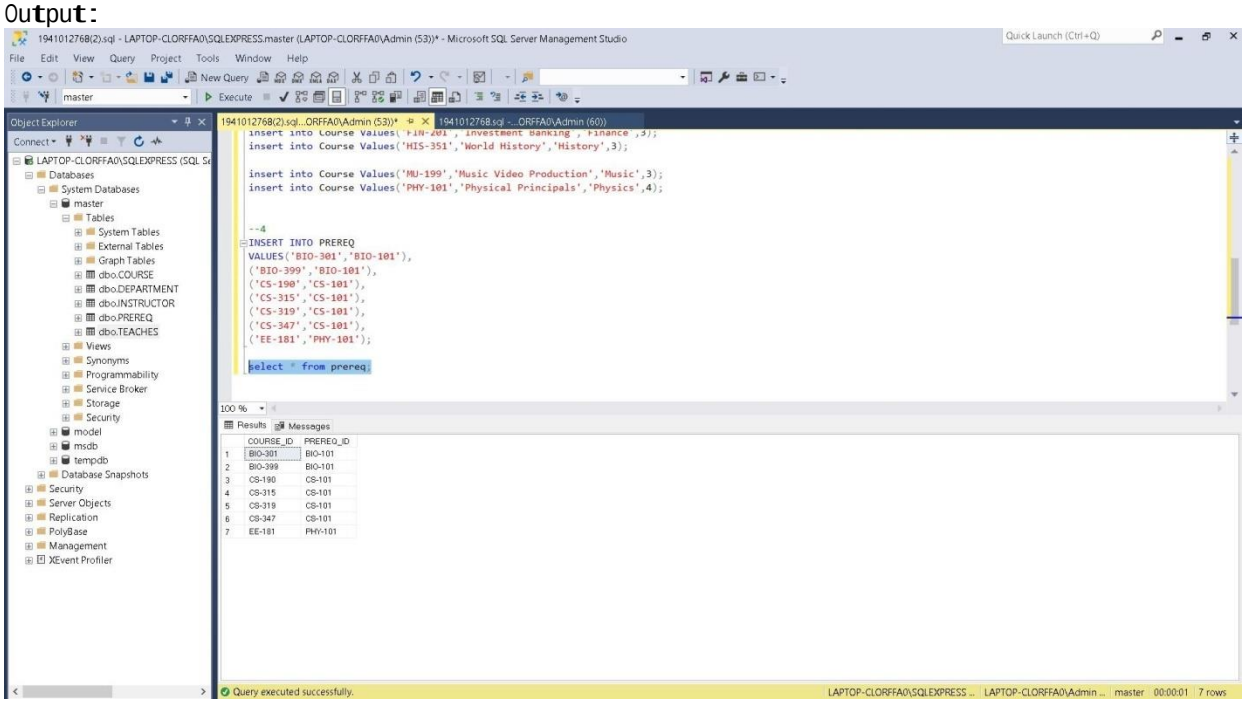
course_id	prereq_id
BIO-301	BIO-101
BIO-399	BIO-101
CS-190	CS-101
CS-315	CS-101
CS-319	CS-101
CS-347	CS-101
EE-181	PHY-101

Query:

```
INSERT INTO PREREQ
VALUES("BIO-301","BIO-101"),
("BIO-399","BIO-101"),
("CS-190","CS-101"),
("CS-315","CS-101"),
("CS-319","CS-101"),
("CS-347","CS-101"),
("EE-181","PHY-101");

select * from prereq;
```

Output:



4. Insert data into **Department** table with the data below:

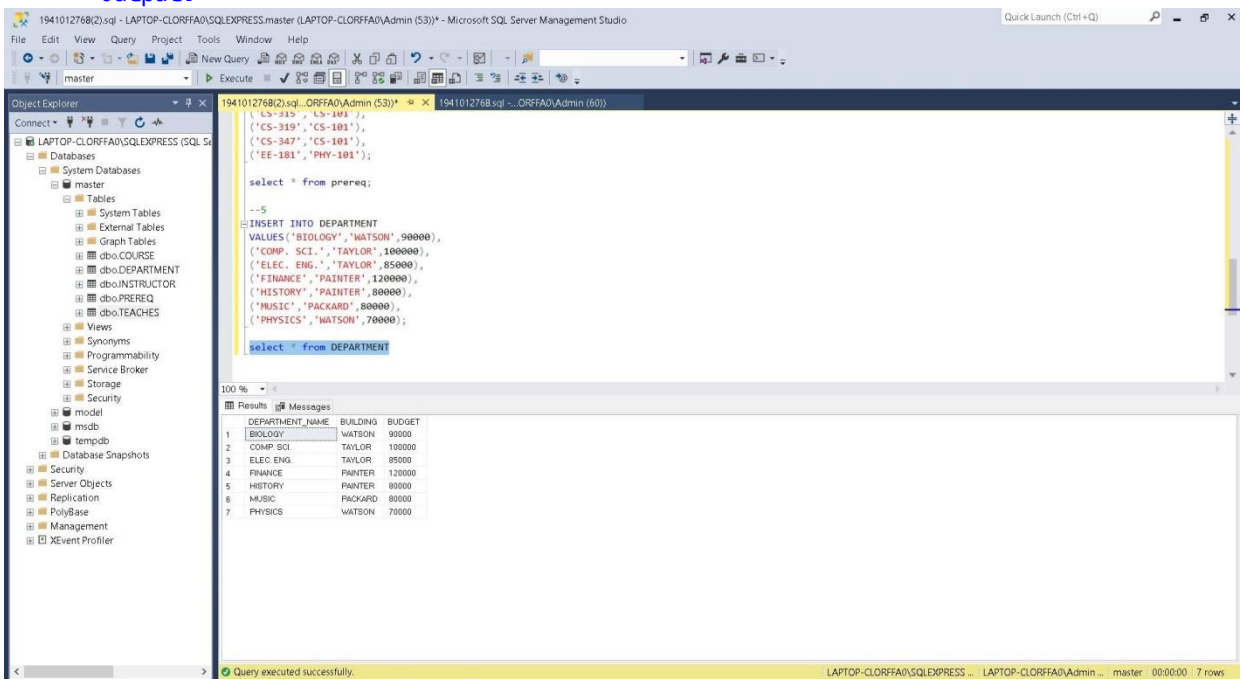
dept_name	building	budget
Biology	Watson	90000
Comp. Sci.	Taylor	100000
Elec. Eng.	Taylor	85000
Finance	Painter	120000
History	Painter	50000
Music	Packard	80000
Physics	Watson	70000

Query:

```
INSERT INTO DEPARTMENT
VALUES("BIOLOGY","WATSON",90000),
("COMP. SCI.","TAYLOR",100000),
("ELEC. ENG.","TAYLOR",85000),
("FINANCE","PAINTER",120000),
("HISTORY","PAINTER",80000),
("MUSIC","PACKARD",80000),
("PHYSICS","WATSON",70000);

select * from DEPARTMENT
```

Output:



5. Insert data into **Teaches** table with the data below:

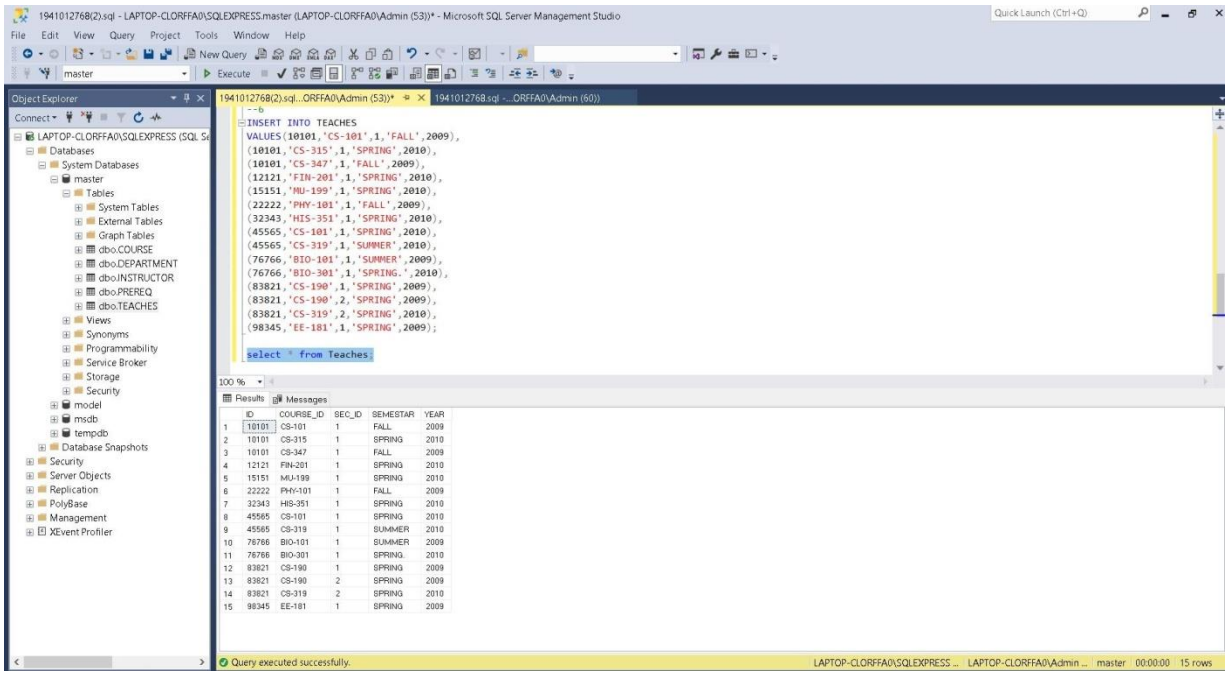
ID	course_id	sec_id	semester	year
10101	CS-101	1	Fall	2009
10101	CS-315	1	Spring	2010
10101	CS-347	1	Fall	2009
12121	FIN-201	1	Spring	2010
15151	MU-199	1	Spring	2010
22222	PHY-101	1	Fall	2009
32343	HIS-351	1	Spring	2010
45565	CS-101	1	Spring	2010
45565	CS-319	1	Spring	2010
76766	BIO-101	1	Summer	2009
76766	BIO-301	1	Summer	2010
83821	CS-190	1	Spring	2009
83821	CS-190	2	Spring	2009
83821	CS-319	2	Spring	2010
98345	EE-181	1	Spring	2009

Query:

```
INSERT INTO TEACHES
VALUES(10101,"CS-101",1,"FALL",2009),
(10101,"CS-315",1,"SPRING",2010),
(10101,"CS-347",1,"FALL",2009),
(12121,"FIN-201",1,"SPRING",2010),
(15151,"MU-199",1,"SPRING",2010),
(22222,"PHY-101",1,"FALL",2009),
(32343,"HIS-351",1,"SPRING",2010),
(45565,"CS-101",1,"SPRING",2010),
(45565,"CS-319",1,"SUMMER",2010),
(76766,"BIO-101",1,"SUMMER",2009),
(76766,"BIO-301",1,"SPRING.",2010),
(83821,"CS-190",1,"SPRING",2009),
(83821,"CS-190",2,"SPRING",2009),
(83821,"CS-319",2,"SPRING",2010),
(98345,"EE-181",1,"SPRING",2009);

select * from Teaches;
```

Output: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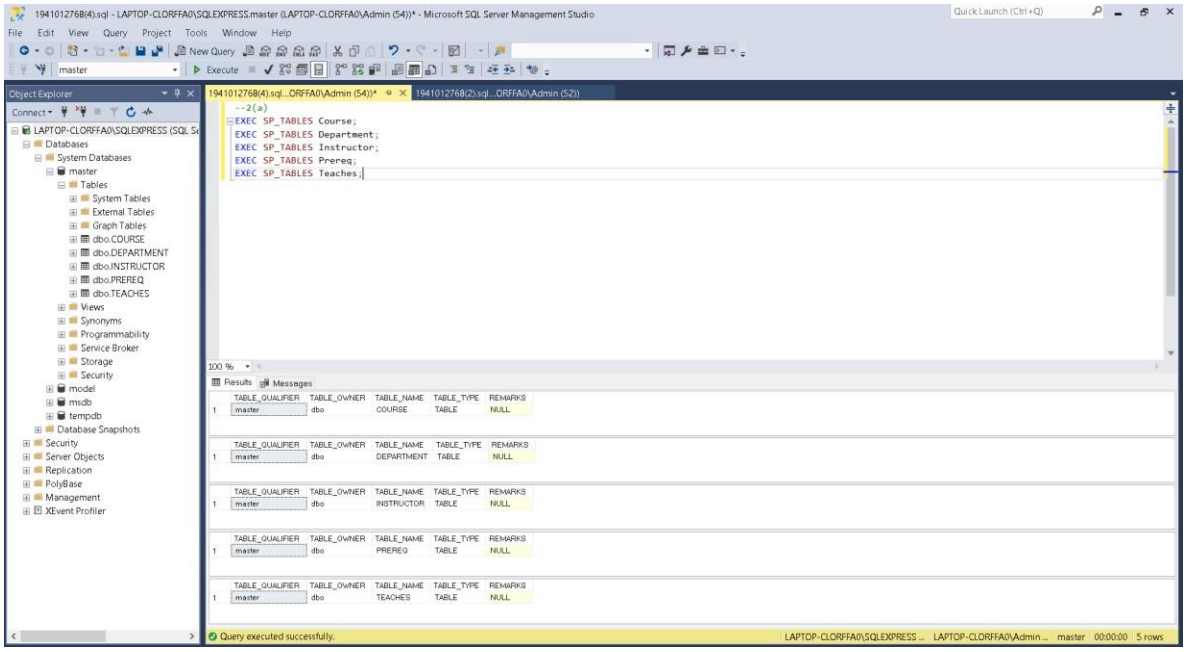
File Edit View Query Project Tools Window Help
New Query
Execute
Object Explorer
Connect
LAPTOP-CLORFFA0\SQLEXPRESS (SQL Se
Databases
System Databases
master
Tables
System Tables
External Tables
Graph Tables
dbo.COURSE
dbo.DEPARTMENT
dbo.INSTRUCTOR
dbo.PREREQ
dbo.TEACHES
Views
Synonyms
Programmability
Service Broker
Storage
Security
model
msdb
tempdb
Database Snapshots
Security
Server Objects
Replication
PolyBase
Management
XEvent Profiler
1941012768(2).sql...ORFFA0\Admin (53))*
1941012768.sql -...ORFFA0\Admin (60))
--b
INSERT INTO TEACHES
VALUES(10101,'CS-101',1,'FALL',2009),
(10101,'CS-315',1,'SPRING',2010),
(10101,'CS-347',1,'FALL',2009),
(12121,'FIN-201',1,'SPRING',2010),
(15151,'MU-199',1,'SPRING',2010),
(22222,'PHY-101',1,'FALL',2009),
(32343,'HIS-351',1,'SPRING',2010),
(45565,'CS-101',1,'SPRING',2010),
(45565,'CS-319',1,'SUMMER',2010),
(76766,'BIO-101',1,'SUMMER',2009),
(76766,'BIO-301',1,'SPRING.',2010),
(83821,'CS-190',1,'SPRING',2009),
(83821,'CS-190',2,'SPRING',2009),
(83821,'CS-319',2,'SPRING',2010),
(98345,'EE-181',1,'SPRING',2009);
select * from Teaches;
100 %
Results
Messages
ID COURSE_ID SEC_ID SEMESTAR YEAR
1 10101 CS-101 1 FALL 2009
2 10101 CS-315 1 SPRING 2010
3 10101 CS-347 1 FALL 2009
4 12121 FIN-201 1 SPRING 2010
5 15151 MU-199 1 SPRING 2010
6 22222 PHY-101 1 FALL 2009
7 32343 HIS-351 1 SPRING 2010
8 45565 CS-101 1 SPRING 2010
9 45565 CS-319 1 SUMMER 2010
10 76766 BIO-101 1 SUMMER 2009
11 76766 BIO-301 1 SPRING. 2010
12 83821 CS-190 1 SPRING 2009
13 83821 CS-190 2 SPRING 2009
14 83821 CS-319 2 SPRING 2010
15 98345 EE-181 1 SPRING 2009
Query executed successfully.
LAPTOP-CLORFFA0\SQLEXPRESS ... LAPTOP-CLORFFA0\Admin ... master 00:00:00 15 rows

ASSIGNMENT –2

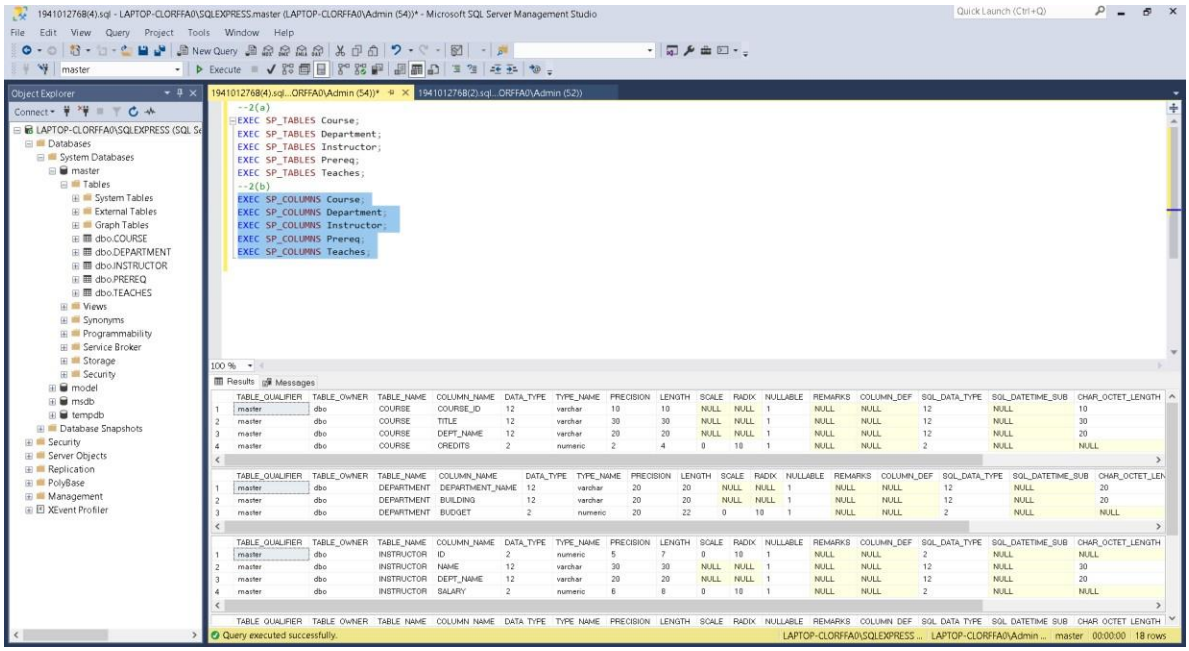
1. **Write the SQL Expressions for the following SQL Queries and verify it in your PC by executing it.**
   a. **Display the structure of all the tables you have created in assignment (1).**
   Ans.

```
EXEC SP_TABLES Course;
EXEC SP_TABLES Department;
EXEC SP_TABLESINSTRUCTOR;
EXEC SP_TABLES Prerequired;
EXEC SP_TABLES Teaches;
```



   b. **Display the contents of all the tables you have created in assignment (1).**
   Ans.

```
EXEC SP_COLUMNS Course;
EXEC SP_COLUMNS Department;
EXECSP_COLUMNS INSTRUCTOR;
EXEC SP_COLUMNS Prerequired;
EXEC SP_COLUMNS Teaches;
```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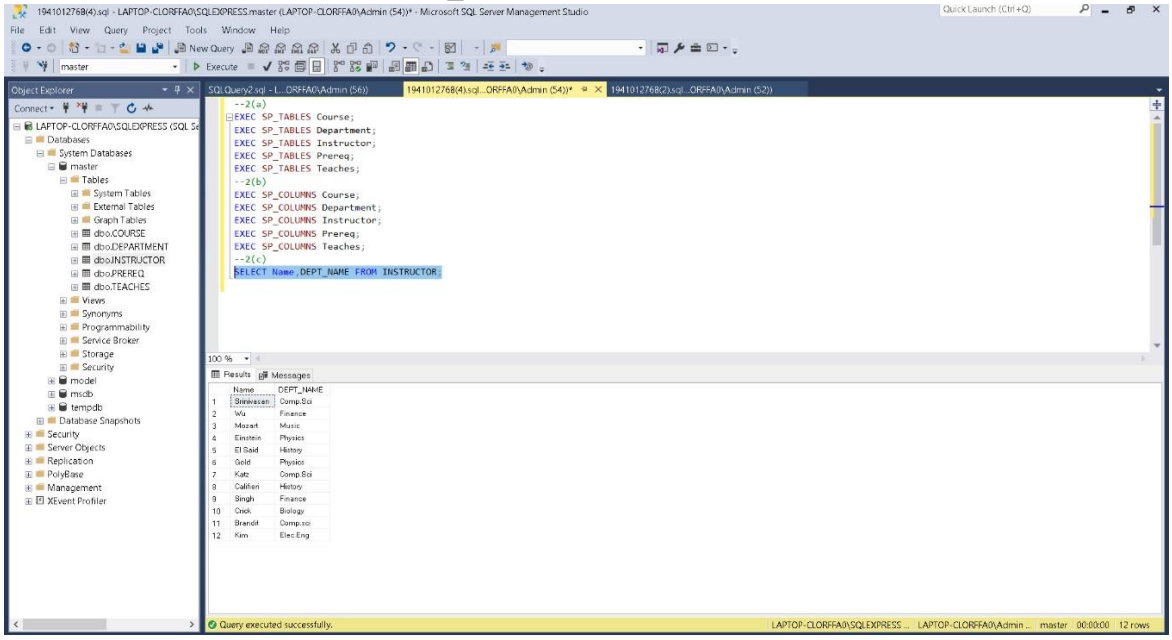
Quick Launch (Ctrl+Q)
File Edit View Query Project Tools Window Help
New Query
Execute
master
Object Explorer
Connect
LAPTOP-CLORFFA0\SQLEXPRESS (SQL Se
Databases
System Databases
master
Tables
System Tables
External Tables
Graph Tables
dbo.COURSE
dbo.DEPARTMENT
dbo.INSTRUCTOR
dbo.PREREQ
dbo.TEACHES
Views
Synonyms
Programmability
Service Broker
Storage
Security
model
msdb
tempdb
Database Snapshots
Security
Server Objects
Replication
PolyBase
Management
XEvent Profiler
1941012768(4).sql...ORFFA0\Admin (54))*
1941012768(2).sql...ORFFA0\Admin (52))
--2(a)
EXEC SP_TABLES Course;
EXEC SP_TABLES Department;
EXEC SP_TABLES Instructor;
EXEC SP_TABLES Prereq;
EXEC SP_TABLES Teaches;
--2(b)
EXEC SP_COLUMNS Course;
EXEC SP_COLUMNS Department;
EXEC SP_COLUMNS Instructor;
EXEC SP_COLUMNS Prereq;
EXEC SP_COLUMNS Teaches;
100 %
Results
Messages
TABLE_QUALIFIER TABLE_OWNER TABLE_NAME COLUMN_NAME DATA_TYPE TYPE_NAME PRECISION LENGTH SCALE RADIX NULLABLE REMARKS COLUMN_DEF SQL_DATA_TYPE SQL_DATETIME_SUB CHAR_OCTET_LENGTH
1 master dbo COURSE COURSE_ID 12 varchar 10 10 NULL NULL 1 NULL NULL 12 NULL 10
2 master dbo COURSE TITLE 12 varchar 30 30 NULL NULL 1 NULL NULL 12 NULL 30
3 master dbo COURSE DEPT_NAME 12 varchar 20 20 NULL NULL 1 NULL NULL 12 NULL 20
4 master dbo COURSE CREDITS 2 numeric 2 4 0 10 1 NULL NULL 2 NULL NULL
TABLE_QUALIFIER TABLE_OWNER TABLE_NAME COLUMN_NAME DATA_TYPE TYPE_NAME PRECISION LENGTH SCALE RADIX NULLABLE REMARKS COLUMN_DEF SQL_DATA_TYPE SQL_DATETIME_SUB CHAR_OCTET_LEN
1 master dbo DEPARTMENT DEPARTMENT_NAME 12 varchar 20 20 NULL NULL 1 NULL NULL 12 NULL 20
2 master dbo DEPARTMENT BUILDING 12 varchar 20 20 NULL NULL 1 NULL NULL 12 NULL 20
3 master dbo DEPARTMENT BUDGET 2 numeric 20 22 0 10 1 NULL NULL 2 NULL NULL
TABLE_QUALIFIER TABLE_OWNER TABLE_NAME COLUMN_NAME DATA_TYPE TYPE_NAME PRECISION LENGTH SCALE RADIX NULLABLE REMARKS COLUMN_DEF SQL_DATA_TYPE SQL_DATETIME_SUB CHAR_OCTET_LENGTH
1 master dbo INSTRUCTOR ID 2 numeric 5 7 0 10 1 NULL NULL 2 NULL NULL
2 master dbo INSTRUCTOR NAME 12 varchar 30 30 NULL NULL 1 NULL NULL 12 NULL 30
3 master dbo INSTRUCTOR DEPT_NAME 12 varchar 20 20 NULL NULL 1 NULL NULL 12 NULL 20
4 master dbo INSTRUCTOR SALARY 2 numeric 6 8 0 10 1 NULL NULL 2 NULL NULL
TABLE_QUALIFIER TABLE_OWNER TABLE_NAME COLUMN_NAME DATA_TYPE TYPE_NAME PRECISION LENGTH SCALE RADIX NULLABLE REMARKS COLUMN_DEF SQL_DATA_TYPE SQL_DATETIME_SUB CHAR_OCTET_LENGTH
Query executed successfully.
LAPTOP-CLORFFA0\SQLEXPRESS ...
LAPTOP-CLORFFA0\Admin ...
master
00:00:00
18 rows

c. Display the name and department of each instructor.

Ans.

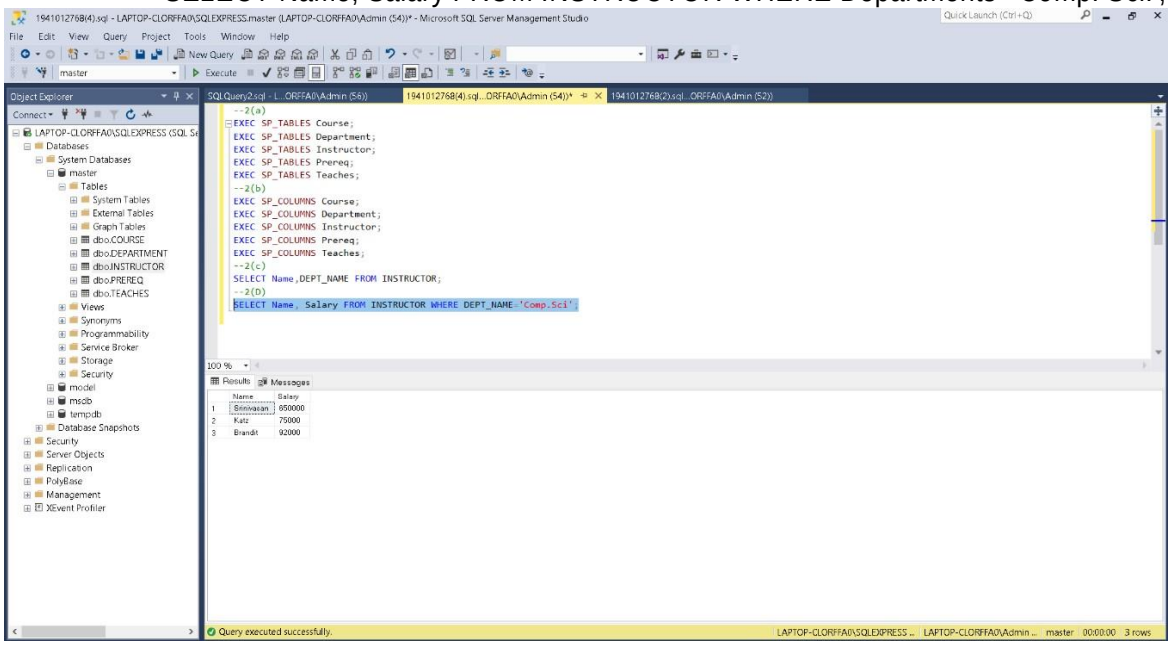
SELECT Name,DEPT_NAME FROM INSTRUCTOR;



d. Display the name and salary of Comp. Sci. Instructors.

Ans.

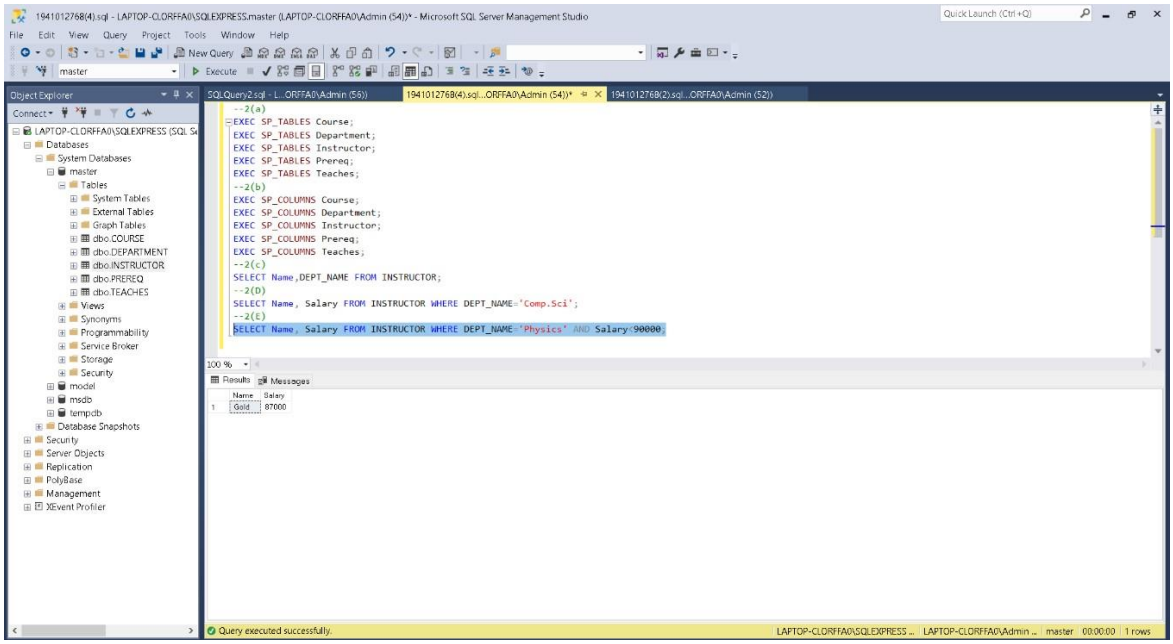
SELECT Name, Salary FROM INSTRUCTOR WHERE Departments='Comp. Sci.';



e. Display the records of instructor who belongs to Physics department and getting salary less than 90000.

Ans.

SELECT Name, Salary FROM INSTRUCTOR WHERE DEPT_NAME='Physics' AND Salary<90000;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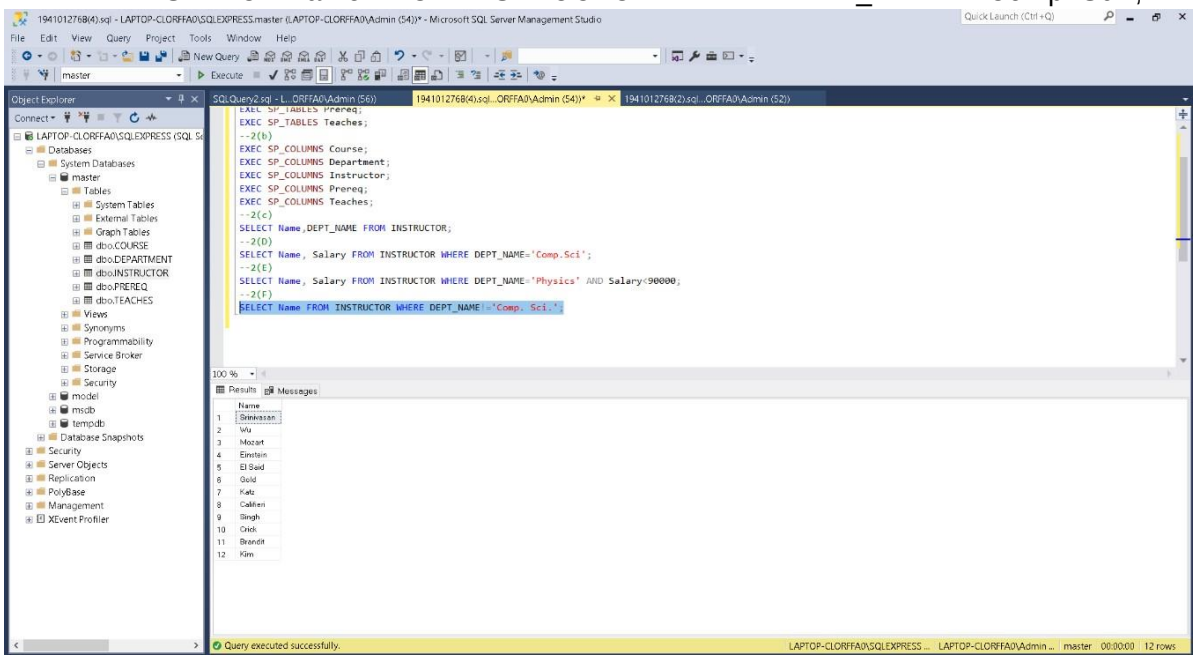
File Edit View Query Project Tools Window Help
New Query
Execute
master
Object Explorer
Connect
LAPTOP-CLORFFA0\SQLEXPRESS (SQL S
Databases
System Databases
master
Tables
System Tables
External Tables
Graph Tables
dbo.COURSE
dbo.DEPARTMENT
dbo.INSTRUCTOR
dbo.PREREQ
dbo.TEACHES
Views
Synonyms
Programmability
Service Broker
Storage
Security
model
msdb
tempdb
Database Snapshots
Security
Server Objects
Replication
PolyBase
Management
XEvent Profiler
SQLQuery2.sql - L...ORFFA0\Admin (56))
1941012768(4).sql...ORFFA0\Admin (54))*
1941012768(2).sql...ORFFA0\Admin (52))
--2(a)
EXEC SP_TABLES Course;
EXEC SP_TABLES Department;
EXEC SP_TABLES Instructor;
EXEC SP_TABLES Prereq;
EXEC SP_TABLES Teaches;
--2(b)
EXEC SP_COLUMNS Course;
EXEC SP_COLUMNS Department;
EXEC SP_COLUMNS Instructor;
EXEC SP_COLUMNS Prereq;
EXEC SP_COLUMNS Teaches;
--2(c)
SELECT Name,DEPT_NAME FROM INSTRUCTOR;
--2(D)
SELECT Name, Salary FROM INSTRUCTOR WHERE DEPT_NAME='Comp.Sci';
--2(E)
SELECT Name, Salary FROM INSTRUCTOR WHERE DEPT_NAME='Physics' AND Salary<90000;
100 %
Results
Messages
Name
Salary
1
Gold
87000
Query executed successfully.
LAPTOP-CLORFFA0\SQLEXPRESS ...
LAPTOP-CLORFFA0\Admin ...
master
00:00:00
1 rows

f. Display the name of the instructors who do not belong to Comp. Sci. Department.

Ans.

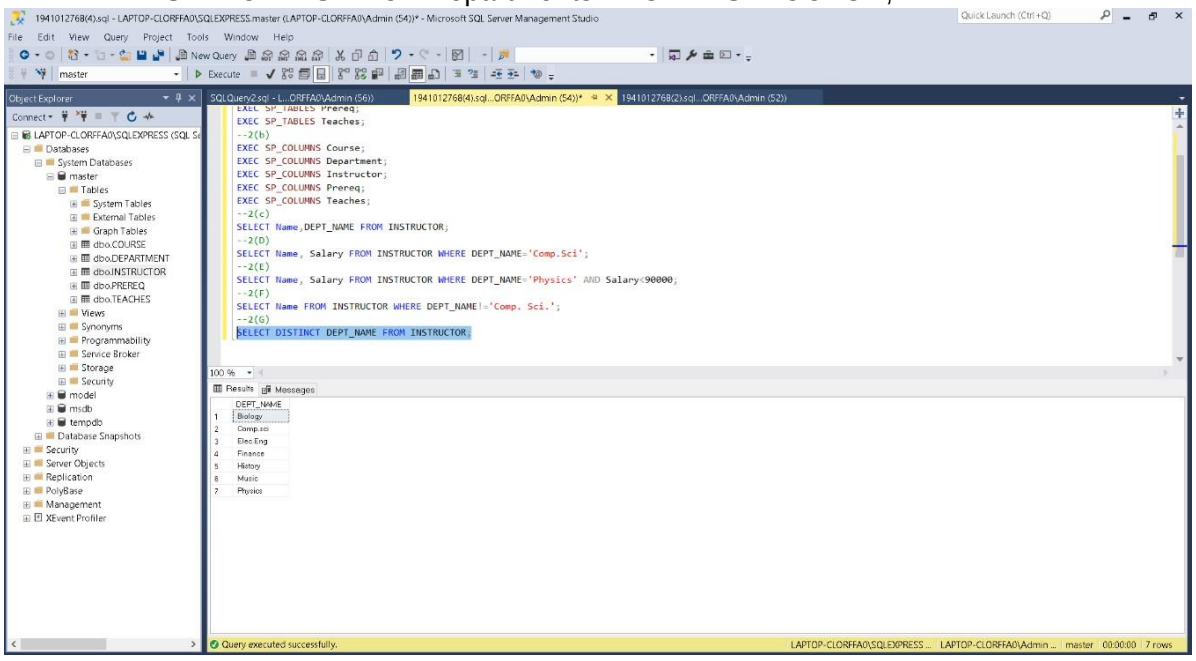
SELECT Name FROM INSTRUCTOR WHERE DEPT_NAME!='Comp. Sci.';



g. Display the names of the different department distinctly available in Instructor table.

Ans.

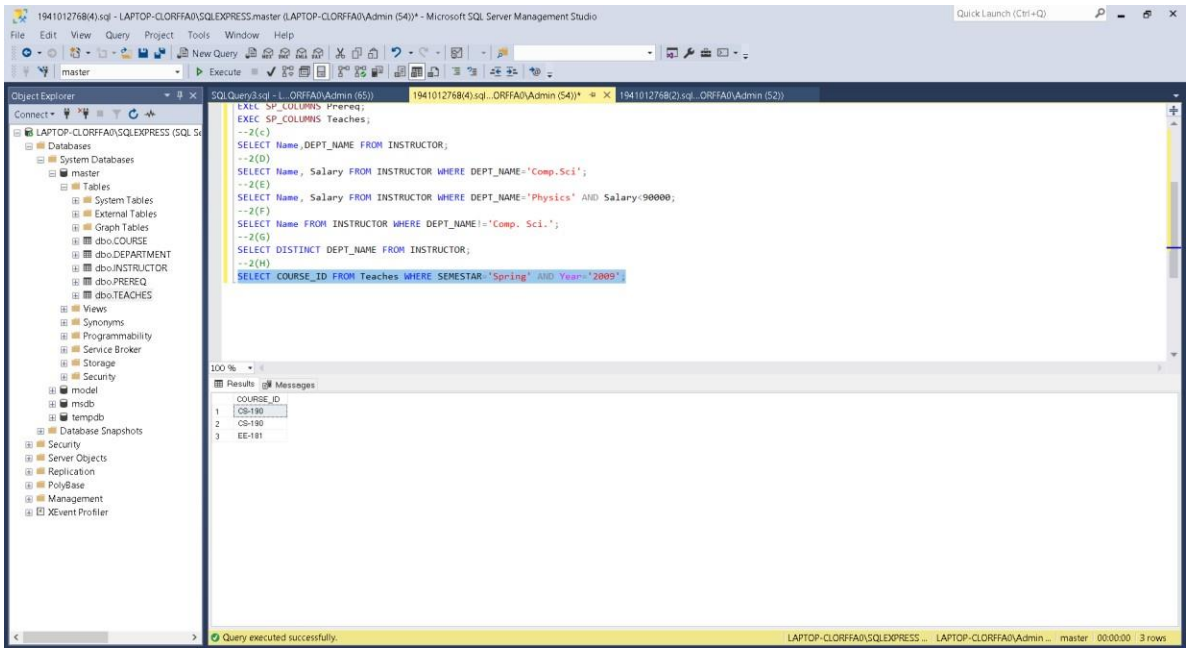
SELECT DISTINCT Departments FROM INSTRUCTOR;



h. Display all Course_id's that are taught in Spring semester of 2009.

Ans.

SELECT COURSE_ID FROM Teaches WHERE Semester='Spring' AND Year='2009';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dbo.INSTRUCTOR
dbo.PREREQ
dbo.TEACHES
Views
Synonyms
Programmability
Service Broker
Storage
Security
model
msdb
tempdb
Database Snapshots
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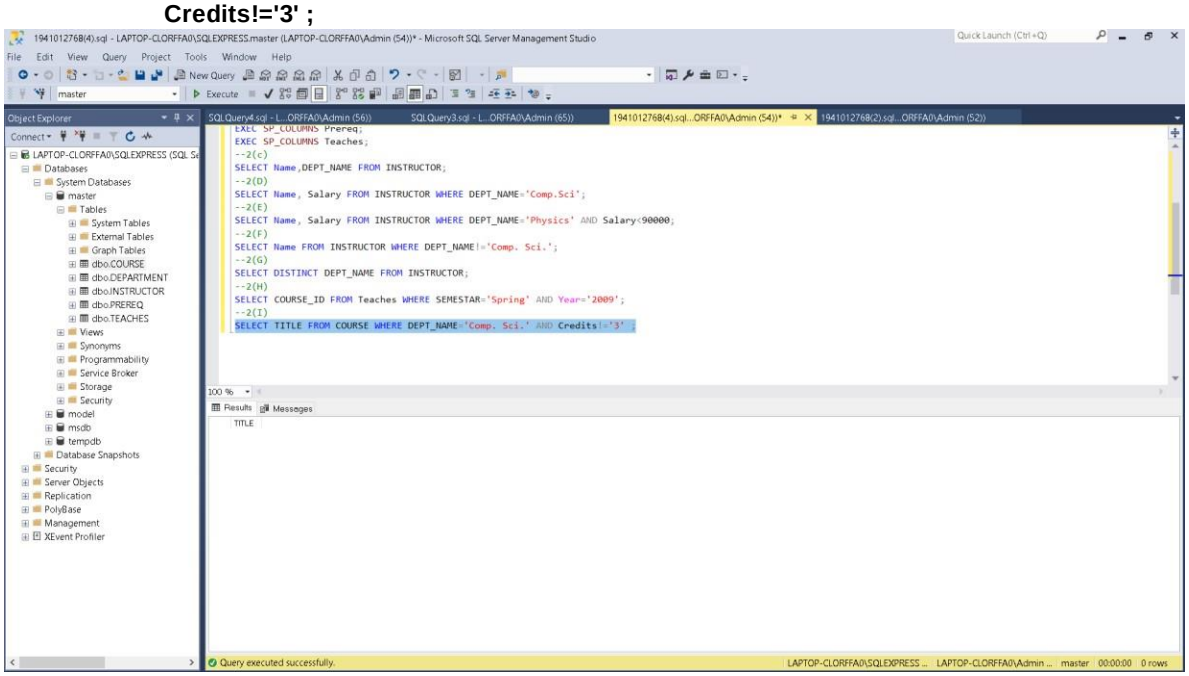
Server Objects
Replication
PolyBase
Management
XEvent Profiler
SQLQuery3.sql - L...ORFFA0\Admin (65))
1941012768(4).sql...ORFFA0\Admin (54))*
1941012768(2).sql...ORFFA0\Admin (52))
EXEC SP_COLUMNS Prereq;
EXEC SP_COLUMNS Teaches;
--2(c)
SELECT Name,DEPT_NAME FROM INSTRUCTOR;
--2(D)
SELECT Name, Salary FROM INSTRUCTOR WHERE DEPT_NAME='Comp.Sci';
--2(E)
SELECT Name, Salary FROM INSTRUCTOR WHERE DEPT_NAME='Physics' AND Salary<90000;
--2(F)
SELECT Name FROM INSTRUCTOR WHERE DEPT_NAME!='Comp. Sci.';
--2(G)
SELECT DISTINCT DEPT_NAME FROM INSTRUCTOR;
--2(H)
SELECT COURSE_ID FROM Teaches WHERE SEMESTAR='Spring' AND Year='2009';
100 %
Results
Messages
COURSE_ID
1 CS-190
2 CS-190
3 EE-181
Query executed successfully.
LAPTOP-CLORFFA0\SQLEXPRESS ...
LAPTOP-CLORFFA0\Admin ...
master
00:00:00
3 rows

i. **Display course titles that are taught in Comp. Sci. Department and do not have credit equals to 3.**

Ans.

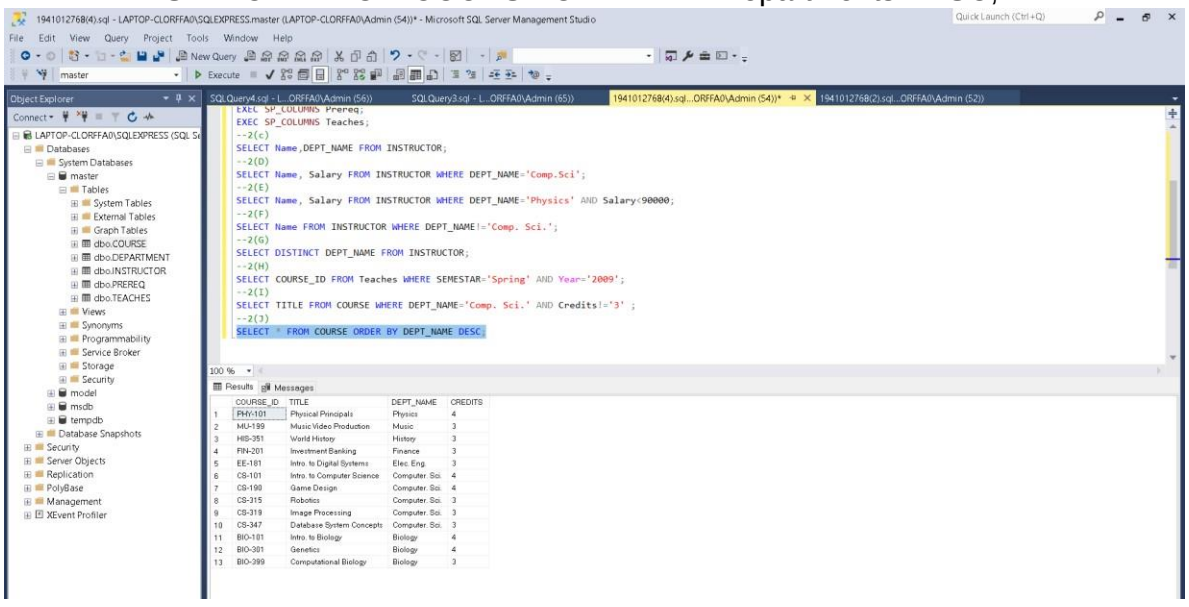
SELECT TITLE FROM COURSE WHERE DEPT_NAME='Comp. Sci.' AND Credits!='3' ;



j. **Display all columns of course table sorted in descending order of department names.**

Ans.

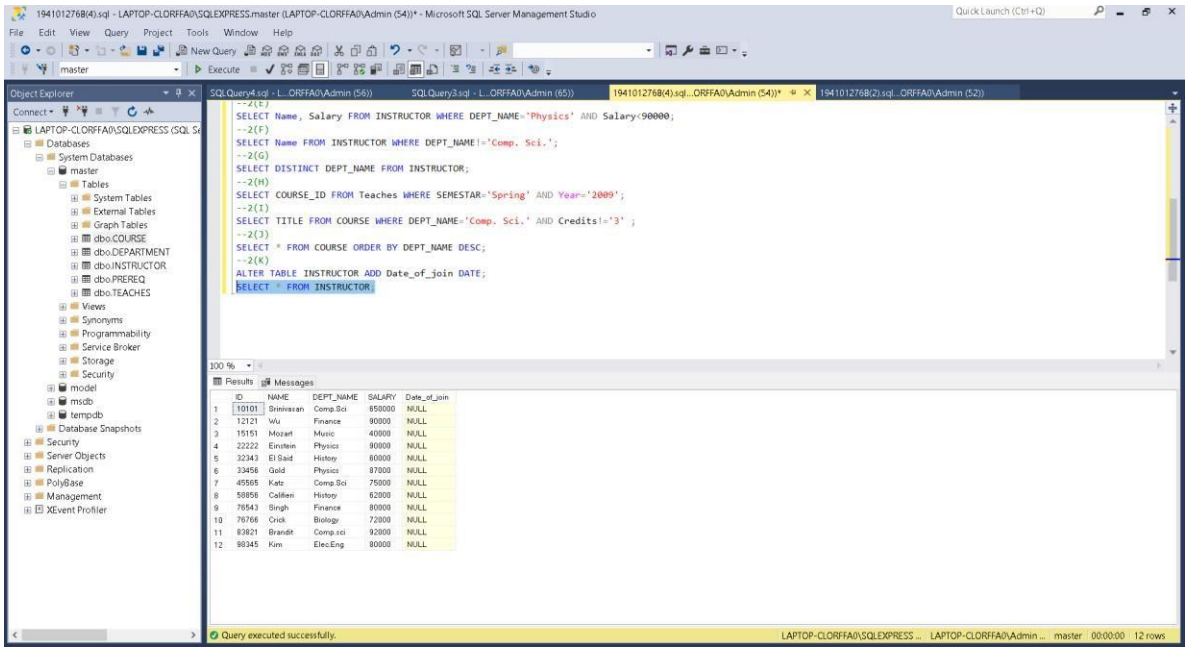
SELECT * FROM COURSE ORDER BY Departments DESC;



k. **Add a date_of_join column to instructor table.**

Ans.

ALTER TABLE INSTRUCTOR ADD Date_of_join DATE;SELECT * FROM INSTRUCTOR;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Tables
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External Tables
Graph Tables
dbo.COURSE
dbo.DEPARTMENT
dbo.INSTRUCTOR
dbo.PREREQ
dbo.TEACHES
Views
Synonyms
Programmability
Service Broker
Storage
Security
model
msdb
tempdb
Database Snapshots
Security
Server Objects
Replication
PolyBase
Management
XEvent Profiler
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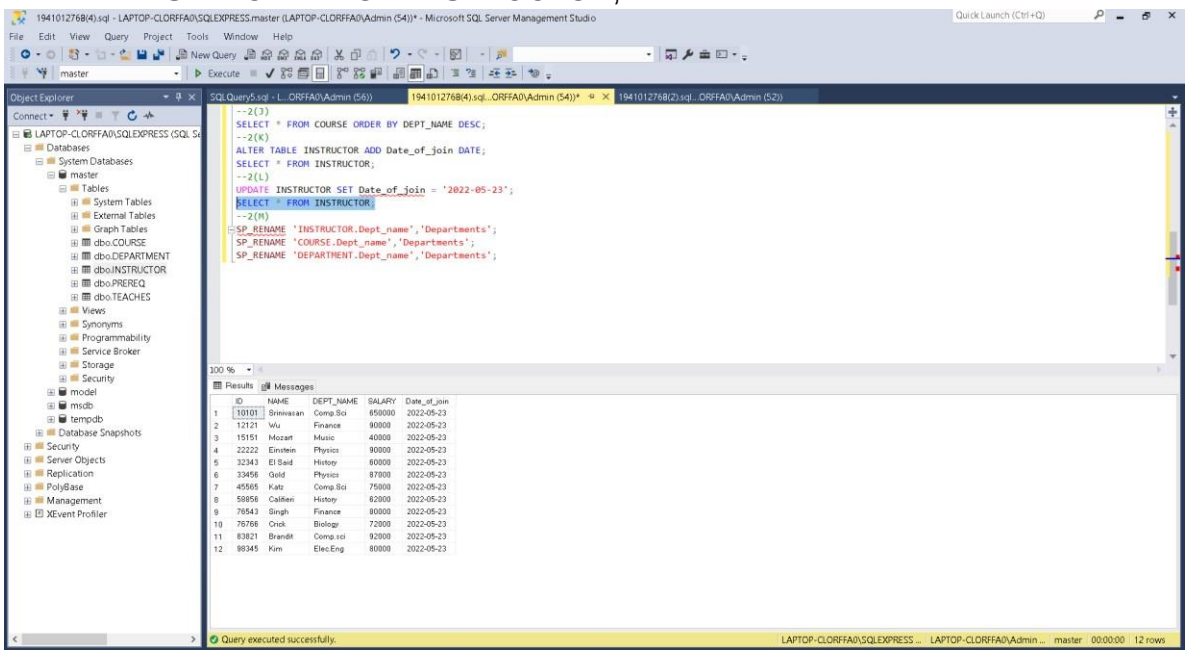
SQLQuery3.sql - L...ORFFA0\Admin (65))
1941012768(4).sql...ORFFA0\Admin (54))*
1941012768(2).sql...ORFFA0\Admin (52))
--2(E)
SELECT Name, Salary FROM INSTRUCTOR WHERE DEPT_NAME='Physics' AND Salary<90000;
--2(F)
SELECT Name FROM INSTRUCTOR WHERE DEPT_NAME!='Comp. Sci.';
--2(G)
SELECT DISTINCT DEPT_NAME FROM INSTRUCTOR;
--2(H)
SELECT COURSE_ID FROM Teaches WHERE SEMESTAR='Spring' AND Year='2009';
--2(I)
SELECT TITLE FROM COURSE WHERE DEPT_NAME='Comp. Sci.' AND Credits!='3' ;
--2(J)
SELECT * FROM COURSE ORDER BY DEPT_NAME DESC;
--2(K)
ALTER TABLE INSTRUCTOR ADD Date_of_join DATE;
SELECT * FROM INSTRUCTOR;
100 %
Results
Messages
ID NAME DEPT_NAME SALARY Date_of_join
1 10101 Srinivasan Comp.Sci 650000 NULL
2 12121 Wu Finance 90000 NULL
3 15151 Mozart Music 40000 NULL
4 22222 Einstein Physics 90000 NULL
5 32343 El Said History 60000 NULL
6 33456 Gold Physics 87000 NULL
7 45565 Katz Comp.Sci 75000 NULL
8 58856 Califieri History 62000 NULL
9 76543 Singh Finance 80000 NULL
10 76766 Crick Biology 72000 NULL
11 83821 Brandt Comp.sci 92000 NULL
12 98345 Kim Elec.Eng 80000 NULL
Query executed successfully.
LAPTOP-CLORFFA0\SQLEXPRESS ...
LAPTOP-CLORFFA0\Admin ...
master
00:00:00
12 rows

l. Insert date values to existing rows.

Ans.

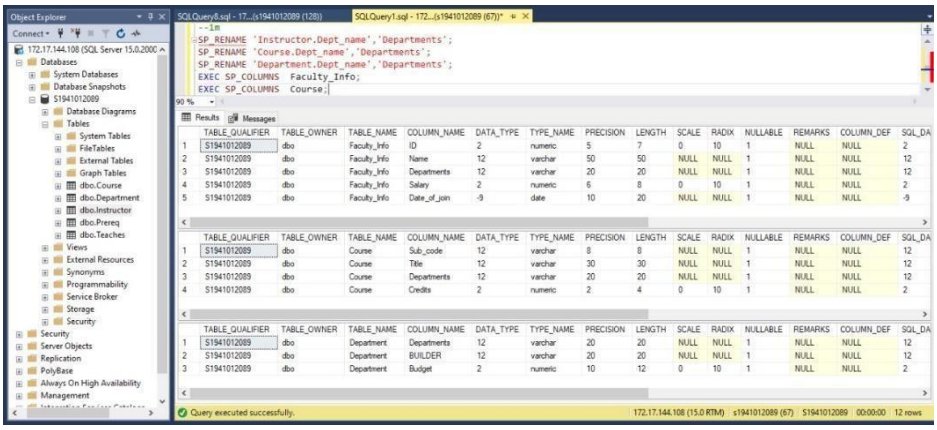
```
UPDATE INSTRUCTOR SET Date_of_join = '2022-05-23';
SELECT * FROM INSTRUCTOR;
```



m. Change the name of dept_name to department in all the tables.

Ans.

```
SP_RENAME 'INSTRUCTOR.Dept_name','Departments';
SP_RENAME 'COURSE.Dept_name','Departments';
SP_RENAME 'DEPARTMENT.Dept_name','Departments';
```



n. Change the name of "Prereq" table with new name "Prerequired"

Ans.

```
--1n
SP_RENAME 'PREREQ','Prerequired';
```

o. Change Course_id column name to Sub_code.

Ans.

```
--1o
SP_RENAME 'COURSE.Course_id','Sub_code';
SP_RENAME 'Prerequired.Course_id','Sub_code';
SP_RENAME 'TEACHES.Course_id','Sub_code';
```

p. **Change the data type of name to varchar2 (50).**
Ans.

```
--1p
ALTER TABLE Instructor ALTER COLUMN name VARCHAR(50);
```

q. **Change the name of Instructor table to Faculty_Info.**
Ans.

```
--1q
SP_rename 'Instructor', 'Faculty_Info';
```

r. **Change the Column size of Course_id in Course table from 10 to 8.**
Ans.

```
--1r
ALTER TABLE Course ALTER COLUMN Sub_code VARCHAR(8);
```

s. **Delete the content of the table Prereq along with its description.**
Ans.

```
--1s
DROP TABLE Prerequired;
```

t. **Change the column name 'Building' of Department table by new column name 'Builder'.**
Ans.

```
--1t
sp_rename 'DEPARTMENT.BUILDING','BUILDER';
```

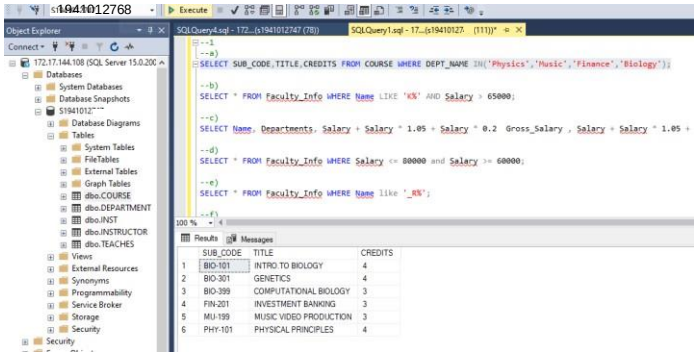
ASSINGMENT-3

1. Write the SQL Expressions for the following queries using suitable SQL operators .

a) Display the Course_ids, Titles and Credits of course that are offered in any of the departments namely: Physics, Music, Finance and Biology.

Ans.

```
SELECT SUB_CODE,TITLE,CREDITS FROM COURSE WHERE DEPT_NAME
IN('Physics','Music','Finance','Biology');
```

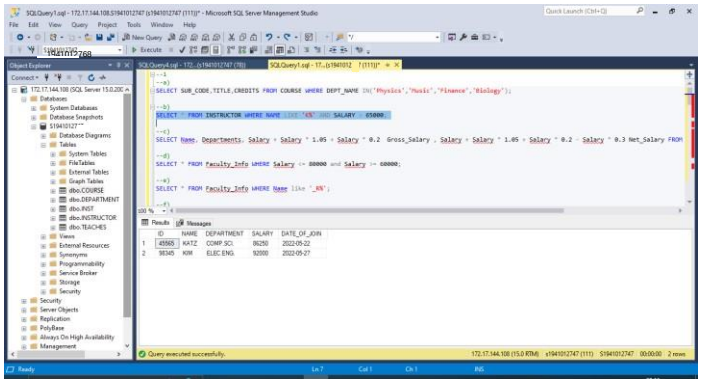


	SUB_CODE	TITLE	CREDITS
1	BIO-101	INTRO.TO BIOLOGY	4
2	BIO-301	GENETICS	4
3	BIO-399	COMPUTATIONAL BIOLOGY	3
4	FIN-201	INVESTMENT BANKING	3
5	MU-199	MUSIC VIDEO PRODUCTION	3
6	PHY-101	PHYSICAL PRINCIPLES	4

b) Display records of the instructors whose name starts with "K" and who get salary more than 65000.

Ans.

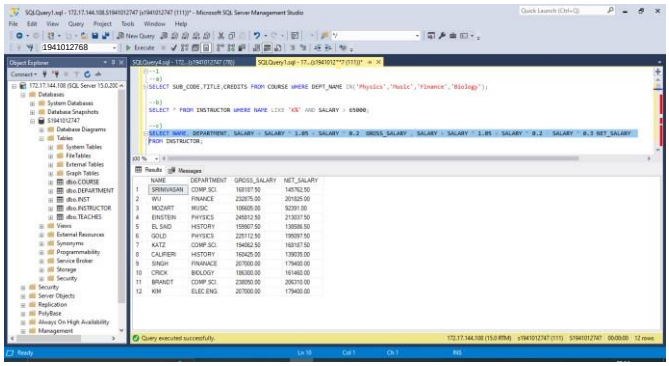
```
SELECT * FROM INSTRUCTOR WHERE NAME LIKE 'K%' AND SALARY > 65000;
```



c) Display name, department, gross salary and net salary of instructors with 105% DA, 20% HRA, 30% IT. (gross salary = salary + DA + HRA, net salary = gross salary – IT).

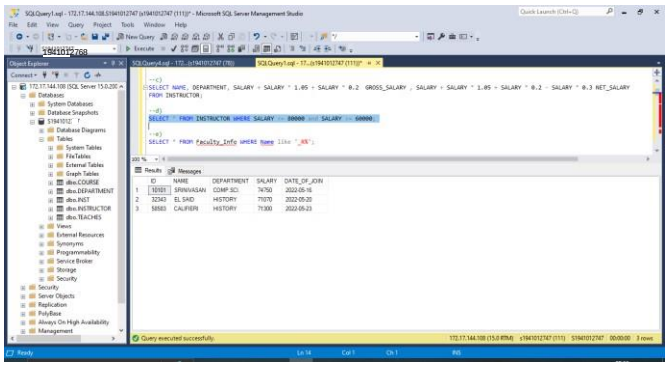
Ans.

```
SELECT NAME,DEPARTMENT,SALARY+SALARY*1.05+SALARY*0.2 GROSS_SALARY,SALARY
+SALARY*1.05+SALARY*0.2-SALARY*0.3 NET_SALARY
FROM INSTRUCTOR;
```



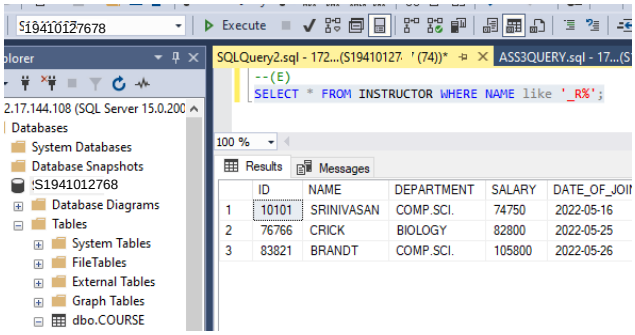
d) Display records of the Instructors with salary range 60000 to 80000. Ans.

```
SELECT * FROM INSTRUCTOR WHERE SALARY <= 80000 and SALARY >= 60000;
```



e) Display the records of the instructors having the second letter in their name as 'r'. Ans.

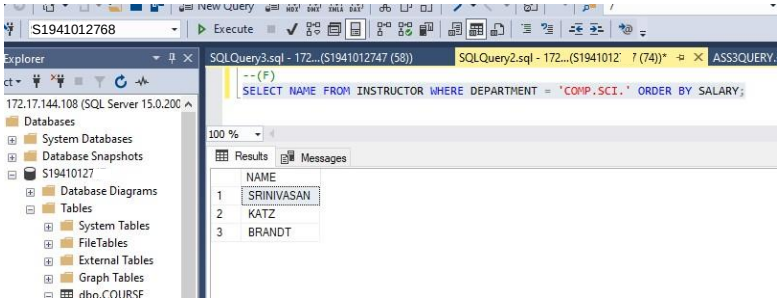
```
SELECT * FROM INSTRUCTOR WHERE NAME like '_R%';
```



f) Display the names of the instructors of Comp.Sci. Department in the descending order of their salary.

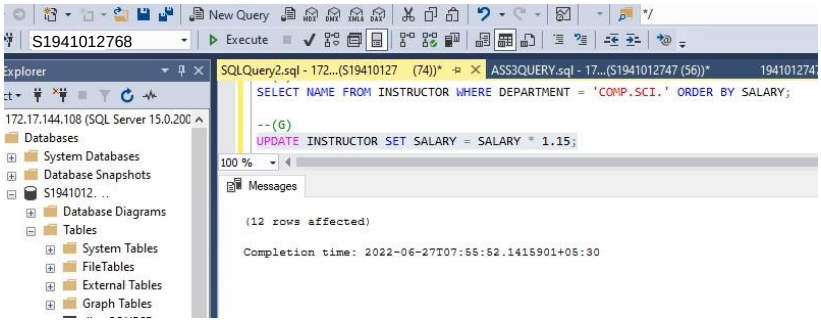
Ans.

```
SELECT NAME FROM INSTRUCTOR WHERE DEPARTMENT = 'COMP.SCI.' ORDER BY SALARY;
```



g) Update all records of Instructor table with a salary hike of 15%. Ans.

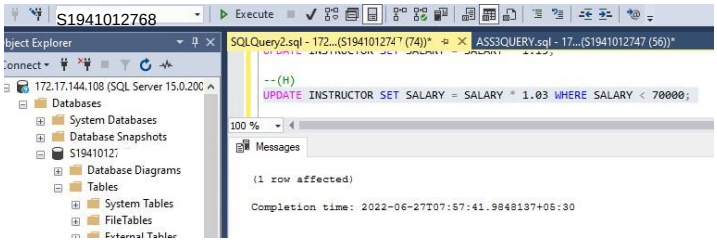
```
UPDATE INSTRUCTOR SET SALARY = SALARY * 1.15;
```



h) Update the records with a salary hike of 3% for Comp.Sci. Dept instructors having salary less than 70000.

Ans.

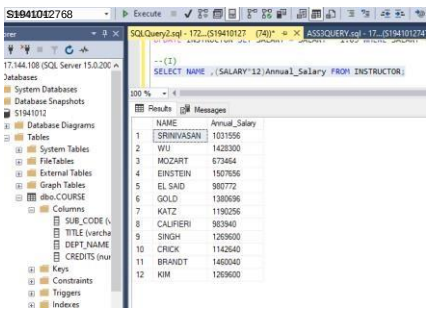
```
UPDATE INSTRUCTOR SET SALARY = SALARY * 1.03 WHERE SALARY < 70000;
```



i) Display the annual salary of each

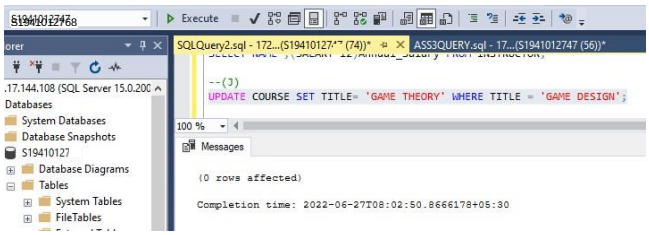
instructor. Ans.

```
SELECT NAME ,(SALARY*12)Annual_Salary FROM INSTRUCTOR;
```



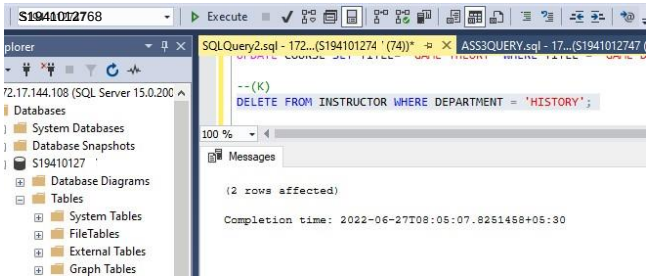
j) Update the title of the course having title 'Game Design' to 'Game Theory'. Ans.

```
UPDATE COURSE SET TITLE= 'GAME THEORY' WHERE TITLE = 'GAME DESIGN';
```



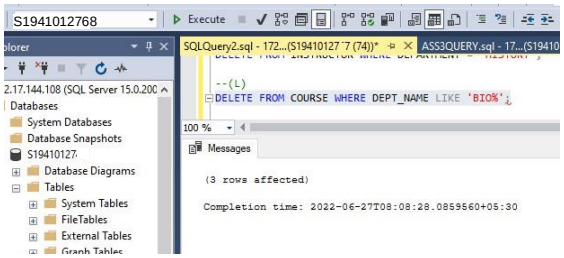
k) Delete the instructor records of History department. Ans.

```
DELETE FROM INSTRUCTOR WHERE DEPARTMENT = 'HISTORY';
```



l) Delete the course records of the courses having course_id starting with 'BIO' Ans.

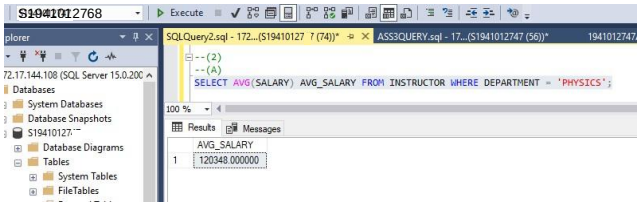
```
DELETE FROM COURSE WHERE DEPT_NAME LIKE 'BIO%';
```



2. Write the SQL Expressions for the following queries using suitable SQL aggregate function.

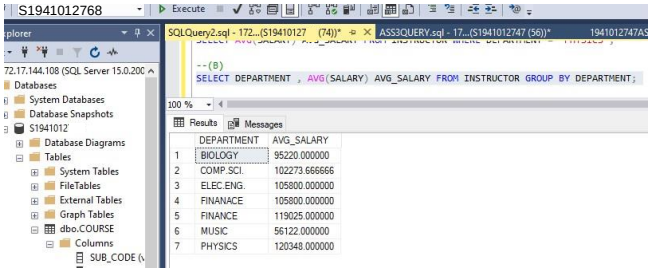
a) Display the Avg. salary of instructors of Physics department. Ans.

```
SELECT AVG(SALARY) AVG_SALARY FROM INSTRUCTOR WHERE DEPARTMENT = 'PHYSICS';
```



b) Display the Dept_ name and Average salary paid to instructor of each department Ans.

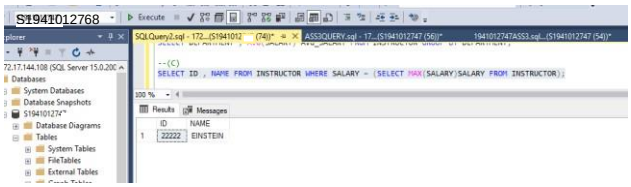
```
SELECT DEPARTMENT , AVG(SALARY) AVG_SALARY FROM INSTRUCTOR GROUP BY DEPARTMENT;
```



	DEPARTMENT	AVG_SALARY
1	BIOLOGY	95220.000000
2	COMP.SCI.	102273.666666
3	ELEC.ENG.	105800.000000
4	FINANACE	105800.000000
5	FINANCE	119025.000000
6	MUSIC	56122.000000
7	PHYSICS	120348.000000

c) Display the ID, Name & Department of the instructor drawing the highest salary. Ans.

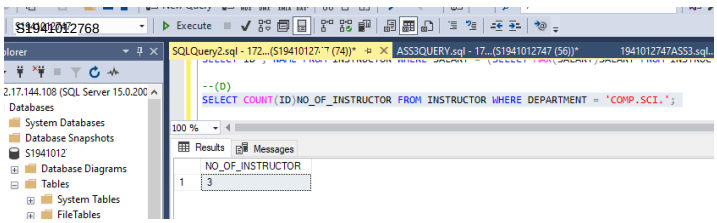
```
SELECT ID , NAME FROM INSTRUCTOR WHERE SALARY = (SELECT MAX(SALARY)SALARY FROM INSTRUCTOR);
```



	ID	NAME
1	22222	EINSTEIN

d) Display the number of instructors available in Comp. Sci. Department. Ans.

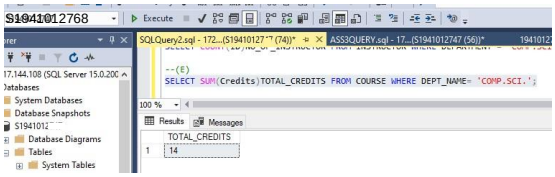
```
SELECT COUNT(ID)NO_OF_INSTRUCTOR FROM INSTRUCTOR WHERE DEPARTMENT = 'COMP.SCI.';
```



	NO_OF_INSTRUCTOR
1	3

e) Display the total credits of all courses offered in Comp.Sci. Department. Ans.

```
SELECT SUM(Credits)TOTAL_CREDITS FROM COURSE WHERE DEPT_NAME= 'COMP.SCI.';
```

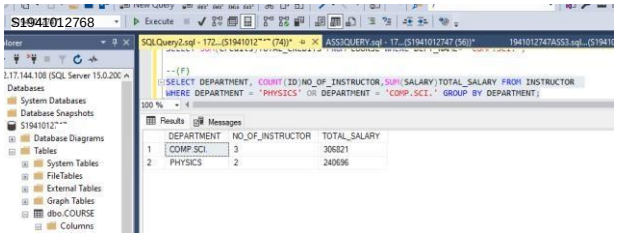


	TOTAL_CREDITS
1	14

f) Display the number of instructors and total salary drawn by Physics and Comp.Sci. departments.

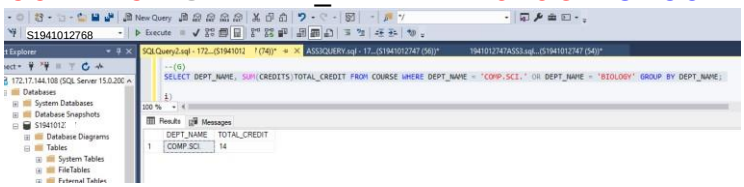
Ans.

```
SELECT DEPARTMENT, COUNT(ID)NO_OF_INSTRUCTOR,SUM(SALARY)TOTAL_SALARY FROM
INSTRUCTOR
WHERE DEPARTMENT = 'PHYSICS' OR DEPARTMENT = 'COMP.SCI.' GROUP BY DEPARTMENT;
```



g) Display the total credits of Comp.Sci. and Biology departments from course table. Ans.

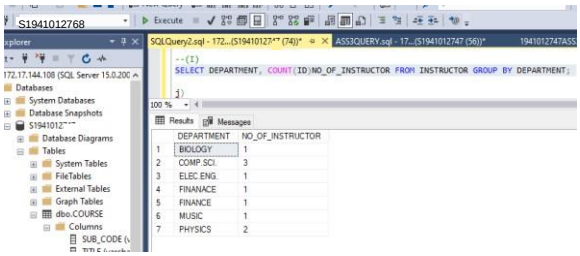
```
SELECT DEPT_NAME, SUM(CREDITS)TOTAL_CREDIT FROM COURSE WHERE DEPT_NAME =
'COMP.SCI.' OR DEPT_NAME = 'BIOLOGY' GROUP BY DEPT_NAME;
```



h) Display building wise total budget values. Ans.

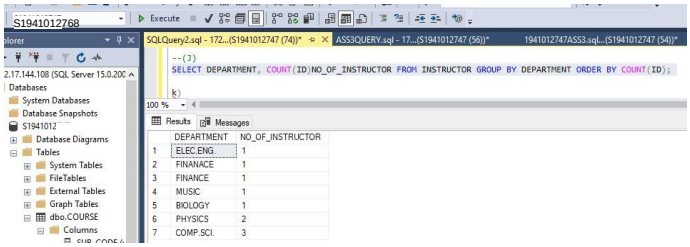
```
SELECT DEPARTMENT, COUNT(ID)NO_OF_INSTRUCTOR FROM INSTRUCTOR GROUP BY
DEPARTMENT;
```

i) Display the number of instructors of each department. Ans.



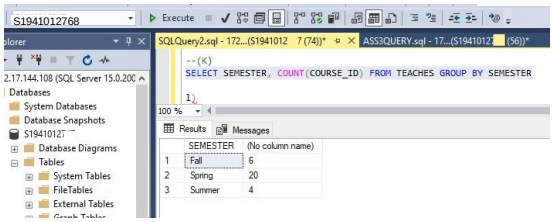
j) Display the number of instructors of each department sorted in high to low. Ans.

```
SELECT DEPARTMENT, COUNT(ID)NO_OF_INSTRUCTOR FROM INSTRUCTOR GROUP BY
DEPARTMENT ORDER BY COUNT(ID);
```



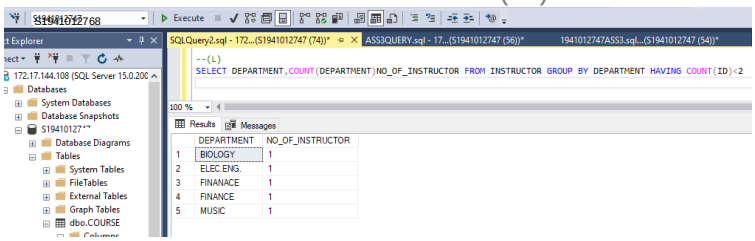
k) Display the number of courses offered semester wise. Ans.

```
SELECT SEMESTER, COUNT(COURSE_ID) FROM TEACHES GROUP BY SEMESTER
```



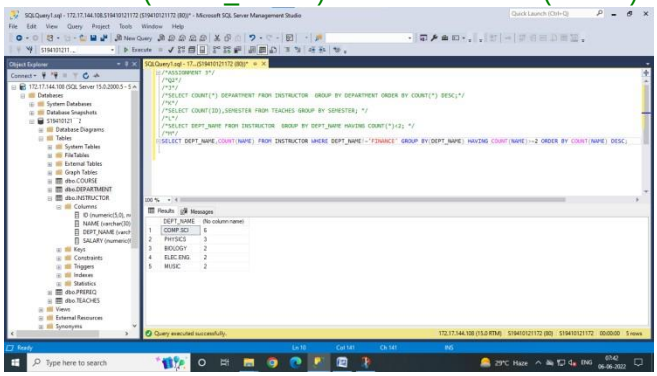
l) Display the name of departments having number of instructors less than 2; Ans.

```
SELECT DEPARTMENT,COUNT(DEPARTMENT)NO_OF_INSTRUCTOR FROM INSTRUCTOR GROUP BY DEPARTMENT HAVING COUNT(ID)<2
```



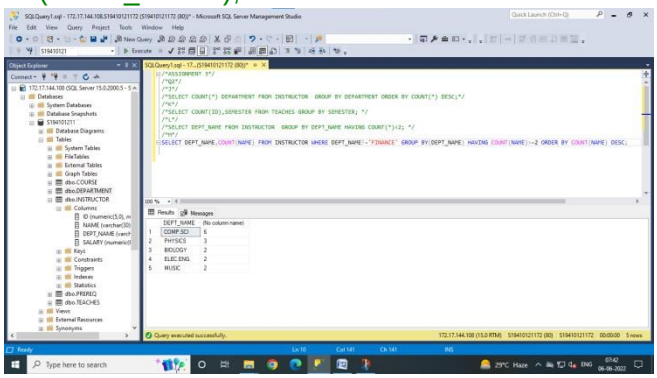
m) List the number of instructors of each department having 2 or more than 2 instructors except Finance department, sorted in high to low order of their number. Ans.

```
SELECT DEPT_NAME,COUNT(NAME) FROM INSTRUCTOR WHERE DEPT_NAME!='FINANCE'
GROUP BY(DEPT_NAME) HAVING COUNT(NAME)>=2 ORDER BY COUNT(NAME) DESC;
```



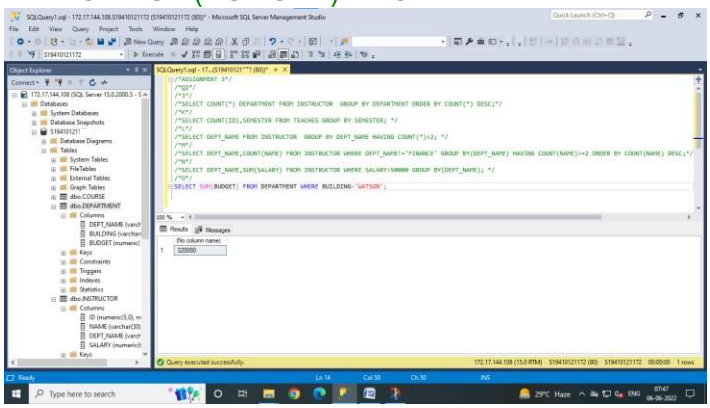
n) Display the Dept_name that has paid total salary more than 50000. Ans.

SELECT DEPT_NAME,SUM(SALARY) FROM INSTRUCTOR WHERE SALARY>50000 GROUP BY(DEPT_NAME);



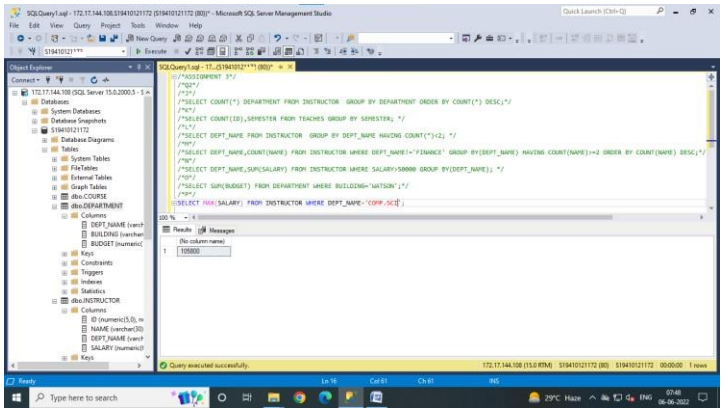
o) Display the total budget for the building built by Watson. Ans.

SELECT SUM(BUDGET) FROM DEPARTMENT WHERE BUILDING='WATSON';



p) Display the highest salary of the instructor of Comp.Sci. Department. Ans.

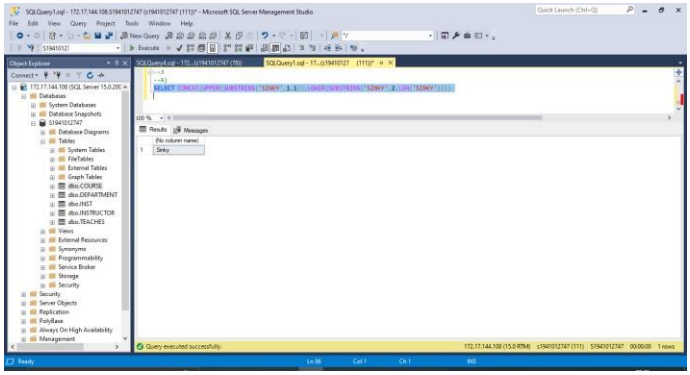
SELECT MAX(SALARY) FROM INSTRUCTOR WHERE DEPT_NAME='COMP.SCI';



3. Write the SQL Expressions for the following queries using suitable SQL scalar function.

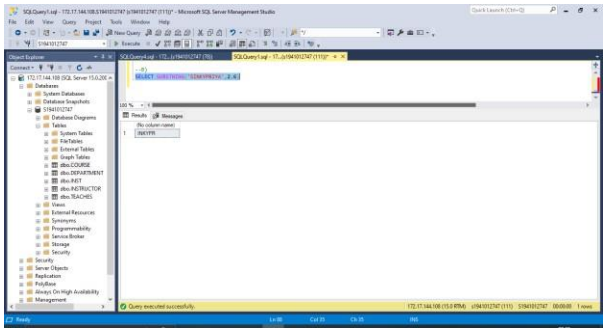
a) Display your name with first letter being capital, where the entered name is in lower case. Ans.

```
SELECT CONCAT(UPPER(SUBSTRING('ANKIT',1,1)),LOWER(SUBSTRING('ANKIT',2,LEN('ANKIT'))))
```



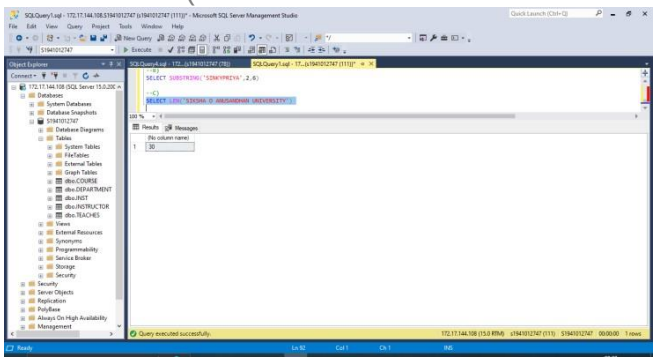
b) Display 2nd- 6th characters of your name. Ans.

```
SELECT SUBSTRING('ANKIT KUMAR',2,6)
```



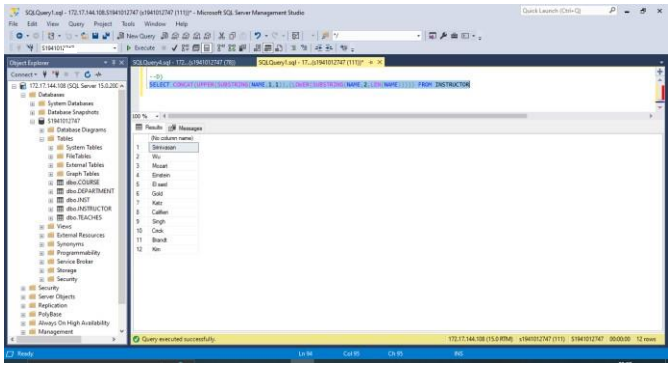
c) Find length of your full university name. Ans.

```
SELECT LEN('SIKSHA O ANUSANDHAN UNIVERSITY')
```



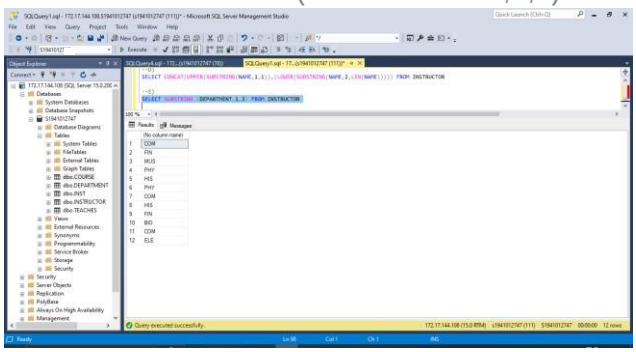
d) Display all the Instructor names with its first letter in upper case. Ans.

```
SELECT CONCAT(UPPER(SUBSTRING(NAME,1,1)),(LOWER(SUBSTRING(NAME,2,LEN(NAME)))))
FROM INSTRUCTOR
```



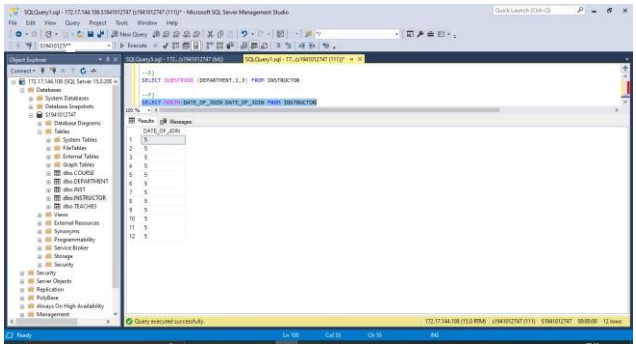
e) List the department name of each instructor as a three letter code. Ans.

```
SELECT SUBSTRING (DEPARTMENT,1,3) FROM INSTRUCTOR
```



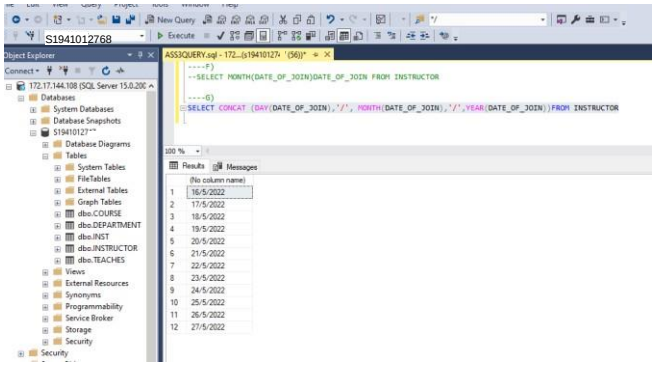
f) Display the month of the joining of each instructor. Ans.

```
SELECT MONTH(DATE_OF_JOIN)DATE_OF_JOIN FROM INSTRUCTOR
```



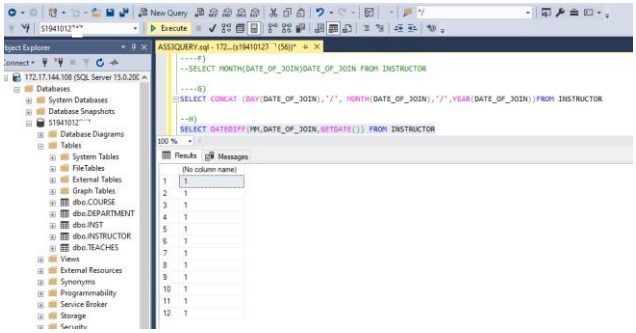
g) Display the date of joining of each instructor in dd/mm/yy format. Ans.

```
SELECT CONCAT (DAY(DATE_OF_JOIN),'/',
MONTH(DATE_OF_JOIN),'/',YEAR(DATE_OF_JOIN))FROM INSTRUCTOR
```



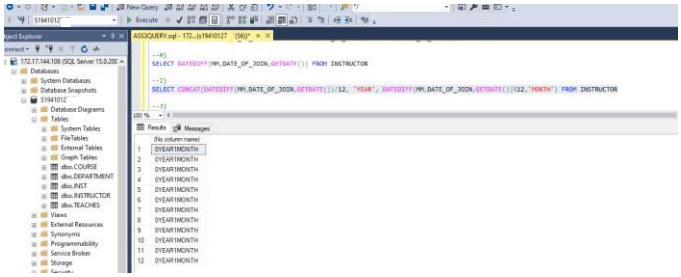
h) Display the experience of each instructor in terms of months. Ans.

```
SELECT DATEDIFF(MM,DATE_OF_JOIN,GETDATE()) FROM INSTRUCTOR
```



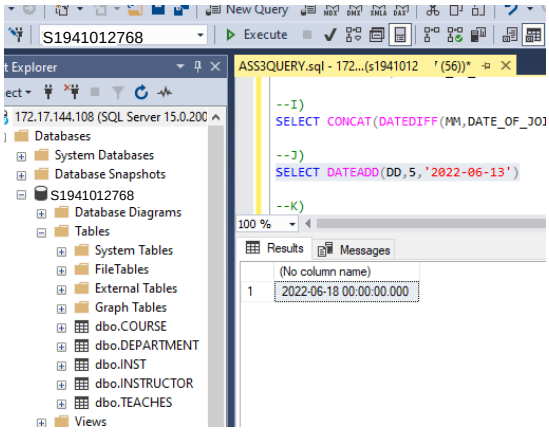
i) Display the experience of each instructor in term of years and months. Ans.

```
SELECT CONCAT(DATEDIFF(MM,DATE_OF_JOIN,GETDATE())/12, 'YEAR',
DATEDIFF(MM,DATE_OF_JOIN,GETDATE())%12,'MONTH') FROM INSTRUCTOR
```



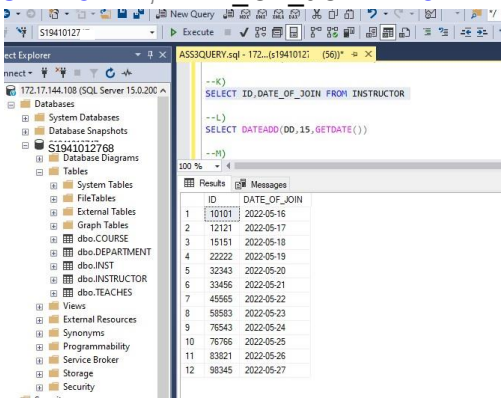
j) Display the date of the next Friday after today's date. Ans.

```
SELECT DATEADD(DD,5,'2022-06-13')
```



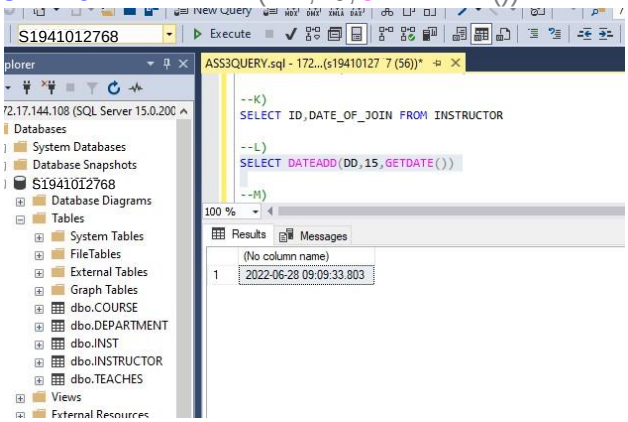
k) Display the day of joining of each instructor. Ans.

```
SELECT ID,DATE_OF_JOIN FROM INSTRUCTOR
```



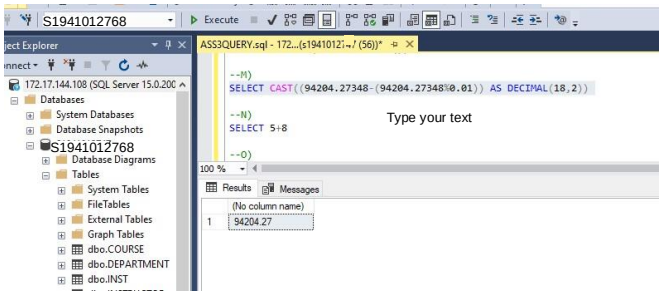
l) Display the date corresponding to 15 days after today's date. Ans.

```
SELECT DATEADD(DD,15,GETDATE())
```



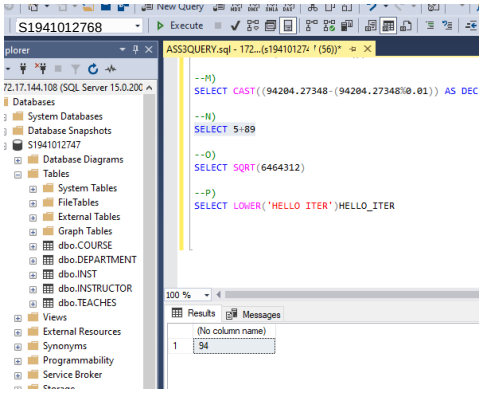
m) Display the value 94204.27348 truncated up to 2 digits after decimal point. Ans.

```
SELECT CAST((94204.27348-(94204.27348%0.01)) AS DECIMAL(18,2))
```



n) Display the value of the expression 5 + 89 Ans.

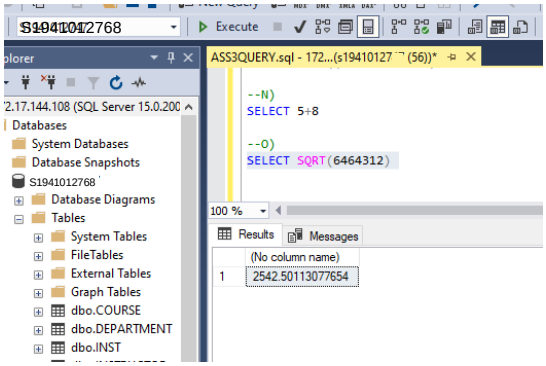
```
SELECT 5+89
```



o) Find out the square root of 6464312.

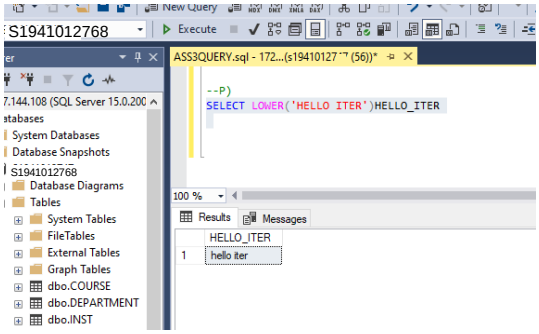
```
SELECT SQRT(6464312)
```

Ans.



p) Display the string "HELLO ITER" in lower case with a column heading lower case. Ans.

```
SELECT LOWER('HELLO ITER')HELLO_ITER
```


New Query
S1941012768
Execute
ASS3QUERY.sql - 172...(s19410127 (56))*
--P)
SELECT LOWER('HELLO ITER')HELLO_ITER
7.144.108 (SQL Server 15.0.200
atabases
System Databases
Database Snapshots
S1941012768
Database Diagrams
Tables
System Tables
FileTables
External Tables
Graph Tables
dbo.COURSE
dbo.DEPARTMENT
dbo.INST
100 %
Results
Messages
HELLO_ITER
1
hello iter

Laboratory Assignments
Subject: Introduction to Databases
Subject code: CSE 3151

Assignment 4: Table creation using Database Constraints

1. Create the Tables for the following descriptions using the constraints as specified.

TABLE NAME-- CUSTOMER

COLUMN NAME	CONSTRAINT DESCRIPTION
CUST_NO	-PRIMARY KEY -MUST BE 5 CHARACTER LONG & START WITH LETTER 'C'
NAME	NOT NULL
PHONE_NO	
CITY	NOT NULL

```
CREATE TABLE CUSTOMER (CUST_NO VARCHAR(5) PRIMARY KEY ,
CHECK(CUST_NO LIKE 'C%'),
NAME VARCHAR(10),
PHONE_NO INT(10),
CITY VARCHAR(10) NOT NULL);
```

```
mysql> DESC CUSTOMER;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| cust_no  | varchar(5)  | NO   | PRI | NULL    |       |
| name     | varchar(10) | YES  |     | NULL    |       |
| phone_no | int         | YES  |     | NULL    |       |
| city     | varchar(10) | NO   |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

TABLE NAME-- ACCOUNT

COLUMN NAME	CONSTRAINT DESCRIPTION
ACCOUNT_NO	-PRIMARY KEY -MUST BE 5 CHARACTER LONG & START WITH LETTER 'A'
TYPE	-TYPES- 'SB', 'FD', 'CA'
BALANCE	-MUST BE < 10000000
BRANCH_CODE	-FOREIGN KEY, REFERS TABLE *BRANCH*

```
CREATE TABLE ACCOUNT( ACCOUNT_NO VARCHAR(5) PRIMARY KEY,
 CHECK (ACCOUNT_NO LIKE 'A%'),
TYPE VARCHAR(2) CHECK(TYPE IN('SB','FD','CA')),
 BALANCE INT(10) CHECK(BALANCE<10000000),
BRANCH_CODE VARCHAR(6) REFERENCES BRANCH(BRANCH_CODE)
);
```

```
mysql> DESC ACCOUNT;
+-------------+------------+------+-----+---------+-------+
| Field       | Type       | Null | Key | Default | Extra |
+-------------+------------+------+-----+---------+-------+
| account_no  | varchar(5) | NO   | PRI | NULL    |       |
| type        | varchar(2) | YES  |     | NULL    |       |
| balance     | int        | YES  |     | NULL    |       |
| branch_code | varchar(6) | YES  |     | NULL    |       |
+-------------+------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

TABLE NAME-- DEPOSITOR

COLUMN NAME	CONSTRAINT DESCRIPTION
CUST_NO	-FOREIGN KEY, REFERS TABLE CUSTOMER -PRIMARY KEY
ACCOUNT_NO	-FOREIGN KEY, REFERS TABLE *ACCOUNT* *-PRIMARY KEY*

```
CREATE TABLE DEPOSITOR( CUST_NO VARCHAR(5) REFERENCES CUSTOMER(CUST_NO)
,
ACCOUNT_NO VARCHAR(5) REFERENCES ACCOUNT(ACCOUNT_NO));
```

```
mysql> DESC DEPOSITOR;
+------------+------------+------+-----+---------+-------+
| Field      | Type       | Null | Key | Default | Extra |
+------------+------------+------+-----+---------+-------+
| cust_no    | varchar(5) | YES  |     | NULL    |       |
| account_no | varchar(5) | YES  |     | NULL    |       |
+------------+------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

TABLE NAME-- LOAN

COLUMN NAME	CONSTRAINT DESCRIPTION
LOAN-NO	-PRIMARY KEY -MUST BE 5 CHARACTER LONG & START WITH LETTER 'L'
CUST_NO	-FOREIGN KEY, REFERS TABLE *CUSTOMER*
AMOUNT	-MUST BE > 1000
BRANCH_CODE	-FOREIGN KEY, REFERS TABLE *BRANCH*

```
CREATE TABLE LOAN (LOAN_NO VARCHAR(5) CHECK(LOAN_NO LIKE 'L%') PRIMARY
KEY,
CUST_NO VARCHAR(5) REFERENCES CUSTOMER(CUST_NO),
 AMOUNT INT(10) CHECK(AMOUNT>1000),
BRANCH_CODE VARCHAR(6) REFERENCES BRANCH(BRANCH_CODE));
```

```
mysql> DESC LOAN;
+-------------+------------+------+-----+---------+-------+
| Field       | Type       | Null | Key | Default | Extra |
+-------------+------------+------+-----+---------+-------+
| LOAN_NO     | varchar(5) | NO   | PRI | NULL    |       |
| CUST_NO     | varchar(5) | YES  |     | NULL    |       |
| AMOUNT      | int        | YES  |     | NULL    |       |
| BRANCH_CODE | varchar(6) | YES  |     | NULL    |       |
+-------------+------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

TABLE NAME-- BRANCH

COLUMN NAME	CONSTRAINT DESCRIPTION
BRANCH_CODE	-PRIMARY KEY
BRANCH_NAME	-NOT NULL
BRANCH_CITY	-ANY METRO CITY OF INDIA – DELHI, MUMBAI, KOLKATA, CHENNAI.

```
CREATE TABLE BRANCH( BRANCH_CODE VARCHAR(6) PRIMARY KEY,
BRANCH_NAME VARCHAR(20) NOT NULL,
BRANCH_CITY VARCHAR(10) ,
CHECK(BRANCH_CITY IN('DELHI','MUMBAI','KOLKATA','CHENNAI'))
);
```

```
mysql> DESC BRANCH;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| branch_code | varchar(6)  | NO   | PRI | NULL    |       |
| branch_name | varchar(20) | NO   |     | NULL    |       |
| branch_city | varchar(10) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

TABLE NAME- INSTALLMENT

COLUMN NAME	CONSTRAINT DESCRIPTION
INST_NO	-PRIMARY KEY -MUST BE<=10
LOAN_NO	-PRIMARY KEY -FOREIGN KEY, REFERS TABLE LOAN
INST_AMOUNT	-NOT NULL

```
CREATE TABLE INSTALLMENT(
INST_NO VARCHAR(5) CHECK(INST_NO<=10),
LOAN_NO VARCHAR(5) REFERENCES LOAN(LOAN_NO),
INST_AMOUNT NUMERIC(10) NOT NULL,
CONSTRAINT COM PRIMARY KEY(INST_NO,LOAN_NO)
);
```

```
mysql> CREATE TABLE INSTALLMENT(
    -> INST_NO VARCHAR(5) CHECK(INST_NO<=10),
    -> LOAN_NO VARCHAR(5) REFERENCES LOAN(LOAN_NO),
    -> INST_AMOUNT NUMERIC(10) NOT NULL,
    -> CONSTRAINT COM PRIMARY KEY(INST_NO,LOAN_NO)
    -> );
Query OK, 0 rows affected (0.04 sec)

mysql> DESC INSTALLMENT;
+-------------+---------------+------+-----+---------+-------+
| Field       | Type          | Null | Key | Default | Extra |
+-------------+---------------+------+-----+---------+-------+
| INST_NO     | varchar(5)    | NO   | PRI | NULL    |       |
| LOAN_NO     | varchar(5)    | NO   | PRI | NULL    |       |
| INST_AMOUNT | decimal(10,0) | NO   |     | NULL    |       |
+-------------+---------------+------+-----+---------+-------+
3 rows in set (0.01 sec)
```

2. **Insert the records to the tables as specified:**

CUSTOMER			
CUST_NO	***NAME***	***PHONE_NO***	***CITY***
C0001	RAJ ANAND SINGH	9861258466	DELHI
C0002	ANKITA SINGH	9879958651	BANGALORE
C0003	SOUMYA JHA	9885623344	MUMBAI
C0004	ABHIJIT MISHRA	9455845425	MUMBAI
C0005	YASH SARAF	9665854585	KOLKATA
C0006	SWAROOP RAY	9437855466	CHENNAI
C0007	SURYANARAYAN	9937955212	GURGAON
C0008	PRANAV PRAVEEN	9336652441	PUNE
C0009	STUTI MISRA	7870266534	DELHI
C0010	ASLESHA TIWARI		MUMBAI

```
INSERT INTO CUSTOMER VALUES('C0001','RAJ ANAND
SINGH','9861258466','DELHI');
INSERT INTO CUSTOMER VALUES('C0002','ANKITA
SINGH','9879958651','BANGALORE');
INSERT INTO CUSTOMER VALUES('C0003','SOUMYA JHA','9885623344','MUMBAI');
INSERT INTO CUSTOMER VALUES('C0004','ABHIJT
MISHRA','9455845425','MUMBAI');
INSERT INTO CUSTOMER VALUES('C0005','YASH
```

```
SARAF','9665854585','KOLKOTA');
INSERT INTO CUSTOMER VALUES('C0006','SWAROOP
RAY','9437855466','CHENNAI');
INSERT INTO CUSTOMER VALUES('C0007','SURYA
NARAYAN','9937955212','GURGAON');
INSERT INTO CUSTOMER VALUES('C0008','PRANAB
PRAVEEN','9336652441','PUNE');
INSERT INTO CUSTOMER VALUES('C0009','STUTI MISRA','7870266534','DELHI');
INSERT INTO CUSTOMER VALUES('C0010','ASLESHA TIWARI',NULL,'MUMBAI');
```

```
mysql> select * from customer;
+---------+-----------------+------------+-----------+
| cust_no | name            | phone_no   | city      |
+---------+-----------------+------------+-----------+
| C0001   | RAJ ANAND SINGH | 9861258466 | DELHI     |
| C0002   | ANKITA SINGH    | 9879958651 | BANGALORE |
| C0003   | SOUMYA JHA      | 9885623344 | MUMBAI    |
| C0004   | ABHIJT MISHRA   | 9455845425 | MUMBAI    |
| C0005   | YASH SARAF      | 9665854585 | KOLKOTA   |
| C0006   | SWAROOP RAY     | 9437855466 | CHENNAI   |
| C0007   | SURYA NARAYAN   | 9937955212 | GURGAON   |
| C0008   | PRANAB PRAVEEN  | 9336652441 | PUNE      |
| C0009   | STUTI MISRA     | 7870266534 | DELHI     |
| C0010   | ASLESHA TIWARI  | NULL       | MUMBAI    |
+---------+-----------------+------------+-----------+
10 rows in set (0.00 sec)
```

ACCOUNT

ACCOUNT_NO	*TYPE*	*BALANCE*	*BRANCH_CODE*
A0001	SB	200000	B003
A0002	SB	15000	B002
A0003	CA	850000	B004
A0004	CA	35000	B004
A0005	FD	28500	B005
A0006	FD	550000	B005
A0007	SB	48000	B001
A0008	SB	7200	B002
A0009	SB	18750	B003
A0010	FD	99000	B004

```
INSERT INTO ACCOUNT VALUES('A0001','SB',200000,'B003');
INSERT INTO ACCOUNT VALUES('A0002','SB',15000,'B002');
INSERT INTO ACCOUNT VALUES('A0003','CA',850000,'B004');
INSERT INTO ACCOUNT VALUES('A0004','CA',35000,'B004');
INSERT INTO ACCOUNT VALUES('A0005','FD',28500,'B005');
INSERT INTO ACCOUNT VALUES('A0006','FD',550000,'B005');
INSERT INTO ACCOUNT VALUES('A0007','SB',48000,'B001');
INSERT INTO ACCOUNT VALUES('A0008','SB',7200,'B002');
INSERT INTO ACCOUNT VALUES('A0009','SB',18750,'B003');
INSERT INTO ACCOUNT VALUES('A0010','FD',99000,'B004');
```

```
mysql> select * from account;
+------------+------+---------+-------------+
| account_no | type | balance | branch_code |
+------------+------+---------+-------------+
| A0001      | SB   |  200000 | B003        |
| A0002      | SB   |   15000 | B002        |
| A0003      | CA   |  850000 | B004        |
| A0004      | CA   |   35000 | B004        |
| A0005      | FD   |   28500 | B005        |
| A0006      | FD   |  550000 | B005        |
| A0007      | SB   |   48000 | B001        |
| A0008      | SB   |    7200 | B002        |
| A0009      | SB   |   18750 | B003        |
| A0010      | FD   |   99000 | B004        |
+------------+------+---------+-------------+
10 rows in set (0.00 sec)
```

DEPOSITOR

CUST_NO	*ACCOUNT_NO*
C0003	A0001
C0004	A0001
C0004	A0002
C0006	A0003
C0006	A0004
C0001	A0005
C0002	A0005
C0010	A0006
C0009	A0007
C0008	A0008
C0007	A0009
C0006	A0010

```
INSERT INTO DEPOSITOR VALUES('C0003','A0001');
INSERT INTO DEPOSITOR VALUES('C0004','A0001');
INSERT INTO DEPOSITOR VALUES('C0004','A0002');
INSERT INTO DEPOSITOR VALUES('C0006','A0003');
INSERT INTO DEPOSITOR VALUES('C0006','A0004');
INSERT INTO DEPOSITOR VALUES('C0001','A0005');
INSERT INTO DEPOSITOR VALUES('C0002','A0005');
INSERT INTO DEPOSITOR VALUES('C0010','A0006');
INSERT INTO DEPOSITOR VALUES('C0009','A0007');
INSERT INTO DEPOSITOR VALUES('C0008','A0008');
INSERT INTO DEPOSITOR VALUES('C0007','A0009');
INSERT INTO DEPOSITOR VALUES('C0006','A0010');
```

```
mysql> select * from depositor;
+---------+------------+
| cust_no | account_no |
+---------+------------+
| C0003   | A0001      |
| C0004   | A0001      |
| C0004   | A0002      |
| C0006   | A0003      |
| C0006   | A0004      |
| C0001   | A0005      |
| C0002   | A0005      |
| C0010   | A0006      |
| C0009   | A0007      |
| C0008   | A0008      |
| C0007   | A0009      |
| C0006   | A0010      |
+---------+------------+
12 rows in set (0.00 sec)
```

LOAN

LOAN-NO	*CUST_NO*	*AMOUNT*	*BRANCH_CODE*
L0001	C0005	3000000	B006
L0002	C0001	50000	B005
L0003	C0002	8000000	B004
L0004	C0010	100000	B004
L0005	C0009	9500000	B005
L0006	C0008	25000	B006

```
INSERT INTO LOAN VALUES('L0001','C0005',3000000,'B006');
INSERT INTO LOAN VALUES('L0002','C0001',50000,'B005');
INSERT INTO LOAN VALUES('L0003','C0002',8000000,'B004');
INSERT INTO LOAN VALUES('L0004','C0010',100000,'B004');
INSERT INTO LOAN VALUES('L0005','C0009',9500000,'B005');
INSERT INTO LOAN VALUES('L0006','C0008',25000,'B006');
```

```
mysql> SELECT * FROM LOAN;
+---------+---------+---------+-------------+
| LOAN_NO | CUST_NO | AMOUNT  | BRANCH_CODE |
+---------+---------+---------+-------------+
| L0001   | C0005   | 3000000 | B006        |
| L0002   | C0001   |   50000 | B005        |
| L0003   | C0002   | 8000000 | B004        |
| L0004   | C0010   |  100000 | B004        |
| L0005   | C0009   | 9500000 | B005        |
| L0006   | C0008   |   25000 | B006        |
+---------+---------+---------+-------------+
6 rows in set (0.00 sec)
```

BRANCH

BRANCH_CODE	*BRANCH_NAME*	*BRANCH_CITY*
B001	JANAKPURI BRANCH	DELHI
B002	CHANDNICHOWK BRANCH	DELHI
B003	JUHU BRANCH	MUMBAI
B004	ANDHERI BRANCH	MUMBAI
B005	SALTLAKE BRANCH	KOLKATA
B006	SRIRAMPURAM BRANCH	CHENNAI

```
INSERT INTO BRANCH VALUES('B001','JANAKPURI BRANCH','DELHI');
INSERT INTO BRANCH VALUES('B002','CHANDINICHOWK
BRANCH','DELHI');
INSERT INTO BRANCH VALUES('B003','JUHU BRANCH','MUMBAI');
INSERT INTO BRANCH VALUES('B004','ANDHERI BRANCH','MUMBAI');
INSERT INTO BRANCH VALUES('B005','SALTLAKE BRANCH','KOLKATA');
INSERT INTO BRANCH VALUES('B006','SRIRAMPUR BRANCH','CHENNAI');
SELECT * FROM BRANCH;
```

```
mysql> SELECT * FROM BRANCH;
+-------------+----------------------+-------------+
| branch_code | branch_name          | branch_city |
+-------------+----------------------+-------------+
| B001        | JANAKPURI BRANCH     | DELHI       |
| B002        | CHANDINICHOWK BRANCH | DELHI       |
| B003        | JUHU BRANCH          | MUMBAI      |
| B004        | ANDHERI BRANCH       | MUMBAI      |
| B005        | SALTLAKE BRANCH      | KOLKATA     |
| B006        | SRIRAMPUR BRANCH     | CHENNAI     |
+-------------+----------------------+-------------+
6 rows in set (0.00 sec)
```

INSTALLMENT

INST_NO	*LOAN_NO*	*INST_AMOUNT*
1	L0005	500000
1	L0002	10000
1	L0003	50000
1	L0004	20000
2	L0005	500000
1	L0006	3000
2	L0002	10000
3	L0002	10000
2	L0003	50000
2	L0004	20000

```
INSERT INTO INSTALLMENT VALUES(1,'L0005',500000);
INSERT INTO INSTALLMENT VALUES(1,'L0002',10000);
INSERT INTO INSTALLMENT VALUES(1,'L0003',50000);
INSERT INTO INSTALLMENT VALUES(1,'L0004',20000);
INSERT INTO INSTALLMENT VALUES(2,'L0005',500000);
INSERT INTO INSTALLMENT VALUES(1,'L0006',3000);
INSERT INTO INSTALLMENT VALUES(2,'L0002',10000);
INSERT INTO INSTALLMENT VALUES(3,'L0002',10000);
INSERT INTO INSTALLMENT VALUES(2,'L0003',50000);
INSERT INTO INSTALLMENT VALUES(2,'L0004',20000);
```

```
mysql> SELECT * FROM INSTALLMENT;
+---------+---------+-------------+
| INST_NO | LOAN_NO | INST_AMOUNT |
+---------+---------+-------------+
| 1       | L0002   |       10000 |
| 1       | L0003   |       50000 |
| 1       | L0004   |       20000 |
| 1       | L0005   |      500000 |
| 1       | L0006   |        3000 |
| 2       | L0002   |       10000 |
| 2       | L0003   |       50000 |
| 2       | L0004   |       20000 |
| 2       | L0005   |      500000 |
| 3       | L0002   |       10000 |
+---------+---------+-------------+
10 rows in set (0.00 sec)
```

Laboratory Assignments
Subject: Introduction to Databases
Subject code: CSE 3151

Assignment 5: Sub queries and Joins

1. Write the expression for the following set of queries in SQL, based on the set of schemas of Assignment (4), using concept of sub query.

a) Find out the name, phone_no and cust_no of customer having Account_no "A0004".

```
SELECT NAME,PHONE_NO,CUST_NO FROM CUSTOMER WHERE CUST_NO=ALL(
SELECT CUST_NO FROM DEPOSITOR WHERE ACCOUNT_NO='A0004');
```

```
mysql> select name,phone_no,cust_no from customer where cust_no=all( select cust_no from depositor where account_no='A0004');
+-------------+------------+---------+
| name        | phone_no   | cust_no |
+-------------+------------+---------+
| SWAROOP RAY | 9437855466 | C0006   |
+-------------+------------+---------+
1 row in set (0.00 sec)
```

b) Find out the name of the customer who has not taken any loan.

```
SELECT NAME FROM CUSTOMER WHERE CUST_NO NOT IN (SELECT
CUST_NO FROM LOAN);
```

```
mysql> SELECT NAME FROM CUSTOMER WHERE CUST_NO NOT IN (SELECT CUST_NO FROM LOAN);
+----------------+
| NAME           |
+----------------+
| SOUMYA JHA     |
| ABHIJT MISHRA  |
| SWAROOP RAY    |
| SURYA NARAYAN  |
+----------------+
4 rows in set (0.00 sec)
```

c) Find out the branch_city where "ASLESHA TIWARI" has taken a loan.

```
SELECT BRANCH_CITY FROM BRANCH WHERE BRANCH_CODE=ALL( SELECT
BRANCH_CODE FROM LOAN WHERE CUST_NO=(SELECT CUST_NO FROM
CUSTOMER WHERE NAME='ASLESHA TIWARI'));
```

```
mysql> SELECT BRANCH_CITY FROM BRANCH WHERE BRANCH_CODE=ALL( SELECT BRANCH_CODE FROM LOAN WHERE CUST_NO=(SELECT CUST_NO FROM CUSTOMER WHERE NAME='ASLESHA TIWARI'));
+-------------+
| BRANCH_CITY |
+-------------+
| MUMBAI      |
+-------------+
1 row in set (0.00 sec)
```

d) Find out the installment details of customer named “ANKITA SINGH”.

SELECT INST_NO, LOAN_NO,INST_AMOUNT FROM INSTALLMENT WHERE LOAN_NO=(SELECT LOAN_NO FROM LOAN WHERE CUST_NO=(SELECT CUST_NO FROM CUSTOMER WHERE NAME='ANKITA SINGH'));

```
mysql> SELECT INST_NO, LOAN_NO,INST_AMOUNT FROM INSTALLMENT WHERE LOAN_NO=(SELECT LOAN_NO FROM LOAN WHERE CUST_NO=(SELECT CUST_NO FROM CUSTOMER WHERE NAME='ANKITA SINGH'));
+---------+---------+-------------+
| INST_NO | LOAN_NO | INST_AMOUNT |
+---------+---------+-------------+
| 1       | L0003   |       50000 |
| 2       | L0003   |       50000 |
+---------+---------+-------------+
2 rows in set (0.00 sec)
```

e) Find out the branch name and branch city, in which “ABHIJIT MISHRA” has an account.

SELECT BRANCH_NAME,BRANCH_CITY FROM BRANCH WHERE BRANCH_CODE=ANY(SELECT BRANCH_CODE FROM ACCOUNT WHERE ACCOUNT_NO=ALL(SELECT ACCOUNT_NO FROM DEPOSITOR WHERE CUST_NO=ANY(SELECT CUST_NO FROM CUSTOMER WHERE NAME='ABHIJIT MISHRA')));

```
mysql> SELECT BRANCH_NAME,BRANCH_CITY FROM BRANCH WHERE BRANCH_CODE=ANY( SELECT BRANCH_CODE FROM ACCOUNT WHERE ACCOUNT_NO=ALL(SELECT ACCOUNT_NO FROM DEPOSITOR WHERE CUST_NO=ANY(SELECT CUST_NO FROM CUSTOMER WHERE
 NAME='ABHIJIT MISHRA')));
+--------------------+-------------+
| BRANCH_NAME        | BRANCH_CITY |
+--------------------+-------------+
| JANAKPURI BRANCH   | DELHI       |
| CHANDINICHOWK BRANCH | DELHI     |
| JUHU BRANCH        | MUMBAI      |
| ANDHERI BRANCH     | MUMBAI      |
| SALTLAKE BRANCH    | KOLKATA     |
+--------------------+-------------+
5 rows in set (0.00 sec)
```

2. Write the expression for the following set of queries in SQL, based on the set of schemas of Assignment (4), using concept of join.

a) Find out the Loan_nos where the loans are taken from any branch with branch_city =MUMBAI.

SELECT LOAN_NO FROM LOAN WHERE BRANCH_CODE=ANY(SELECT BRANCH_CODE FROM BRANCH WHERE BRANCH_CITY='MUMBAI');

```
mysql> SELECT LOAN_NO FROM LOAN WHERE BRANCH_CODE=ANY(SELECT BRANCH_CODE FROM BRANCH WHERE BRANCH_CITY='MUMBAI');
+---------+
| LOAN_NO |
+---------+
| L0003   |
| L0004   |
+---------+
2 rows in set (0.00 sec)
```

b) Find the Type of the accounts available in any branch with branch_city =DELHI.

SELECT TYPE AS ACCOUNT_TYPE FROM ACCOUNT WHERE BRANCH_CODE=ANY(SELECT BRANCH_CODE FROM BRANCH WHERE BRANCH_CITY='DELHI');

```
mysql> SELECT TYPE AS ACCOUNT_TYPE FROM ACCOUNT WHERE BRANCH_CODE=ANY(SELECT BRANCH_CODE FROM BRANCH WHERE BRANCH_CITY='DELHI');
+--------------+
| ACCOUNT_TYPE |
+--------------+
| SB           |
| SB           |
| SB           |
+--------------+
3 rows in set (0.00 sec)
```

c) Find out Installment_no and Installment amount of customer with Name= RAJ ANAND SINGH.

SELECT INST_NO,INST_AMOUNT FROM INSTALLMENT WHERE LOAN_NO=ANY(SELECT LOAN_NO FROM LOAN WHERE CUST_NO=(SELECT CUST_NO FROM CUSTOMER WHERE NAME='RAJ ANAND SINGH'));

```
mysql> SELECT INST_NO,INST_AMOUNT FROM INSTALLMENT WHERE LOAN_NO=ANY(SELECT LOAN_NO FROM LOAN WHERE CUST_NO=(SELECT CUST_NO FROM CUSTOMER WHERE NAME='RAJ ANAND SINGH'));
+---------+-------------+
| INST_NO | INST_AMOUNT |
+---------+-------------+
| 1       |       10000 |
| 2       |       10000 |
| 3       |       10000 |
+---------+-------------+
3 rows in set (0.00 sec)
```

d) Find out the Name of the customers who have paid installments of Amount 50000 against his/her loan.

SELECT NAME FROM CUSTOMER WHERE CUST_NO=ANY(SELECT CUST_NO FROM LOAN WHERE LOAN_NO=ALL(SELECT LOAN_NO FROM INSTALLMENT WHERE INST_AMOUNT>50000));

```
mysql> select name from customer where cust_no=any(select cust_no from loan where loan_no=all(select loan_no from installment where inst_amount>50000));
+-------------+
| name        |
+-------------+
| STUTI MISRA |
+-------------+
1 row in set (0.01 sec)
```

e) Find out the Ph_no of customers having account at branch with Branch_name equal to SALTLAKE.

SELECT PHONE_NO FROM CUSTOMER WHERE CUST_NO=ANY(SELECT CUST_NO FROM DEPOSITOR WHERE ACCOUNT_NO=ANY(SELECT ACCOUNT_NO FROM ACCOUNT WHERE BRANCH_CODE=ANY(SELECT BRANCH_CODE FROM BRANCH WHERE BRANCH_NAME='SALTLAKE BRANCH')));

```
mysql> select phone_no from customer where cust_no=any(select cust_no from depositor where account_no=any(select account_no from account where branch_code=any(select branch_code from branch where branch_name='SA
LTLAKE BRANCH')));
+------------+
| phone_no   |
+------------+
| 9861258466 |
| 9879958651 |
| NULL       |
+------------+
3 rows in set (0.00 sec)
```

End term project using JDBC connectivity

Objective of this Assignment:

- To design a miniature Project for a Banking Management System using Java, SQLServer and JDBC.

Requisite:

- Completion of IDB Laboratory Assignment-4
- Basic Java Programming knowledge

Overview of the Project:

A Banking Management System is to be designed, putting together the concepts learnt in theory and practised in laboratory. The Project will integrate a Java frontend menu driven program to the backend Banking Database designed in SQL Server through JDBC connectivity.

Project Description:

The Java program provides an interface to the user to access, insert, delete and update the database. The program handles user input, output to and from the database for the said operations. User should be able to do the following operations:

1. Show Customer Records:

Using this option the details of all the customers should be displayed in particular format.

2. Add Customer Record:

Using this option the user needs to provide the information such as cust_no, name, phoneno and city through user input, which will be saved in database. After that using option 1, details of all the customers will be displayed in particular format.

3. Delete Customer Record:

Using this option the user needs to provide the cust_no of a customer through user input and all the information related to that customer will be deleted from the database. After that using option 1, details of all the customers will be displayed in particular format.

4. Update Customer Information: Using this option the user needs to provide the cust_no of a customer through user input and based on the following choice the information related to the customer will be updated.

: Update name

: Update Phoneno.

: Update city

After that using option 1, details of all the customers will be displayed in particular format.

5. Show Account Details of a Customer:

Using this option the user needs to provide the cust_no of a customer through user input and all the information of that customer along with his account_no, type, balance, branch_code, branch_name and branch_city will be displayed in proper format.

6. Show Loan Details of a Customer:

Using this option the user needs to provide the cust_no of a customer through user input and all the information of that customer along with his loan_no, loan amount, branch_code, branch_name and branch_city will be displayed in proper format.

7. Deposit Money to an Account:

Using this option the user needs to provide the account_no of a customer and the amount to be deposited through user input. According to the deposited amount the updated balance will be verified in proper format using option 5.

8. Withdraw Money from an Account:

Using this option the user needs to provide the account_no of a customer and the amount to be withdraw through user input. According to the withdraw amount the updated balance will be verified in proper format using option 5.

9. Exit the Program

The operations are choice based. Appropriate option has to be chosen from a switch case based menu driven program and the operation on the database is performed accordingly. The output is displayed in the terminal screen with appropriate messages from the database. Exceptions should be handled properly by the Java program. The output should be displayed in a formatted way for clarity of understanding and visual.

```
 import java.sql.*; import java.io.*; public class bankpro {
public static void main(String [] prgrocks)throws IOException
    {         int n; // n stores the number of rows affected by insert, update or
delete          int ch,ch1;// for user choice switch case
        Connection con=null;// connection object
        Statement stmt=null;// statement object, helps to execute sql statements through java
try
        {
            String uid="s1941012707",pwd="Iter1234#";
            // Load the driver class
            //Class.forName("oracle.jdbc.driver.OracleDriver");
            Class.forName("com.microsoft.sqlserver.jdbc.SQLServerDriver");
            // Create the connection object
            String conurl="jdbc:sqlserver://172.17.144.108;databaseName=s1941012707";
//String conurl="jdbc:oracle:thin:@172.17.144.110:1521:ora11g";// predefined
con=DriverManager.getConnection(conurl,uid,pwd);              stmt=con.createStatement();
            System.out.println("\n\n***** Banking Management System*****\n\n");
BufferedReader br= new BufferedReader(new InputStreamReader(System.in));                do
            {
            System.out.println("1: display the customer details");
            System.out.println("2: insert a customer's details");
            System.out.println("3: delete a customer's details");
            System.out.println("4: update a customer's details");
            System.out.println("5: show account details of a customer");
            System.out.println("6: show loan details of a customer");
            System.out.println("7: Deposit Money to an Account");
            System.out.println("8: Withdraw Money from an Account");
            System.out.println("9: EXIT\n");
            System.out.println("enter your choice");
ch=Integer.parseInt(br.readLine());              switch(ch)
            {
            case 1://displaying customer records
int c=0;
                String sqlstr="select * from CUSTOMER order by CUST_NO";// sql query
ResultSet rs=stmt.executeQuery(sqlstr);// ResultSet reference is a matrix
while(rs.next())
                {
                    System.out.print(rs.getString(1)+"\t\t");// these indices are the column
number of the  column
                    System.out.print(rs.getString(2)+"\t\t");
                    System.out.print(rs.getString(3)+"\t\t");
System.out.println(rs.getString(4)+"\t\t\n");                        c++;
                }
                System.out.println(c+" rows selected !!!\n\n");
```

```
                    break;
```

```
            case 2://inserting records in customer table
                System.out.println("enter the cust_no of the customer");
                String cno=br.readLine(); // readLine() is used to take string type user
input
                System.out.println("enter the name of the customer");
                String name=br.readLine();
                System.out.println("enter the phone no. of the customer");
long phn=Long.parseLong(br.readLine());
                System.out.println("enter the city of the customer");
                String city=br.readLine();
                String insstr="insert into CUSTOMER
values('"+cno+"','"+name+"',"+phn+",'"+city+"')";// sql query
                n=stmt.executeUpdate(insstr);// n returns the number of rows
added                    System.out.println(n+" \nrows inserted\n\n");
break;
            case 3:// delete the details of a customer
                System.out.println("enter the cust_no of the customer");
                String cn=br.readLine(); // readLine() is used to take string type user
input                    String delstr="delete from CUSTOMER where CUST_NO='"+cn+"'";// sql
query                    n=stmt.executeUpdate(delstr);// n returns the number of rows added
System.out.println("\n"+n+" rows deleted\n");                    break;
            case 4: // update the record's of a customer
                System.out.println("enter the cust_no of the customer");
                String cn4=br.readLine();                    String updstr="";//
since it is getting modified inside switch case
                System.out.println("1: Update name of the customer");
                System.out.println("2: Update phone_no of the customer");
                System.out.println("3: Update city of the
customer");                    System.out.println("enter your
choice\n");                    ch1=Integer.parseInt(br.readLine());
switch(ch1)
                {
case 1:
                        System.out.println("enter the name of the customer");
String name4=br.readLine();
                        updstr="update CUSTOMER set NAME='"+name4+"'
where CUST_NO='"+cn4+"'";// sql query                        break;
case 2:
                        System.out.println("enter the phone no. of the customer");
long phn4=Long.parseLong(br.readLine());
                        updstr="update CUSTOMER set PHONE_NO="+phn4+"
where CUST_NO='"+cn4+"'";// sql query                        break;
case 3:
                        System.out.println("enter the city of the customer");
String city4=br.readLine();
                        updstr="update CUSTOMER set CITY='"+city4+"'
where CUST_NO='"+cn4+"'";// sql query                        break;
                }
```

```
                n=stmt.executeUpdate(updstr);// n returns the number of rows
added                   System.out.println("\n"+n+" rows updated\n");
break;
```

```
            case 5: //Show Account Details of a Customer
```

```
                System.out.println("enter the cust_no of the customer");
                String cn5=br.readLine();
                String sqlstr5="select * from CUSTOMER natural join DEPOSITOR natural
join  ACCOUNT natural join BRANCH where CUST_NO="'"+cn5+"'";
                ResultSet rs5=stmt.executeQuery(sqlstr5);// ResultSet reference is a matrix
System.out.println("\nCUST_NO\tNAME\t\tPHONE_NO\tCITY\tACC_NO\tTYPE\tBALANCE\
tBR_CODE\tBRANCH_NAME\tBRANCH_CITY\n");                while(rs5.next())
                {
                    System.out.print(rs5.getString("cust_no")+"\t");// these indices are the
column number of the column
                    System.out.print(rs5.getString("name")+"\t");
                    System.out.print(rs5.getString("phone_no")+"\t");
                    System.out.print(rs5.getString("city")+"\t");
                    System.out.print(rs5.getString("account_no")+"\t");
                    System.out.print(rs5.getString("type")+"\t");
                    System.out.print(rs5.getString("balance")+"\t");
                    System.out.print(rs5.getString("branch_code")+"\t");
                    System.out.print(rs5.getString("branch_name")+"\t");
                    System.out.println(rs5.getString("branch_city")+"\n");
                }            break;
case 6: //Show Loan Details of a Customer
int z=0;
                System.out.println("enter the cust_no of the customer");
                String cn6=br.readLine();
                String sqlstr6="select * from CUSTOMER natural join LOAN natural
join  BRANCH where CUST_NO="'"+cn6+"'";
                ResultSet rs6=stmt.executeQuery(sqlstr6);// ResultSet reference is a matrix

System.out.println("\nCUST_NO\tNAME\t\tPHONE_NO\tCITY\tLOAN_NO\tAMOUNT\tBR_CO
DE\tBRANCH_NAME\tBRANCH_CITY\n");                while(rs6.next())
                {
                    System.out.print(rs6.getString("cust_no")+"\t");// these indices are the
column number of the column
                    System.out.print(rs6.getString("name")+"\t");
                    System.out.print(rs6.getString("phone_no")+"\t");
                    System.out.print(rs6.getString("city")+"\t");
                    System.out.print(rs6.getString("loan_no")+"\t");
                    System.out.print(rs6.getString("amount")+"\t");
                    System.out.print(rs6.getString("branch_code")+"\t");
                    System.out.print(rs6.getString("branch_name")+"\t");
System.out.println(rs6.getString("branch_city")+"\n");
z++;                 }                if(z==0)
                    System.out.println("congrats !!! you have no loan\n\n");
break;
            case 7://Deposit Money to an Account
                System.out.println("enter the account number");
                String acc7=br.readLine();
                System.out.println("enter the amount to be deposited");
int amt7=Integer.parseInt(br.readLine());
                String sqlstr71="select BALANCE from ACCOUNT where ACCOUNT_NO="'"+acc7+"'";
```

```
ResultSet rs71=stmt.executeQuery(sqlstr71);// ResultSet reference is a matrix
```

```
            System.out.print("Previous balance is: \t");
```

```
                while(rs71.next())
                    System.out.println(rs71.getString("balance")+"\n");
updstr="update ACCOUNT set BALANCE=BALANCE+"+amt7+" where
ACCOUNT_NO="+acc7+"'";// sql query
n=stmt.executeUpdate(updstr);// n returns the number of rows added
                //System.out.println("\n"+n+" rows updated\n");
                String sqlstr72="select BALANCE from ACCOUNT where ACCOUNT_NO='"+acc7+"'";
                ResultSet rs72=stmt.executeQuery(sqlstr72);// ResultSet reference is a
matrix                    System.out.print("Updated balance is: \t");
while(rs72.next())

System.out.println(rs72.getString("balance")+"\n");                break;
case 8://Withdraw Money from an Account                    int bal8=0;
                System.out.println("enter the account number");
                String acc8=br.readLine();
                System.out.println("enter the amount to be withdraw");
int amt8=Integer.parseInt(br.readLine());
                String sqlstr81="select BALANCE from ACCOUNT where ACCOUNT_NO='"+acc8+"'";
                ResultSet rs81=stmt.executeQuery(sqlstr81);// ResultSet reference is a
matrix                    System.out.print("Previous balance  is:  \t");
while(rs81.next())
                {
                    System.out.println(rs81.getString("balance")+"\n");
bal8=Integer.parseInt(rs81.getString("balance"));
                }
if(bal8>=amt8)
                {
                    updstr="update ACCOUNT set BALANCE=BALANCE-"+amt8+" where
ACCOUNT_NO="+acc8+"'";// sql query
n=stmt.executeUpdate(updstr);// n returns the number of rows added
                    //System.out.println("\n"+n+" rows updated\n");
                    String sqlstr82="select BALANCE from ACCOUNT where
ACCOUNT_NO="+acc8+"'";
                    ResultSet rs82=stmt.executeQuery(sqlstr82);// ResultSet reference is a
matrix
                    System.out.print("Updated balance is: \t");
while(rs82.next())
                    System.out.println(rs82.getString("balance")+"\n");
                }
else
                    System.out.println("Insufficient Balance !!!!!\n");
break;
            case 9: //exit case
stmt.close();                    con.close();
                System.out.println("\nThank
you\n");                    System.exit(0);
break;              default:
                System.out.println("\nWrong choice\n");
```

```
                    }// end of switch case
}// end of do block
while(ch!=9);
          }// end of try block
```

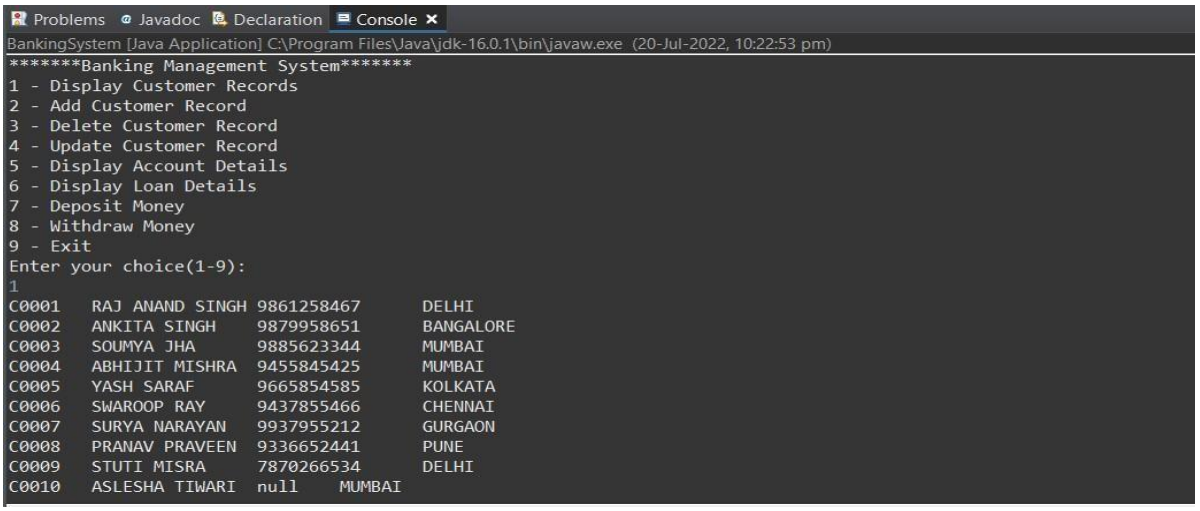
```
        catch(Exception e)
```

```
        {
            System.out.println(e);
```

Test Cases:

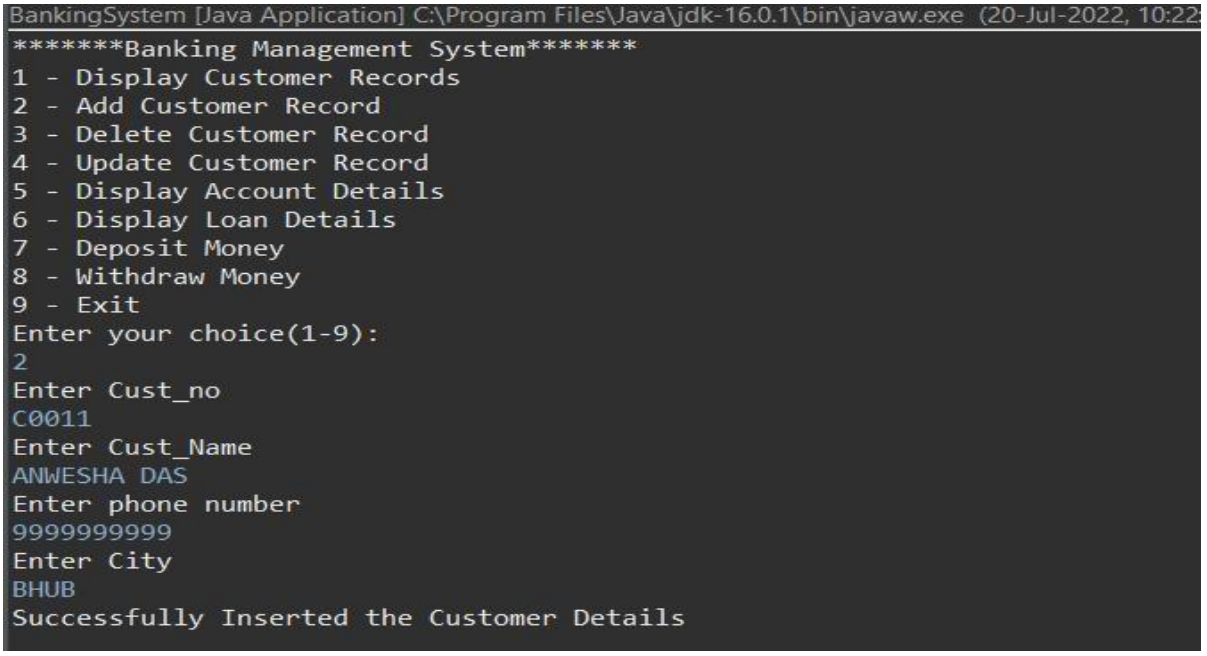
1. The program should able to produce correct answer or appropriate error message corresponding to the following test cases:

Show Customer Records:



2. Add Customer Record:

<C0011, ANWESHA DAS, 9999999999, BHUB>



< C0012,SACHIN SINGH, 9898989898,CTC>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
2
Enter Cust_no
C0012
Enter Cust_Name
SACHIN SINGH
Enter phone number
9898989898
Enter City
CTC
Successfully Inserted the Customer Details
```

<C0013, ARJUN MISHRA, 7777777777, BBSR>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
2
Enter Cust_no
C0013
Enter Cust_Name
ARJUN MISHRA
Enter phone number
7777777777
Enter City
BBSR
Successfully Inserted the Customer Details
```

```
C0001   RAJ ANAND SINGH 9861258467      DELHI
C0002   ANKITA SINGH    9879958651      BANGALORE
C0003   SOUMYA JHA      9885623344      MUMBAI
C0004   ABHIJIT MISHRA  9455845425      MUMBAI
C0005   YASH SARAF      9665854585      KOLKATA
C0006   SWAROOP RAY     9437855466      CHENNAI
C0007   SURYA NARAYAN   9937955212      GURGAON
C0008   PRANAV PRAVEEN  9336652441      PUNE
C0009   STUTI MISRA     7870266534      DELHI
C0010   ASLESHA TIWARI  null    MUMBAI
C0011   ANWESHA DAS     9999999999      BHUB
C0012   SACHIN SINGH    9898989898      CTC
C0013   ARJUN MISHRA    7777777777      BBSR
```

3 Delete Customer Record:

<C0013>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
3
Enter the CUST_NO
C0013
Successfully Deleted
```

<C0016>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
3
Enter the CUST_NO
C0016
No such Cust id found
```

4 Update Customer Record for any attribute except Customer Number:

<C0011> [Update each column once]

Update Customer Name:

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
4
Enter 1: For Name 2: For Phone no 3: For City to update:
1
Enter CUST_NO
C0012
State the updated Name
SAHIL KANUNGO
Customer name updated successfully
```

Update Customer Phone Number:

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
4
Enter 1: For Name 2: For Phone no 3: For City to update:
2
Enter CUST_NO
c0012
State the updated Phone No
9843512902
Customer PHONE NO updated successfully
```

Update Customer City:

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
4
Enter 1: For Name 2: For Phone no 3: For City to update:
3
Enter CUST_NO
c0012
State the updated City
BPT
Customer CITY updated successfully
```

5 Show Account Details of a Customer:

<C0003>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
5
Enter the CUST_NO
C0003
A0001   SB      200000  JUHU BRANCH     MUMBAI
```

<C0005>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
5
Enter the CUST_NO
C0005
No Account Details for the C0005 found
```

<C0016>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
5
Enter the CUST_NO
C0016
No Account Details for the C0016 found
```

6. Show Loan Details of a Customer:

<C0003>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
6
Enter Customer Number
C0003
Congratulation NO LOAN AMOUNT for C0003
```

<c0005>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
6
Enter Customer Number
c0005
LOAN AMOUNT of CUSTOMER_ID ( c0005 )is  3000000
```

<C0008>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
6
Enter Customer Number
C0008
LOAN AMOUNT of CUSTOMER_ID ( C0008 )is  25000
```

<C0016>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
6
Enter Customer Number
C0016
Congratulation NO LOAN AMOUNT for C0016
```

7. Deposit Money to an Account:

<A0008, 800>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
7
Enter the account number , You want to deposit
A0008
Amount of money , You want to deposit !
800
Transaction Successfully
```

<A0005, 10000>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
7
Enter the account number , You want to deposit
A0005
Amount of money , You want to deposit !
10000
Transaction Successfully
```

8. Withdraw Money from an Account:

<A0008, 800>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
8
Enter the account number , You want to withdraw
A0008
Amount of money , You want to withdraw!
800
Are you sure want to withdraw ?????????
Type yes or no
YES
Successfully withdraw the money
```

<A0008, 8000>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
8
Enter the account number , You want to withdraw
A0008
Amount of money , You want to withdraw!
8000
Are you sure want to withdraw ?????????
Type yes or no
YES
Successfully withdraw the money
```

<A0005, 10000>

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
8
Enter the account number , You want to withdraw
a0005
Amount of money , You want to withdraw!
10000
Are you sure want to withdraw ?????????
Type yes or no
Yes
Successfully withdraw the money
```

9. Exit the Program

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
9
Exit Successfully
```

10. Enter choice 10

```
*******Banking Management System*******
1 - Display Customer Records
2 - Add Customer Record
3 - Delete Customer Record
4 - Update Customer Record
5 - Display Account Details
6 - Display Loan Details
7 - Deposit Money
8 - Withdraw Money
9 - Exit
Enter your choice(1-9):
10
No such option exists in the menu
Option ranges from 0-9
```