

# Final Project

## Introduction to Database

**Section: J**

**Group 02**

**Project Title: Nursery Management System**

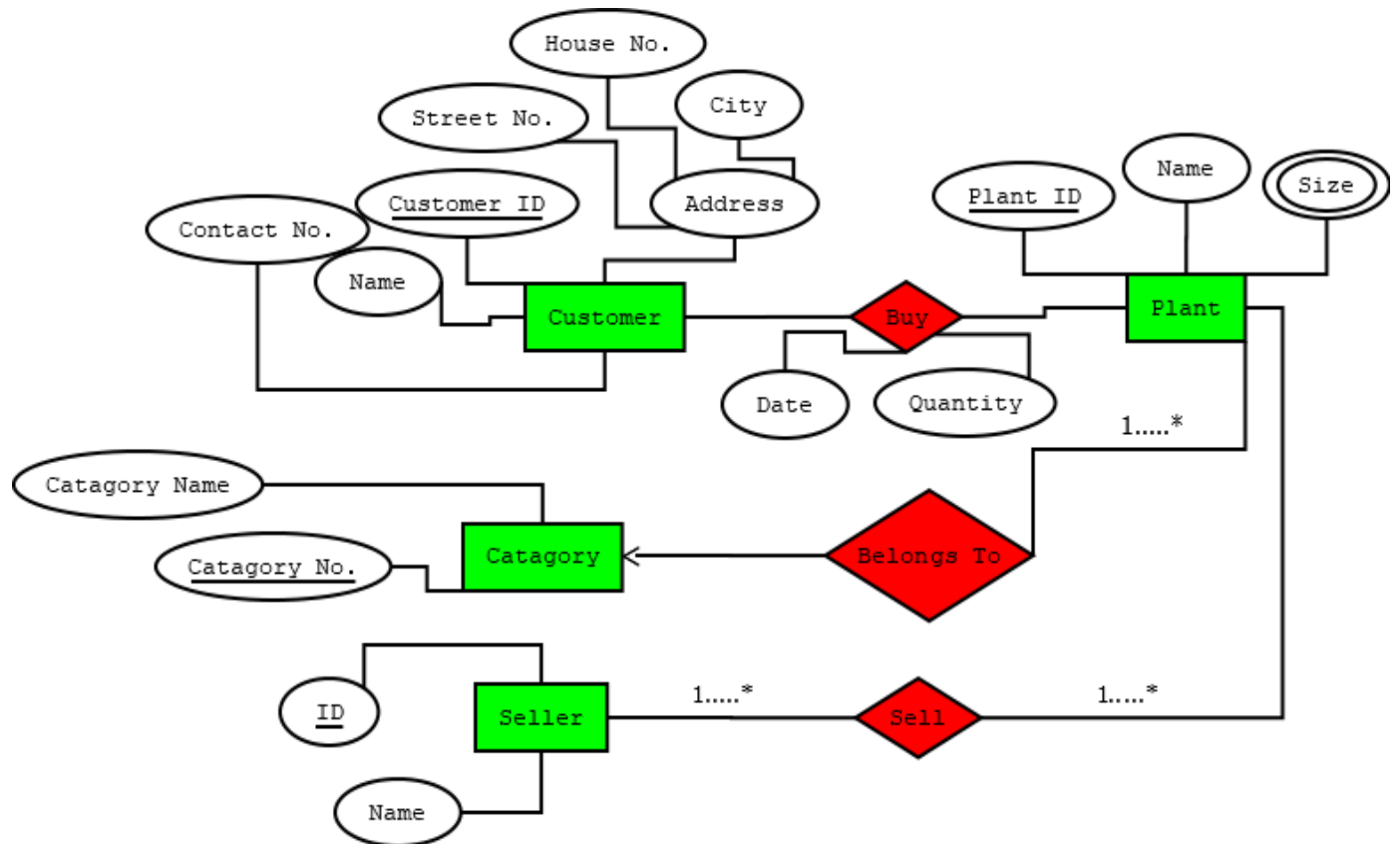
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## **ER Diagram Paragraph**

In a nursery management system, many customers may buy many plants. One plant may be bought by exactly one customer. A customer is identified by a customer number. The system also stores customer name, contact number and address. A customer address is composed of house number, street name and city. A plant is identified by plant ID. Plant name and size of a plant are also stored. There may be multiple size of a plant. While buying, the date of the buying and quantity number of the plant is stored. A plant belongs to exactly one category and for a category there must be at least one plant. Each category has a name and the unique property of each category is a category number. In this nursery many workers work called seller. A plant is sold by at least one seller. A seller may sell many plants but the system stores information of those sellers of who has sold at least one plant have in the nursery. To identify a seller, the system stores seller ID along with seller name.

## ER Diagram



## Normalization

**Buy: -**

**UNF:**

Customer ID, Name, Contact\_No., Address, Street\_No., House\_No, City, Date, Quantity, Plant ID, Name, Size

Size is a multivalued attribute.

**1NF:**

Customer ID, Size, Plant ID, Name, Contact\_No., Address, Street\_No., House\_No, City, Date, Quantity, Name

**2NF:**

1. Customer ID, Name, Contact\_No., Street\_No., House\_No, City, Date, Quantity
2. Plant ID, Name, Size

**3NF:**

1. Customer ID, Name, Contact\_No., Date, Quantity
2. Address id, Street\_No., House\_No, City
3. Plant ID, Name, Size

## Total table from buy:

1. Customer ID, Name, Contact\_No., Date, Quantity, Address id
2. Address id, Street\_No., House\_No, City.
3. Plant ID, Name, Customer ID
4. Plant ID, Size. (Composite key)

**Belongs\_To: -**

**UNF:**

Category ID, Category\_Name, Plant ID, Name, Size

**Size is a multivalued attribute.**

**1NF:** Category ID, Size, Plant ID, Category\_Name, Name

**2NF:**

1. Category ID, Category\_Name
2. Plant ID, Name, Size

**3NF:**

1. Category ID, Category\_Name
2. Plant ID, Name, Size

### **Total table from Belongs\_To**

5. Category ID, Category\_Name
6. Plant ID, Name, Category ID
7. Plant ID, Size. (Composite key)

**Sell: -**

**UNF:**

ID, Name, Plant ID, Name, Size

**Size is a multivalued attribute.**

**1NF:**

ID, Size, Plant ID, Name, Name,

**2NF:**

1. ID, Name
2. Plant ID, Name, Size

**3NF:**

1. ID, Name
2. Plant ID, Name, Size

**Total table from sell:**

8. ID, Name
9. Plant ID, Name, ID
10. Plant ID, Size. (Composite key)

## **Total Table**

1. **Customer ID**, Name, Contact\_No., Date, Quantity, **Address id**
2. **Address id**, Street\_No., House\_No, City.
3. **Plant ID**, Name, **Customer ID, ID, Category ID**
4. **Plant ID**, **Size**.
5. **Category ID**, Category\_Name
6. **ID**, Name

# Table Creation

## 01.Customer Info:

CREATE TABLE Customer\_Info

( Customer\_ID NUMBER(5) CONSTRAINT PK\_CUSTOMER PRIMARY KEY,

Name VARCHAR2(20),

Contact\_No NUMBER(15) NOT NULL,

Date\_IN DATE,

Quantity NUMBER(10),

Address\_id NUMBER(5) CONSTRAINT Address\_FK REFERENCES  
Customer\_Address\_Details);

## Screenshot:

The screenshot shows the Oracle Database Express Edition SQL Commands window. The user is SCOTT. The command entered is `describe Customer_Info`. The results show the table structure for **CUSTOMER\_INFO**.

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMER_INFO	CUSTOMER_ID	Number	-	5	0	1	-	-	-
	NAME	Varchar2	20	-	-	-	✓	-	-
	CONTACT_NO	Number	-	15	0	-	-	-	-
	DATE_IN	Date	7	-	-	-	✓	-	-
	QUANTITY	Number	-	10	0	-	✓	-	-
	ADDRESS_ID	Number	-	5	0	-	✓	-	-

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5:27 AM  
8/19/2021



## 02. Customer Address Details:

CREATE TABLE Customer\_Address\_Details

( Address\_id NUMBER(5) CONSTRAINT PK\_Address\_ID PRIMARY KEY,

Street\_No NUMBER(5),

House\_No NUMBER(5),

City VARCHAR2(20));

## Screenshot:

The screenshot shows the Oracle Database Express Edition SQL Commands window. The command entered is `describe Customer_Address_Details`. The results show the table structure for **CUSTOMER\_ADDRESS\_DETAILS**.

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMER_ADDRESS_DETAILS	ADDRESS_ID	Number	-	5	0	1	-	-	-
	STREET_NO	Number	-	5	0	-	✓	-	-
	HOUSE_NO	Number	-	5	0	-	✓	-	-
	CITY	Varchar2	20	-	-	-	✓	-	-

1 - 4

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### 03. Plant Info:

CREATE TABLE Plant\_Info

( Plant\_ID NUMBER(5) CONSTRAINT PK\_Plant\_ID PRIMARY KEY,

Name VARCHAR2(20),

Customer\_ID NUMBER(5) CONSTRAINT Customer\_FK REFERENCES Customer\_Info,

ID NUMBER(5) CONSTRAINT ID\_FK REFERENCES Seller\_Info,

Category\_ID NUMBER(5) CONSTRAINT Category\_ID\_FK REFERENCES  
Category\_Details);

### Screenshot:

The screenshot shows the Oracle Database Express Edition SQL Commands window. The user is SCOTT. The command entered is `describe Plant_Info`. The results show the structure of the `PLANT_INFO` table.

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
PLANT_INFO	PLANT_ID	Number	-	5	0	1	-	-	-
	NAME	Varchar2	20	-	-	-	✓	-	-
	CUSTOMER_ID	Number	-	5	0	-	✓	-	-
	ID	Number	-	5	0	-	✓	-	-
	CATEGORY_ID	Number	-	5	0	-	✓	-	-

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## 4. Plant Size Info:

CREATE TABLE Plant\_Size\_Info

(Plant\_ID NUMBER(10),

Sz NUMBER(5),

CONSTRAINT PLANTSIZE\_PK PRIMARY KEY(Plant\_ID,Sz));

## Screenshot:

The screenshot shows the Oracle Database Express Edition interface. The SQL Commands window contains the following text:

```
CREATE TABLE Plant_Size_Info  
(Plant_ID NUMBER(10),  
Sz number(5),  
CONSTRAINT plantsize_pk PRIMARY KEY(Plant_ID,Sz));  
  
describe Plant_Size_Info
```

The Results tab is selected, displaying the following table structure for the PLANT\_SIZE\_INFO table:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
PLANT_SIZE_INFO	PLANT_ID	Number	-	10	0	1	-	-	-
	SZ	Number	-	5	0	2	-	-	-

At the bottom right, there is a watermark for "Activate Windows" and "Go to Settings to activate Windows." The footer of the application shows "Application Express 2.1.0.00.39" and "Copyright © 1999, 2006, Oracle. All rights reserved."

## 05. Category Details:

CREATE TABLE Category\_Details

(Category\_ID NUMBER(5) CONSTRAINT PK\_Category\_ID PRIMARY KEY,

Category\_Name VARCHAR2(20));

## Screenshot:

The screenshot shows the Oracle SQL Developer interface. The top toolbar includes buttons for Autocommit, Display, and a dropdown menu. The main text area contains the SQL command: `describe Category_Details`. Below the command area, the 'Results' tab is active, displaying the table structure for 'CATEGORY\_DETAILS'.

Object Type: TABLE Object: CATEGORY\_DETAILS

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CATEGORY_DETAILS	CATEGORY_ID	Number	-	5	0	1	-	-	-
	CATEGORY_NAME	Varchar2	20	-	-	-	✓	-	-

Language: en-us

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## 06. Seller Info:

CREATE TABLE Seller\_Info

(ID NUMBER(5) CONSTRAINT PK\_ID PRIMARY KEY,

Name VARCHAR2(20));

## Screenshot:

User: SCOTT

Home > SQL > SQL Commands

☒ Autocommit Display 100 Save Run

describe Seller\_Info

Results Explain Describe Saved SQL History

Object Type **TABLE** Object **SELLER\_INFO**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
SELLER_INFO	ID	Number	-	5	0	1	-	-	-
	NAME	Varchar2	20	-	-	-	✓	-	-
1 - 2									

Language: en-us

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# Data Insertion

## 01. Customer Info:

```
INSERT INTO Customer_Info VALUES(101,'X',01729463361,'17-AUG-21',10,201);
```

```
INSERT INTO Customer_Info VALUES(102,'Y',01729293361,'10-JUL-21',2,202);
```

```
INSERT INTO Customer_Info VALUES(103,'Z',01729203661,'20-AUG-21',5,203);
```

```
SELECT * FROM Customer_Info;
```

## Screenshot:

The screenshot displays the Oracle Database Express Edition SQL Commands window. The user is SCOTT. The SQL Commands window shows the following commands:

```
Autocommit Display 100
INSERT INTO Customer_Info VALUES(101,'X',01729463361,'17-AUG-21',10,201)
INSERT INTO Customer_Info VALUES(102,'Y',01729293361,'10-JUL-21',2,202)
INSERT INTO Customer_Info VALUES(103,'Z',01729203661,'20-AUG-21',5,203)
Select * from Customer_Info
desc Customer_Info
```

The Results tab shows the following data:

CUSTOMER_ID	NAME	CONTACT_NO	DATE_IN	QUANTITY	ADDRESS_ID
101	X	1729463361	17-AUG-21	10	201
102	Y	1729293361	10-JUL-21	2	202
103	Z	1729203661	20-AUG-21	5	203

3 rows returned in 0.06 seconds [CSV Export](#)

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## 02. Customer Address Details:

INSERT INTO Customer\_Address\_Details VALUES(201,04,21,'BANGLADESH');

INSERT INTO Customer\_Address\_Details VALUES(202,06,61,'BANGLADESH');

INSERT INTO Customer\_Address\_Details VALUES(203,07,34,'BANGLADESH');

INSERT INTO Customer\_Address\_Details VALUES(204,09,39,'JAPAN');

SELECT \* FROM Customer\_Address\_Details;

## Screenshot:

The screenshot shows the Oracle Database Express Edition interface. The SQL Commands window contains the following SQL statements:

```
INSERT INTO Customer_Address_Details VALUES(201,04,21,'BANGLADESH');
INSERT INTO Customer_Address_Details VALUES(202,06,61,'BANGLADESH');
INSERT INTO Customer_Address_Details VALUES(203,07,34,'BANGLADESH');
INSERT INTO Customer_Address_Details VALUES(204,09,39,'JAPAN');

select *
from Customer_Address_Details;
```

The Results tab shows the output of the SELECT statement:

ADDRESS_ID	STREET_NO	HOUSE_NO	CITY
204	9	39	JAPAN
201	4	21	BANGLADESH
202	6	61	BANGLADESH
203	7	34	BANGLADESH

4 rows returned in 0.12 seconds [CSV Export](#)

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### 03. Plant Info:

INSERT INTO Plant\_Info VALUES(301,'X',101,601,501);

INSERT INTO Plant\_Info VALUES(302,'Y',102,602,502);

INSERT INTO Plant\_Info VALUES(303,'Z',103,603,501);

SELECT \* FROM Plant\_Info;

### Screenshot:

The screenshot shows the Oracle Database Express Edition SQL Commands window. The user is SCOTT. The SQL Commands window contains the following text:

```
Autocommit Display 100
INSERT INTO Plant_Info VALUES(301,'X',101,601,501);
INSERT INTO Plant_Info VALUES(302,'Y',102,602,502);
INSERT INTO Plant_Info VALUES(303,'Z',103,603,501);

select * from Plant_Info

desc Plant_Info
```

The Results tab is selected, showing the following table:

PLANT_ID	NAME	CUSTOMER_ID	ID	CATEGORY_ID
301	X	101	601	501
302	Y	102	602	502
303	Z	103	603	501

3 rows returned in 0.17 seconds [CSV Export](#)

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## 04. Plant\_Size\_Info:

```
INSERT INTO Plant_Size_Info VALUES(301,12);
INSERT INTO Plant_Size_Info VALUES(301,05);
INSERT INTO Plant_Size_Info VALUES(302,10);
INSERT INTO Plant_Size_Info VALUES(302,12);
INSERT INTO Plant_Size_Info VALUES(401,12);
INSERT INTO Plant_Size_Info VALUES(401,05);
INSERT INTO Plant_Size_Info VALUES(402,12);
INSERT INTO Plant_Size_Info VALUES(402,15);
INSERT INTO Plant_Size_Info VALUES(403,15);
```

```
SELECT * FROM Plant_Size_Info;
```

## Screenshot:

The screenshot shows a web-based SQL interface. The top bar includes a browser address bar with the URL `127.0.0.1:8080/apex/f?p=4500:1003:4221427192553573::NO::` and a toolbar with various utility icons. The main area is titled "SQL Commands" and contains a text editor with the following SQL code:

```
Autocommit Display 100
INSERT INTO Plant_Size_Info VALUES(401,12)
INSERT INTO Plant_Size_Info VALUES(401,05)
INSERT INTO Plant_Size_Info VALUES(402,12)
INSERT INTO Plant_Size_Info VALUES(402,15)
INSERT INTO Plant_Size_Info VALUES(403,15)

select * from Plant_Size_Info

desc Plant_Size_Info
```

Below the editor, there are tabs for "Results", "Explain", "Describe", "Saved SQL", and "History". The "Results" tab is active, displaying a table with the following data:

PLANT_ID	SZ
301	5
301	12
302	10
302	12
401	5
401	12
402	12
402	15
403	15

At the bottom of the results section, it states "9 rows returned in 0.00 seconds" and provides a "CSV Export" link. The bottom of the window shows a Windows taskbar with the search bar, application icons, and system clock indicating 12:33 AM on 8/20/2021.

## 05. Category Details:

INSERT INTO Category\_Details VALUES(501,'X');

INSERT INTO Category\_Details VALUES(502,'Y');

INSERT INTO Category\_Details VALUES(503,'Z');

SELECT \* FROM Category\_Details;

## Screenshot:

The screenshot displays the Oracle SQL Developer application. The top toolbar includes buttons for 'Autocommit' (checked), 'Display' (set to 100), 'Save', and 'Run'. The main text area contains the following SQL commands:

```
INSERT INTO Category_Details VALUES(501,'X');
INSERT INTO Category_Details VALUES(502,'Y');
INSERT INTO Category_Details VALUES(503,'Z');

select * from Category_Details
```

Below the SQL editor, the 'Results' tab is active, showing a table with the following data:

CATEGORY_ID	CATEGORY_NAME
501	X
502	Y
503	Z

Below the table, it states '3 rows returned in 0.68 seconds' and provides a 'CSV Export' link. The bottom status bar shows 'Language: en-us' and 'Application Express 2.1.0.0.39 Copyright © 1999, 2006, Oracle. All rights reserved.'

## 06. Seller Info

INSERT INTO Seller\_Info VALUES(601,'X');

INSERT INTO Seller\_Info VALUES(602,'Y');

INSERT INTO Seller\_Info VALUES(603,'Z');

SELECT \* FROM Seller\_Info;

### Screenshot:

The screenshot shows a web-based SQL interface. The top navigation bar includes links for Apps, My Portal, AIUB Mail, Notice (AIUB), SQL (10g), Grammarly, BYLCx, Plagiarism Checker, Paraphrasing Tool, Text Summarization..., ACS, and a Reading list. The user is logged in as SCOTT. The main area is titled 'SQL Commands' and contains the following SQL code:

```
INSERT INTO Seller_Info VALUES(601,'X');
INSERT INTO Seller_Info VALUES(602,'Y');
INSERT INTO Seller_Info VALUES(603,'Z');
Select * from Seller_Info
```

Below the code editor, the 'Results' tab is active, displaying a table with the following data:

ID	NAME
601	X
602	Y
603	Z

Below the table, it states '3 rows returned in 0.20 seconds' and provides a 'CSV Export' link. The bottom status bar shows 'Language: en-us', 'Application Express 2.1.0.00.39', and 'Copyright © 1999, 2006, Oracle. All rights reserved.' The Windows taskbar at the bottom shows the time as 7:30 AM on 8/19/2021.

# Joining

## Equijoin:

### Question:

Display plant id, plant name, customer id and plant size.

### Query:

```
select pi.plant_id, pi.name "Plant Name", pi.customer_id, psi.sz "Plant Size"
from plant_info pi, plant_size_info psi
where pi.plant_id=psi.plant_id;
```

### Screenshot:

The screenshot shows the Oracle Database Express Edition interface. The SQL Commands window contains the following query:

```
select pi.plant_id, pi.name "Plant Name", pi.customer_id, psi.sz "Plant Size"
from plant_info pi, plant_size_info psi
where pi.plant_id=psi.plant_id;
```

The query is executed, and the Results tab shows the following data:

PLANT_ID	Plant Name	CUSTOMER_ID	Plant Size
301	X	101	5
301	X	101	12
302	Y	102	10
302	Y	102	12

4 rows returned in 0.08 seconds. CSV Export

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## Outer join:

### Question:

Display plant name, Customer id, all plant id and all plant size

### Query:

```
select pi.name "Plant Name", pi.customer_id, psi.Plant_id, psi.sz "Plant Size"
from plant_info pi,plant_size_info psi
where pi.plant_id(+)=psi.plant_id;
```

### Screenshot:

The screenshot shows the Oracle Database Express Edition interface. The browser address bar indicates the URL: 127.0.0.1:8080/apex/f?p=4500:1003:3473832983457288::NO::: SQL Commands. The page title is "ORACLE Database Express Edition". The user is logged in as "SCOTT". The breadcrumb navigation shows "Home > SQL > SQL Commands".

The SQL query is entered in the "SQL Commands" text area:

```
select pi.name "Plant Name", pi.customer_id, psi.Plant_id, psi.sz "Plant Size"
from plant_info pi,plant_size_info psi
where pi.plant_id(+)=psi.plant_id;
```

The query is executed, and the results are displayed in a table. The table has four columns: "Plant Name", "CUSTOMER\_ID", "PLANT\_ID", and "Plant Size". There are 9 rows returned.

Plant Name	CUSTOMER_ID	PLANT_ID	Plant Size
X	101	301	5
X	101	301	12
Y	102	302	10
Y	102	302	12
-	-	401	5
-	-	401	12
-	-	402	12
-	-	402	15
-	-	403	15

9 rows returned in 0.00 seconds [CSV Export](#)

Activate Windows  
Go to Settings to activate Windows.

## Self-join:

### Question:

Display customer id and customer address using self-join

### Query:

```
select ci1.customer_id, ci2.address_id
from Customer_info ci1, Customer_info ci2
where ci1.customer_id=ci2.customer_id;
```

### Screenshot:

The screenshot shows the Oracle Database Express Edition interface. The SQL Commands window contains the following query:

```
select ci1.customer_id, ci2.address_id
from Customer_info ci1, Customer_info ci2
where ci1.customer_id=ci2.customer_id;
```

The query is executed, and the Results tab shows the following data:

CUSTOMER_ID	ADDRESS_ID
101	201
102	202
103	203

3 rows returned in 0.00 seconds

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## Subquery

## 01. Question:

Display all information of X.

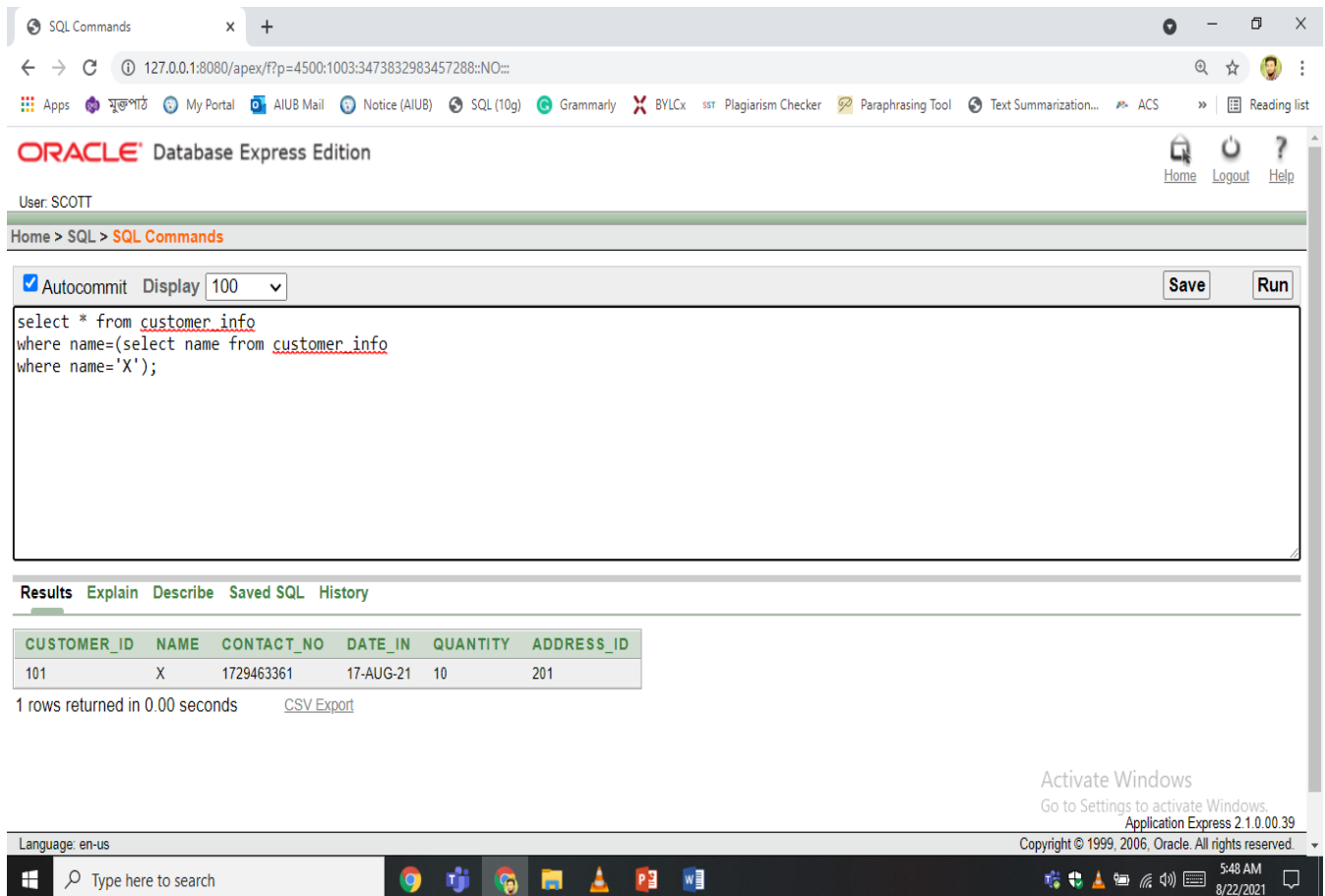
**Query:**

```
select * from customer_info
```

where name=(select name from customer\_info

```
where name='X');
```

### Screenshot:



## 02. Question:

Display Maximum home area.

## Query:

```
select *
```

```
from Customer_Address_Details
```

```
where city=(select max(city)
```

```
from Customer_Address_Details);
```

## Screenshot:

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The browser address bar displays the URL: 127.0.0.1:8080/apex/?p=4500:1003:3473832983457288:NO... The page title is "ORACLE Database Express Edition". The user is logged in as "User: SCOTT". The breadcrumb navigation shows "Home > SQL > SQL Commands". The SQL command area contains the following query:

```
select *  
from Customer_Address_Details  
where city=(select max(city)  
from Customer_Address_Details);
```

The query is executed, and the results are displayed in a table with the following columns: ADDRESS\_ID, STREET\_NO, HOUSE\_NO, and CITY. The results show one row with the following values: 204, 9, 39, and JAPAN.

ADDRESS_ID	STREET_NO	HOUSE_NO	CITY
204	9	39	JAPAN

1 rows returned in 0.00 seconds [CSV Export](#)

At the bottom of the screenshot, there is a Windows taskbar with the search bar and several application icons. The system tray shows the time as 6:02 AM on 8/22/2021.



### 03. Question:

Display second maximum size of plant.

### Query:

```
select max(sz)
from plant_size_info
where sz < (select max(sz)
from plant_size_info);
```

### Screenshot:

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The browser address bar displays the URL: 127.0.0.1:8080/apex/f?p=4500:1003:3473832983457288::NO... The page title is "ORACLE Database Express Edition". The user is logged in as "SCOTT". The breadcrumb navigation shows "Home > SQL > SQL Commands". The SQL command area contains the following query:

```
select max(sz)
from plant_size_info
where sz < (select max(sz)
from plant_size_info);
```

The query is executed, and the results are displayed in a table with one row and one column:

MAX(SZ)
12

Below the table, it states "1 rows returned in 0.03 seconds" and provides a "CSV Export" link. The bottom of the screen shows the Windows taskbar with the time 6:08 AM on 8/22/2021.

## 04. Question:

Display all information of those customer who bought more plant than Y.

## Query:

```
select * from customer_info  
where quantity > any (select quantity  
from customer_info  
where name='Y');
```

## Screenshot:

The screenshot shows the Oracle Database Express Edition interface. The SQL Commands window contains the following query:

```
select * from customer_info  
where quantity > any (select quantity  
from customer_info  
where name='Y');
```

The query is executed, and the Results window displays the following data:

CUSTOMER_ID	NAME	CONTACT_NO	DATE_IN	QUANTITY	ADDRESS_ID
101	X	1729463361	17-AUG-21	10	201
103	Z	1729203661	20-AUG-21	5	203

2 rows returned in 0.00 seconds [CSV Export](#)

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## View (Complex view)

### Question:

Create a view of customer id, customer name and customer address from customer\_info and customer\_address\_info table

### Query:

```
create view vu1 as select ci.customer_id, ci.name, cad.address_id
from customer_info ci, customer_address_details cad
where ci.address_id=cad.address_id;
```

```
select * from vu1;
```

### Screenshot:

The screenshot shows the Oracle Database Express Edition interface. The SQL Commands window contains the following code:

```
create view vu1 as select ci.customer_id, ci.name, cad.address_id
from customer_info ci, customer_address_details cad
where ci.address_id=cad.address_id;

select * from vu1;
```

The Results window shows the output of the query:

CUSTOMER_ID	NAME	ADDRESS_ID
101	X	201
102	Y	202
103	Z	203

3 rows returned in 0.00 seconds

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## Add a constraint

### Question:

Make street no unique.

### Query:

```
alter table customer_address_details add constraint uq unique(street_no);
```

```
describe customer_address_details;
```

### Screenshot:

The screenshot shows the Oracle Database Express Edition interface. The SQL Commands window contains the following commands:

```
alter table customer_address_details add constraint uq unique(street_no);  
describe customer_address_details
```

The Results tab displays the structure of the **CUSTOMER\_ADDRESS\_DETAILS** table:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMER_ADDRESS_DETAILS	ADDRESS_ID	Number	-	5	0	1	-	-	-
	STREET_NO	Number	-	5	0	-	✓	-	-
	HOUSE_NO	Number	-	5	0	-	✓	-	-
	CITY	Varchar2	20	-	-	-	✓	-	-

At the bottom right, there is a watermark: "Activate Windows Go to Settings to activate Windows. Application Express 2.1.0.00.39 Copyright © 1999, 2006, Oracle. All rights reserved."