



American International University- Bangladesh
Department of Computer Science
Faculty of Science and Technology

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Section: C

Course	Introduction to Database	Group	03
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RESTAURANT MANAGEMENT SYSTEM

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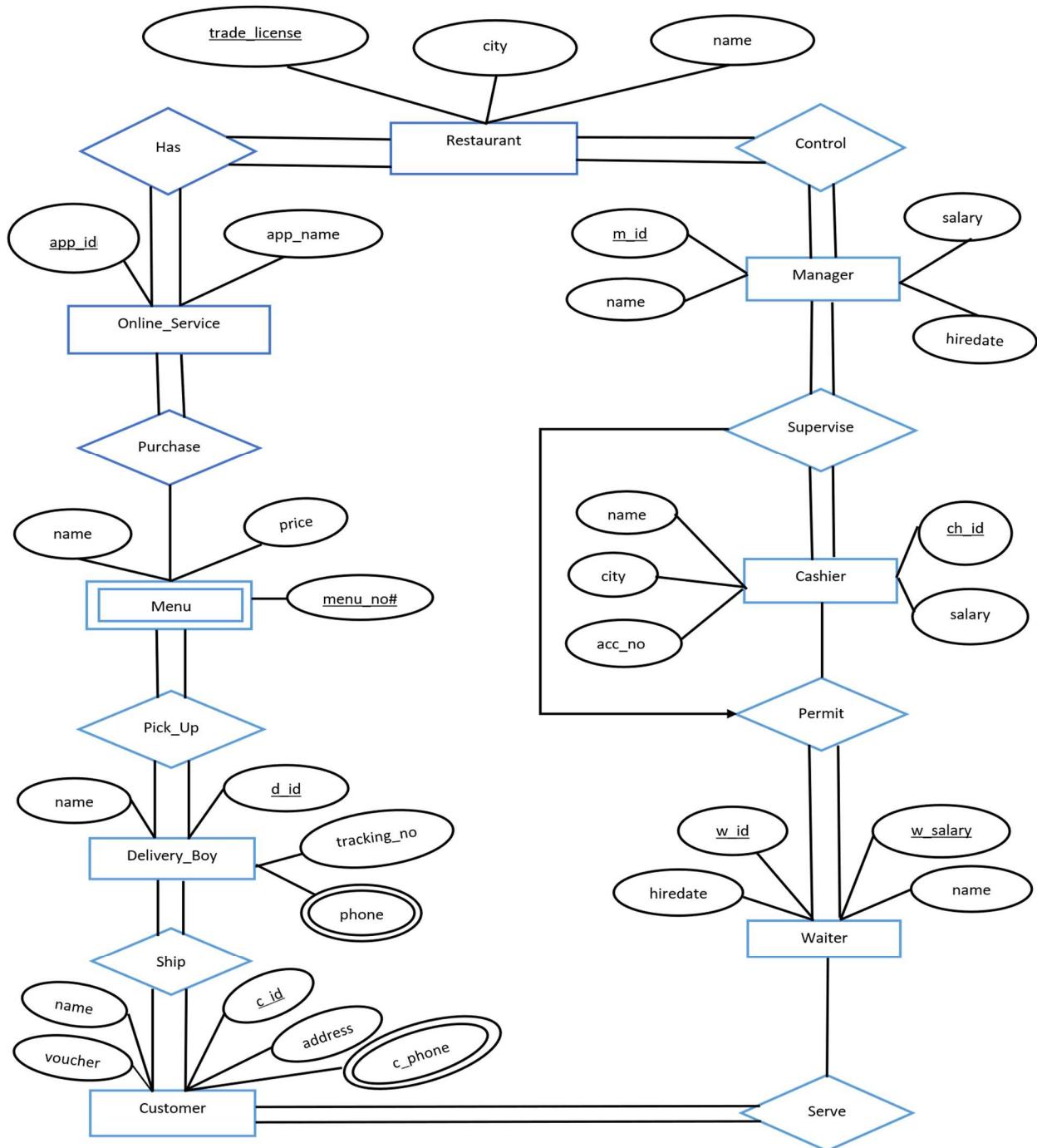
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- **Introduction:** A database management system (DBMS) is a system software for creating and managing databases. The DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data. A DBMS makes it possible for end users to create, read, update and delete data in a database. In this project, we tried to create a database system of a restaurant management using the concept of DBMS.
- **Scenario:** A restaurant management system is to automate day to day activity of a restaurant. A restaurant is a kind of business that serves people all over the world with readymade food. In the restaurant management system, restaurant will be uniquely identified by trade_license, city, and name. The restaurant has several branches throughout the country. Restaurants are controlled by a manager who will be uniquely identified by m_id, name, salary and hiredate. A cashier is supervised by a manager who will be identified by name, salary, unique ch_id, acc_no, and city. A cashier can permit many waiters. Waiters have name, salary, hiredate, and a unique w_id. Waiters serve different types of customers in restaurant. Customers are identified by name, address, a unique c_id, and a voucher. Customers are shipped their order by delivery boy. Delivery boy has unique tracking_no, phone, name, and unique d_id. A delivery boy picks up items from menu to deliver to the customer. Menu has menu_no and it will also store price and name of different food items of menu. These different items from menu are purchased by customers by using online

service. In online service, there are many app identified by app name and unique app_id by which customer can simply order their preferred food from home.

The details of the restaurant are stored into the respective tables with all columns. Each entity contains primary key. There is one to many, many to one and many to many relationship available. All the entities are normalized. The queries are written in oracle SQL.

ER DIAGRAM



(Update: Participation and Aggregation added)

Normalization

(Primary Key, Foreign Key)

Restaurant<has>Online service

HAS –

(trade_license, city, name, app_id, app_name)

1NF: no multivalued attribute

2NF: trade_license, city, name
app_id, app_name

3NF: No transitive dependency
trade_license, city, name
app_id, app_name

- Final list for Restaurant:
 1. trade_license, city, name
 2. app_id, app_name, trade_license

Online service<purchase>Menu

Purchase –

(app_id, app_name, menu_no, name, price)

1NF: no multivalued attribute

2NF: App_id, app-name

Menu_no, name, price

3NF: No transitive dependency

App_id, app_name

Menu_no, name, price

➤ Final list for purchase:

3. App_id, app_name

4. Menu_no, name, price

5. App_id, menu_no

Menu<pick up>Delivery boy

Pick up –

(menu_no, name, price, d_id, name, phone, tracking_no)

1NF: phone is a multivalued attribute

2NF: menu_no, name, price

d_id, name, phone, tracking_no

3NF: No transitive dependency

menu_no, name, price

d_id, name, phone, tracking_no

➤ Final list for pick up:

6. menu_no, name, price, d_id

7. d_id, name, tracking_no

8. d_id, phone- Composite pk

Delivery boy<Ship>Customer

Ship-

(d_id, name, phone, tracking_no, c_id, name, voucher, c_phone, address)

1NF: phone, c_phone are multivalued attributes

2NF: d_id, name, phone, tracking_no
c_id, name, voucher, c_phone, address

3NF: No transitive dependency

d_id, name, phone, tracking_no
c_id, name, voucher, c_phone, address

➤ Final list for shipped:

9. d_id, name, phone, tracking_no
10. c_id, name, voucher, c_phone, address, d_id
11. d_id, phone- Composite pk
12. c_id, c_phone- Composite pk

Customer<serve>Waiter

Serve-

(c_id, name, voucher, c_phone, address, w_id, name, w_salary, w_hiredate)

1NF: c_phone is a multivalued attribute

2NF: c_id, name, voucher, c_phone, address
w_id, name, w_salary, w_hiredate

3NF: No transitive dependency

c_id, name, voucher, c_phone, address

w_id, name, w_salary, w_hiredate

- Final list for serve:
 - 13.c_id, name, voucher, c_phone, address
 - 14. w_id, name, w_salary, w_hiredate
 - 15. c_id, c_phone, w_id- Composite pk

Waiter<permit>Cashier

Permit-

(w_id, name, w_salary, w_hiredate, ch_id, name, acc_no, salary, city)

1NF: no multivalued attribute

2NF: w_id, name, w_salary, w_hiredate
ch_id, name, acc_no, salary, city

3NF: w_id, name, w_salary, w_hiredate
ch_id, name, acc_no, salary
cc_id, city, m_id

- Final list for serve:
 - 16.w_id, name, w_salary, w_hiredate, ch_id
 - 17.ch_id, name, acc_no, salary, cc_id
 - 18.cc_id, city, m_id

Cashier<supervise>Manager

Supervise-

(ch_id, name, acc_no, salary, city, m_id, name, salary, hiredate)

1NF: no multivalued attribute

2NF: ch_id, name, acc_no, salary, city

m_id, name, salary, hiredate

3NF: ch_id, name, acc_no, salary
cc_id, city
m_id, name, salary, hiredate

- Final list for supervise:
19.ch_id, name, acc_no, salary, cc_id
20.cc_id, city, m_id
21.m_id, name, salary, hiredate

Manager<control>Restaurant

Control-

(m_id, name, salary, hiredate, trade_license, city, name)

1NF: no multivalued attribute

2NF: m_id, name, salary, hiredate
trade_license, city, name

3NF: No transitive dependency

m_id, name, salary, hiredate
trade_license, city, name

- Final list for control:
22.m_id, name, salary, hiredate, trade_license
23.trade_license, city, name

Final list from normalization

1. trade_license, city, name -> RESTAURANT
2. app_id, app_name, trade_license -> ONLINE SERVICE
3. app_id, menu_no -> ONLINE INFO
4. menu_no, name, price, d_id -> MENU
5. d_id, phone- Composite pk -> DELIVERY BOY INFO
6. d_id, name, phone, tracking_no -> DELIVERY BOY
7. c_id, name, voucher, c_phone, address, d_id -> CUSTOMER
8. c_id, c_phone, w_id - Composite pk -> CUSTOMER INFO
9. w_id, name, w_salary, w_hiredate, ch_id -> WAITER
10. cc_id, city, m_id -> CASHIER INFO
11. ch_id, name, acc_no, salary, cc_id -> CASHIER
12. m_id, name, salary, hiredate, trade_license -> MANAGER

Table Creation

Description RESTAURANT Table

```
CREATE TABLE RESTAURANT(TRADE_LICENCE NUMBER(20),CONSTRAINT  
RESTAURANT_PK_REST PRIMARY KEY(TRADE_LICENCE),CITY  
VARCHAR2(30),NAME VARCHAR2(50));
```

```
DESC RESTAURANT;
```

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The URL is 127.0.0.1:8080/apex/f?p=4500:1003:1791459908809317::NO:::. The user is SYSTEM. The SQL command window contains:

```
CREATE TABLE RESTAURANT(TRADE_LICENCE NUMBER(20),CONSTRAINT RESTAURANT_PK_REST PRIMARY KEY(TRADE_LICENCE),CITY VARCHAR2(30),NAME VARCHAR2(50));  
DESC RESTAURANT;
```

The results section shows the table structure:

Object Type	TABLE Object	RESTAURANT							
Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
RESTAURANT	TRADE_LICENCE	Number	-	20	0	1	-	-	-
	CITY	Varchar2	30	-	-	-	✓	-	-
	NAME	Varchar2	50	-	-	-	✓	-	-

Page 1 - 3

Application Express 2.1.0.00.39
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Description Online_Service Table

```
CREATE TABLE ONLINE_SERVICE(APP_ID NUMBER(10),CONSTRAINT  
ONLINE_SERVICE_PK_ON PRIMARY KEY(APP_ID), APP_NAME VARCHAR2(30),  
TRADE_LICENCE NUMBER(20),CONSTRAINT FK_ONSER FOREIGN KEY  
(TRADE_LICENCE) REFERENCES RESTAURANT(TRADE_LICENCE));
```

```
DESC ONLINE_SERVICE
```

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

```
CREATE TABLE ONLINE_SERVICE(APP_ID NUMBER(10),CONSTRAINT ONLINE_SERVICE_PK_ON PRIMARY KEY(APP_ID), APP_NAME VARCHAR2(30), TRADE_LICENCE NUMBER(20),CONSTRAINT FK_ONSER FOREIGN KEY (TRADE_LICENCE) REFERENCES RESTAURANT(TRADE_LICENCE));  
DESC ONLINE_SERVICE
```

Below the code, there is a table showing the columns of the ONLINE_SERVICE table:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
ONLINE_SERVICE	APP_ID	Number	-	10	0	1	-	-	-
	APP_NAME	Varchar2	30	-	-	-	✓	-	-
	TRADE_LICENCE	Number	-	20	0	-	✓	-	-

At the bottom of the interface, it says "Application Express 2.1 0.0 39" and "Copyright © 1999, 2006, Oracle. All rights reserved."

Description MANAGER Table

```
CREATE TABLE MANAGER (M_ID NUMBER(10),CONSTRAINT  
MANAGER_PK_MGR PRIMARY KEY(M_ID), NAME VARCHAR2(50),SALARY  
NUMBER(20), HIREDATE VARCHAR2(40),TRADE_LICENCE  
NUMBER(20),CONSTRAINT MANAGER_FK_MNGR FOREIGN  
KEY(TRADE_LICENCE) REFERENCES RESTAURANT(TRADE_LICENCE));
```

DESC MANAGER

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The SQL command window displays the creation of the MANAGER table and its description:

```
CREATE TABLE MANAGER (M_ID NUMBER(10),CONSTRAINT MANAGER_PK_MGR PRIMARY KEY(M_ID), NAME VARCHAR2(50),SALARY NUMBER(20), HIREDATE VARCHAR2(40),TRADE_LICENCE NUMBER(20),CONSTRAINT MANAGER_FK_MNGR FOREIGN KEY(TRADE_LICENCE) REFERENCES RESTAURANT(TRADE_LICENCE));  
DESC MANAGER
```

Below the command window, the results section shows the description of the MANAGER table:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
MANAGER	M_ID	Number	-	10	0	1	-	-	-
	NAME	Varchar2	50	-	-	-	✓	-	-
	SALARY	Number	-	20	0	-	✓	-	-
	HIREDATE	Varchar2	40	-	-	-	✓	-	-
	TRADE_LICENCE	Number	-	20	0	-	✓	-	-

Page number 1 - 5 is visible at the bottom right of the results table.

Description CASHIER_INFO Table

```
CREATE TABLE CASHIER_INFO( CC_ID NUMBER (10),CONSTRAINT  
CASHIER_INFO_PK_CASHIN PRIMARY KEY(CC_ID), CITY VARCHAR2(30),M_ID  
NUMBER(10),CONSTRAINT CASHIER_INFO_FK_CASH FOREIGN KEY(M_ID)  
REFERENCES MANAGER(M_ID));
```

```
DESC CASHIER_INFO
```

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The SQL command window displays the creation of the CASHIER_INFO table and its description:

```
CREATE TABLE CASHIER_INFO( CC_ID NUMBER (10),CONSTRAINT CASHIER_INFO_PK_CASHIN PRIMARY KEY(CC_ID), CITY VARCHAR2(30),M_ID NUMBER(10),CONSTRAINT CASHIER_INFO_FK_CASH FOREIGN KEY(M_ID) REFERENCES MANAGER(M_ID));  
DESC CASHIER_INFO
```

The results pane shows the table structure:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CASHIER_INFO	CC_ID	Number	-	10	0	1	-	-	-
	CITY	Varchar2	30	-	-	-	✓	-	-
	M_ID	Number	-	10	0	-	✓	-	-

Application Express 2.1.0.00.39

Description CASHIER Table

```
CREATE TABLE CASHIER( CH_ID NUMBER(10),CONSTRAINT CASHIER_PK_CASHR PRIMARY KEY (CH_ID), NAME VARCHAR2(50),ACC_NO NUMBER(20),SALARY NUMBER(10),CC_ID NUMBER (10),CONSTRAINT CASHIER_FK_CASHH FOREIGN KEY (CC_ID) REFERENCES CASHIER_INFO (CC_ID));
```

DESC CASHIER

The screenshot shows the Oracle Application Express SQL Commands interface. The top navigation bar includes 'SQL Commands', a search icon, and a URL '127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295:NO::'. Below the bar are buttons for 'Autocommit' (checked), 'Display' (set to 10), 'Save', and 'Run'. The main area contains the SQL code for creating the CASHIER table and a 'DESC CASHIER' command. A message bar at the bottom right shows a smiley face and a red circle with the number '1'. Below the code, a table displays the columns and their properties for the CASHIER table.

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CASHIER	CH_ID	Number	-	10	0	1	-	-	-
	NAME	Varchar2	50	-	-	-	✓	-	-
	ACC_NO	Number	-	20	0	-	✓	-	-
	SALARY	Number	-	10	0	-	✓	-	-
	CC_ID	Number	-	10	0	-	✓	-	-

Results Explain Describe Saved SQL History

Object Type TABLE Object CASHIER

Application Express 2.1.0.00.39
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Language: en-us

Description WAITER Table

```
CREATE TABLE WAITER(W_ID NUMBER(10), CONSTRAINT WAITER_PK_WAIT PRIMARY KEY (W_ID), W_SALARY NUMBER(10), W_HIREDATE VARCHAR2(30), CH_ID NUMBER(10), CONSTRAINT WAITER_FK_WAITR FOREIGN KEY (CH_ID) REFERENCES CASHIER (CH_ID))
```

```
DESC WAITER
```

The screenshot shows the Oracle Application Express SQL Commands interface. The URL is 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO:::.

The SQL command entered is:

```
CREATE TABLE WAITER(W_ID NUMBER(10), CONSTRAINT WAITER_PK_WAIT PRIMARY KEY (W_ID), W_SALARY NUMBER(10), W_HIREDATE VARCHAR2(30), CH_ID NUMBER(10), CONSTRAINT WAITER_FK_WAITR FOREIGN KEY (CH_ID) REFERENCES CASHIER (CH_ID))
```

The DESCRIBE command entered is:

```
DESC WAITER
```

The results section shows the table structure:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
WAITER	W_ID	Number	-	10	0	1	-	-	-
	W_SALARY	Number	-	10	0	-	✓	-	-
	W_HIREDATE	Varchar2	30	-	-	-	✓	-	-
	CH_ID	Number	-	10	0	-	✓	-	-

Page footer:

Application Express 2.1.0.00.39
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Language: en-us

Description DELIVERY_BOY Table

```
CREATE TABLE DELIVERY_BOY(D_ID NUMBER(10), CONSTRAINT  
DELIVERY_BOY_PK_DEL PRIMARY KEY (D_ID), NAME VARCHAR2(30), PHONE  
VARCHAR2(40), TRACKING_NO NUMBER(30));
```

```
DESC DELIVERY_BOY
```

The screenshot shows the Oracle Application Express SQL Commands interface. The top navigation bar includes 'SQL Commands' and a URL '127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO::'. Below the navigation is a toolbar with icons for search, refresh, save, run, and more. The main area contains two SQL statements:

```
CREATE TABLE DELIVERY_BOY(D_ID NUMBER(10), CONSTRAINT DELIVERY_BOY_PK_DEL PRIMARY KEY (D_ID), NAME VARCHAR2(30), PHONE VARCHAR2(40),  
TRACKING_NO NUMBER(30));  
DESC DELIVERY_BOY
```

Below the SQL statements is a results grid titled 'Object Type TABLE Object DELIVERY_BOY'. It displays the following table structure:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DELIVERY_BOY	D_ID	Number	-	10	0	1	-	-	-
	NAME	Varchar2	30	-	-	-	✓	-	-
	PHONE	Varchar2	40	-	-	-	✓	-	-
	TRACKING_NO	Number	-	30	0	-	✓	-	-

At the bottom of the grid, it says '1 - 4'. The footer of the page includes 'Results Explain Describe Saved SQL History' tabs, 'Object Type TABLE Object DELIVERY_BOY', 'Language: en-us', 'Application Express 2.1.0.00.39', and 'Copyright © 1999, 2006, Oracle. All rights reserved.'

Description CUSTOMER Table

```
CREATE TABLE CUSTOMER (C_ID NUMBER(10),CONSTRAINT CUSTOMER_PK_CUS PRIMARY KEY (C_ID), NAME VARCHAR2(30), VOUCHER VARCHAR2(40),C_PHONE VARCHAR2(30), ADDRESS VARCHAR2(50),D_ID NUMBER(30),CONSTRAINT CUSTOMER_FK_CUST FOREIGN KEY (D_ID) REFERENCES DELIVERY_BOY(D_ID));
```

DESC CUSTOMER

The screenshot shows the Oracle Application Express SQL Commands interface. At the top, there is a toolbar with various icons. Below the toolbar, the URL is displayed as 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO:: and the page title is Home > SQL > SQL Commands.

In the main area, there is a text input field containing the SQL code for creating the CUSTOMER table:

```
CREATE TABLE CUSTOMER (C_ID NUMBER(10),CONSTRAINT CUSTOMER_PK_CUS PRIMARY KEY (C_ID), NAME VARCHAR2(30), VOUCHER VARCHAR2(40),C_PHONE VARCHAR2(30), ADDRESS VARCHAR2(50),D_ID NUMBER(30),CONSTRAINT CUSTOMER_FK_CUST FOREIGN KEY (D_ID) REFERENCES DELIVERY_BOY(D_ID))
```

Below the code, the command `DESC CUSTOMER` is entered. The interface includes a "Save" button and a "Run" button.

At the bottom, there is a results section with tabs for Results, Explain, Describe, Saved SQL, and History. The "Describe" tab is selected. A table titled "Object Type TABLE Object CUSTOMER" displays the column details:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMER	C_ID	Number	-	10	0	1	-	-	-
	NAME	Varchar2	30	-	-	-	✓	-	-
	VOUCHER	Varchar2	40	-	-	-	✓	-	-
	C_PHONE	Varchar2	30	-	-	-	✓	-	-
	ADDRESS	Varchar2	50	-	-	-	✓	-	-
	D_ID	Number	-	30	0	-	✓	-	-

At the bottom right of the results section, there are two small icons: a smiley face and a green circle with a white letter 'G'.

At the very bottom right of the entire interface, the text "Application Express 2.1.0.00.39" is visible.

Description CUSTOMER_INFO Table

```
CREATE TABLE CUSTOMER_INFO(C_ID NUMBER (10),CONSTRAINT
CUSTOMERINFO_FK_CUSINFO FOREIGN KEY (C_ID) REFERENCES
CUSTOMER(C_ID), W_ID NUMBER (10),CONSTRAINT
CUSTOMERINFO_FK_CUSSINFO FOREIGN KEY (W_ID) REFERENCES WAITER
(W_ID));
```

DESC CUSTOMER_INFO

The screenshot shows the Oracle SQL Developer interface. The top navigation bar indicates the user is SYSTEM and the current location is Home > SQL > SQL Commands. The main area contains the SQL code for creating the CUSTOMER_INFO table and its description. Below the code, there is a table showing the columns of the CUSTOMER_INFO table. The bottom status bar shows the application version and copyright information.

```
SELECT*FROM CUSTOMER_INFO
DESC CUSTOMER_INFO
CREATE TABLE CUSTOMER_INFO(C_ID NUMBER (10),CONSTRAINT CUSTOMERINFO_FK_CUSINFO FOREIGN KEY (C_ID) REFERENCES CUSTOMER(C_ID), W_ID
NUMBER (10),CONSTRAINT CUSTOMERINFO_FK_CUSSINFO FOREIGN KEY (W_ID) REFERENCES WAITER (W_ID))
DESC CUSTOMER_INFO
```

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMER_INFO	C_ID	Number	-	10	0	-	✓	-	-
	W_ID	Number	-	10	0	-	✓	-	-

Results Explain Describe Saved SQL History

Object Type TABLE Object CUSTOMER_INFO

Application Express 2.1.0.00.39
Language: en-us Copyright © 1999, 2006, Oracle. All rights reserved.

Description DELIVERY_BOY_INFO Table

```
CREATE TABLE DELIVERY_BOY_INFO (D_ID NUMBER(10),CONSTRAINT  
DELIVERY_BOY_INFO_FK_DINFO FOREIGN KEY(D_ID) REFERENCES  
DELIVERY_BOY(D_ID),PHONE VARCHAR2(30));
```

```
DESC DELIVERY_BOY_INFO
```

The screenshot shows the Oracle Application Express SQL Commands interface. The URL in the address bar is 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295:NO:::. The user is SYSTEM. The page title is "SQL Commands". The main content area contains the SQL code for creating the table and its description:

```
CREATE TABLE DELIVERY_BOY_INFO (D_ID NUMBER(10),CONSTRAINT DELIVERY_BOY_INFO_FK_DINFO FOREIGN KEY(D_ID) REFERENCES  
DELIVERY_BOY(D_ID),PHONE VARCHAR2(30))  
  
DESC DELIVERY_BOY_INFO
```

Below the code, there is a table showing the object type and columns of the DELIVERY_BOY_INFO table:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DELIVERY_BOY_INFO	D_ID	Number	-	10	0	-	✓	-	-
	PHONE	Varchar2	30	-	-	-	✓	-	-

At the bottom, it says "1 - 2". The footer includes "Application Express 2.1.0.00.39", "Language: en-us", and "Copyright © 1999, 2006, Oracle. All rights reserved."

Description MENU Table

```
CREATE TABLE MENU(MENU_NO NUMBER(10),CONSTRAINT MENU_PK_MNU
PRIMARY KEY (MENU_NO), NAME VARCHAR2(30),PRICE VARCHAR2(40),D_ID
NUMBER(10),CONSTRAINT MENU_FK_MENUUU FOREIGN KEY (D_ID)
REFERENCES DELIVERY_BOY(D_ID));
```

DESC MENU

The screenshot shows the Oracle SQL Developer interface. The top navigation bar indicates the user is SYSTEM and the current location is Home > SQL > SQL Commands. The main area contains the SQL command for creating the MENU table. Below the command, the word "DESC MENU" is highlighted. The bottom section displays the table structure for the MENU object.

SQL Commands

User: SYSTEM

Home > SQL > SQL Commands

Autocommit Display 10

```
CREATE TABLE MENU(MENU_NO NUMBER(10),CONSTRAINT MENU_PK_MNU PRIMARY KEY (MENU_NO), NAME VARCHAR2(30),PRICE VARCHAR2(40),D_ID NUMBER(10),CONSTRAINT MENU_FK_MENUUU FOREIGN KEY (D_ID) REFERENCES DELIVERY_BOY(D_ID))
DESC MENU
```

Results Explain Describe Saved SQL History

Object Type TABLE Object MENU

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
MENU	MENU_NO	Number	-	10	0	1	-	-	-
	NAME	Varchar2	30	-	-	-	✓	-	-
	PRICE	Varchar2	40	-	-	-	✓	-	-
	D_ID	Number	-	10	0	-	✓	-	-

1 - 4

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Language: en-us

Description ONLINE_INFO Table

```
CREATE TABLE ONLINE_INFO(APP_ID NUMBER(10),CONSTRAINT FK_OLLL
FOREIGN KEY (APP_ID) REFERENCES ONLINE_SERVICE(APP_ID),MENU_NO
NUMBER (10),CONSTRAINT FK_OONN FOREIGN KEY (MENU_NO) REFERENCES
MENU(MENU_NO));
```

DESC ONLINE_INFO

The screenshot shows the Oracle Application Express SQL Commands interface. The top navigation bar includes 'SQL Commands', a search icon, a star icon, a gear icon, a refresh icon, and a help icon. The URL is 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO:::. The user is SYSTEM. The current page is 'Home > SQL > SQL Commands'. The SQL editor contains the following code:

```
CREATE TABLE ONLINE_INFO(APP_ID NUMBER(10),CONSTRAINT FK_OLLL FOREIGN KEY (APP_ID) REFERENCES ONLINE_SERVICE(APP_ID),MENU_NO NUMBER (10),CONSTRAINT FK_OONN FOREIGN KEY (MENU_NO) REFERENCES MENU(MENU_NO))
DESC ONLINE_INFO
```

Below the code, there are icons for a smiley face and a green circle with a 'G'.

The 'Describe' tab is selected, showing the table structure:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
ONLINE_INFO	APP_ID	Number	-	10	0	-	✓	-	-
	MENU_NO	Number	-	10	0	-	✓	-	-
								1 - 2	

At the bottom, it says 'Results Explain Describe Saved SQL History'. The status bar indicates 'Application Express 2.1 0.00.39' and 'Copyright © 1999, 2006, Oracle. All rights reserved.'

Value Insertion

RESTAURANT VALUE Insertion

```
INSERT INTO RESTAURANT VALUES(7757,'DHAKA','DINER')
INSERT INTO RESTAURANT VALUES(7976,'CHITTAGONG','RED ROSE')
INSERT INTO RESTAURANT VALUES(7767,'SYHLHET','CHILL OUT')
INSERT INTO RESTAURANT VALUES(7758,'BARISAL','VOOTER BARI')
INSERT INTO RESTAURANT VALUES(7759,'TANGAIL','ITALIA')

SELECT * FROM RESTAURANT
```

The screenshot shows the Oracle Application Express SQL Commands interface. The SQL code entered is:

```
INSERT INTO RESTAURANT VALUES(7757,'DHAKA','DINER')
INSERT INTO RESTAURANT VALUES(7976,'CHITTAGONG','RED ROSE')
INSERT INTO RESTAURANT VALUES(7767,'SYHLHET','CHILL OUT')
INSERT INTO RESTAURANT VALUES(7758,'BARISAL','VOOTER BARI')
INSERT INTO RESTAURANT VALUES(7759,'TANGAIL','ITALIA')

SELECT * FROM RESTAURANT
```

The results section displays the following table:

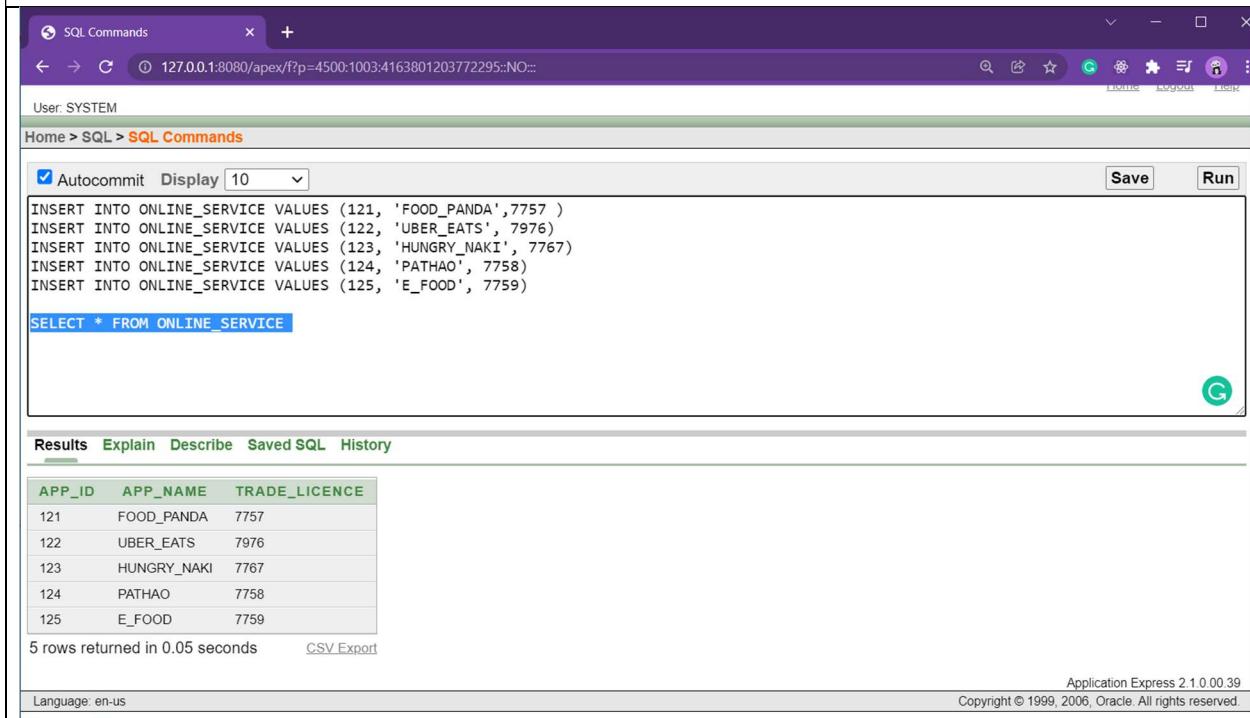
TRADE_LICENCE	CITY	NAME
7757	DHAKA	DINER
7976	CHITTAGONG	RED ROSE
7767	SYHLHET	CHILL OUT
7758	BARISAL	VOOTER BARI
7759	TANGAIL	ITALIA

Below the table, it says "5 rows returned in 0.07 seconds" and provides a "CSV Export" link. At the bottom, it shows "Language: en-us" and copyright information: "Application Express 2.1.0 00 39" and "Copyright © 1999, 2006, Oracle. All rights reserved."

ONLINE SERVICE VALUE Insertion

```
INSERT INTO ONLINE_SERVICE VALUES (121, 'FOOD_PANDA',7757 )
INSERT INTO ONLINE_SERVICE VALUES (122, 'UBER_EATS', 7976)
INSERT INTO ONLINE_SERVICE VALUES (123, 'HUNGRY_NAKI', 7767)
INSERT INTO ONLINE_SERVICE VALUES (124, 'PATHAO', 7758)
INSERT INTO ONLINE_SERVICE VALUES (125, 'E_FOOD', 7759)
```

```
SELECT * FROM ONLINE_SERVICE
```



The screenshot shows the Oracle Application Express SQL Commands interface. The SQL command window contains the following code:

```
INSERT INTO ONLINE_SERVICE VALUES (121, 'FOOD_PANDA',7757 )
INSERT INTO ONLINE_SERVICE VALUES (122, 'UBER_EATS', 7976)
INSERT INTO ONLINE_SERVICE VALUES (123, 'HUNGRY_NAKI', 7767)
INSERT INTO ONLINE_SERVICE VALUES (124, 'PATHAO', 7758)
INSERT INTO ONLINE_SERVICE VALUES (125, 'E_FOOD', 7759)

SELECT * FROM ONLINE_SERVICE
```

The results section displays the following table:

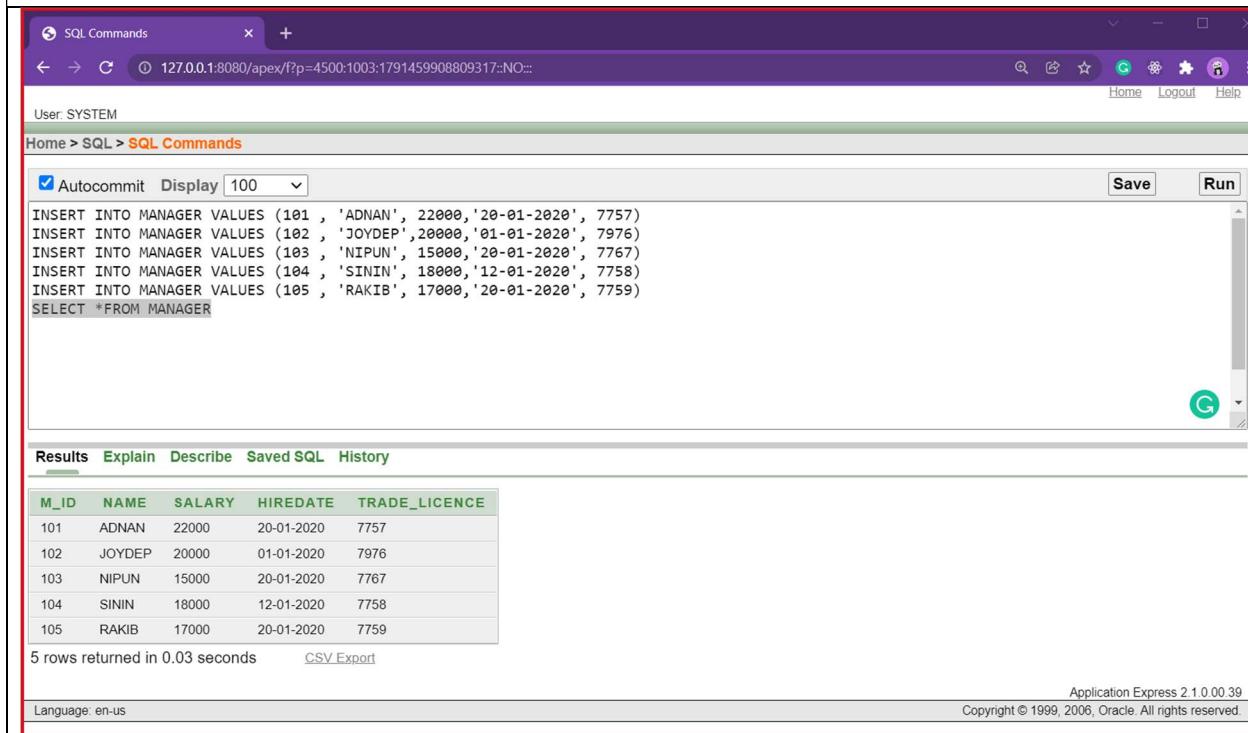
APP_ID	APP_NAME	TRADE_LICENCE
121	FOOD_PANDA	7757
122	UBER_EATS	7976
123	HUNGRY_NAKI	7767
124	PATHAO	7758
125	E_FOOD	7759

Below the table, it says "5 rows returned in 0.05 seconds". The bottom right corner of the interface has a green circular icon with a white letter "G".

MANAGER VALUE Insertion

```
INSERT INTO MANAGER VALUES (101 , 'ADNAN', 22000,'20-01-2020', 7757)
INSERT INTO MANAGER VALUES (102 , 'JOYDEP',20000,'01-01-2020', 7976)
INSERT INTO MANAGER VALUES (103 , 'NIPUN', 15000,'20-01-2020', 7767)
INSERT INTO MANAGER VALUES (104 , 'SININ', 18000,'12-01-2020', 7758)
INSERT INTO MANAGER VALUES (105 , 'RAKIB', 17000,'20-01-2020', 7759)
```

```
SELECT *FROM MANAGER
```



The screenshot shows the Oracle Application Express SQL Commands interface. The SQL editor contains the following commands:

```
INSERT INTO MANAGER VALUES (101 , 'ADNAN', 22000,'20-01-2020', 7757)
INSERT INTO MANAGER VALUES (102 , 'JOYDEP',20000,'01-01-2020', 7976)
INSERT INTO MANAGER VALUES (103 , 'NIPUN', 15000,'20-01-2020', 7767)
INSERT INTO MANAGER VALUES (104 , 'SININ', 18000,'12-01-2020', 7758)
INSERT INTO MANAGER VALUES (105 , 'RAKIB', 17000,'20-01-2020', 7759)
SELECT *FROM MANAGER
```

The results section displays the following table:

M_ID	NAME	SALARY	HIREDATE	TRADE_LICENCE
101	ADNAN	22000	20-01-2020	7757
102	JOYDEP	20000	01-01-2020	7976
103	NIPUN	15000	20-01-2020	7767
104	SININ	18000	12-01-2020	7758
105	RAKIB	17000	20-01-2020	7759

Below the table, it says "5 rows returned in 0.03 seconds" and provides a "CSV Export" link. At the bottom, it shows "Language: en-us" and "Application Express 2.1.0.00.39 Copyright © 1999, 2006, Oracle. All rights reserved."

CASHIER_INFO VALUE Insertion

```
INSERT INTO CASHIER_INFO VALUES(201,'DHAKA',101)
INSERT INTO CASHIER_INFO VALUES(202,'CHITTAGONG',102)
INSERT INTO CASHIER_INFO VALUES(203,'SYLHET',103)
INSERT INTO CASHIER_INFO VALUES(204,'BARISAL',104)
INSERT INTO CASHIER_INFO VALUES(205,'TANGAIL',105)
```

```
SELECT*FROM CASHIER_INFO
```

The screenshot shows the Oracle SQL Developer interface. The SQL Commands tab is active, displaying the following SQL code:

```
INSERT INTO CASHIER_INFO VALUES(201,'DHAKA',101)
INSERT INTO CASHIER_INFO VALUES(202,'CHITTAGONG',102)
INSERT INTO CASHIER_INFO VALUES(203,'SYLHET',103)
INSERT INTO CASHIER_INFO VALUES(204,'BARISAL',104)
INSERT INTO CASHIER_INFO VALUES(205,'TANGAIL',105)

SELECT*FROM CASHIER_INFO
```

The results tab shows the output of the SELECT query:

CC_ID	CITY	M_ID
201	DHAKA	101
202	CHITTAGONG	102
203	SYLHET	103
204	BARISAL	104
205	TANGAIL	105

Below the table, it says "5 rows returned in 0.00 seconds". The bottom right corner of the interface shows the application version: "Application Express 2.1 0.00.39".

CASHIER VALUE Insertion

```

INSERT INTO CASHIER VALUES(301,'TANVIR',21525387,10000,201)
INSERT INTO CASHIER VALUES(302,'SADMAN',32525455,12000,202)
INSERT INTO CASHIER VALUES(303,'DEEP',76425365,8000,203)
INSERT INTO CASHIER VALUES(304,'SELIM',89525365,9000,204)
INSERT INTO CASHIER VALUES(305,'MUNIM',21565378,7000,205)

```

SELECT *FROM CASHIER

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The URL in the address bar is 127.0.0.1:8080/apex/f?p=4500:1003:1791459908809317::NO:::. The user is SYSTEM. The page title is ORACLE Database Express Edition. The main content area contains SQL commands for inserting data into the CUSTOMER table and a SELECT statement:

```

INSERT INTO CUSTOMER VALUES (500,'SAJID ','100', '12345678911', 'NARSHINDI', 501)
INSERT INTO CUSTOMER VALUES (200, 'KAMAL' , '50', '12345678912', 'DHAKA' , 502)
INSERT INTO CUSTOMER VALUES (300, 'ANIK' , '50','12345678901', 'SYLHET' , 503)
INSERT INTO CUSTOMER VALUES (400, 'SAAD', '100' , '1234578900', 'KHULNA' , 504)
INSERT INTO CUSTOMER VALUES (100, 'RAMIM','NULL', '1234578916','BARISHAL' , 505)

SELECT* FROM CUSTOMER

```

The results section displays the following table:

C_ID	NAME	VOUCHER	C_PHONE	ADDRESS	D_ID
200	KAMAL	50	12345678912	DHAKA	502
300	ANIK	50	12345678901	SYLHET	503
400	SAAD	100	1234578900	KHULNA	504
100	RAMIM	NULL	1234578916	BARISHAL	505
500	SAJID	100	12345678911	NARSHINDI	501

Below the table, it says "5 rows returned in 0.00 seconds" and there is a "CSV Export" link. The bottom right corner of the interface shows "Application Express 2.1 0.00.39".

WAITER VALUE Insertion

```
INSERT INTO WAITER VALUES (401,6000, '01-01-2021',301)
INSERT INTO WAITER VALUES (402,5000, '17-6-2021',302)
INSERT INTO WAITER VALUES (403,5500, '30-11-2021',303)
INSERT INTO WAITER VALUES (404,6500, '05-12-2021',304)
INSERT INTO WAITER VALUES (405,5000, '02-06-2021',305)
```

```
SELECT * FROM WAITER
```

The screenshot shows the Oracle Application Express SQL Commands interface. The SQL code entered is:

```
INSERT INTO WAITER VALUES (401,6000, '01-01-2021',301)
INSERT INTO WAITER VALUES (402,5000, '17-6-2021',302)
INSERT INTO WAITER VALUES (403,5500, '30-11-2021',303)
INSERT INTO WAITER VALUES (404,6500, '05-12-2021',304)
INSERT INTO WAITER VALUES (405,5000, '02-06-2021',305)
SELECT * FROM WAITER
DESC WAITER
```

The results section displays the data inserted into the WAITER table:

W_ID	W_SALARY	W_HIREDATE	CH_ID
401	6000	01-01-2021	301
402	5000	17-6-2021	302
403	5500	30-11-2021	303
404	6500	05-12-2021	304
405	5000	02-06-2021	305

Below the table, it says "5 rows returned in 0.01 seconds" and provides a "CSV Export" link. The bottom status bar indicates "Language: en-us" and "Application Express 21.0.0.39 Copyright © 1999, 2008, Oracle. All rights reserved."

DELIVERY_BOY VALUE Insertion

```
INSERT INTO DELIVERY_BOY VALUES (501, 'REFAT', '12345678910', 7364)
INSERT INTO DELIVERY_BOY VALUES (502, 'SAGOR', '12345678911', 7366)
INSERT INTO DELIVERY_BOY VALUES (503, 'HASIN','12345678912', 7264)
INSERT INTO DELIVERY_BOY VALUES (504, 'RAHAT', '12345678913', 7304)
INSERT INTO DELIVERY_BOY VALUES (505, 'SAJIB', '12345678915', 7354)
```

```
SELECT*FROM DELIVERY_BOY
```

The screenshot shows the Oracle Application Express SQL Commands interface. The top navigation bar includes links for Home, Logout, and Help. The main area displays the following SQL code:

```
SQL Commands
127.0.0.1:8080/apex/f?p=4500:1003:1791459908809317::NO::
User: SYSTEM
Home > SQL > SQL Commands
Autocommit Display 100 Save Run
INSERT INTO DELIVERY_BOY VALUES (501, 'REFAT', '12345678910', 7364)
INSERT INTO DELIVERY_BOY VALUES (502, 'SAGOR', '12345678911', 7366)
INSERT INTO DELIVERY_BOY VALUES (503, 'HASIN','12345678912', 7264)
INSERT INTO DELIVERY_BOY VALUES (504, 'RAHAT', '12345678913', 7304)
INSERT INTO DELIVERY_BOY VALUES (505, 'SAJIB', '12345678915', 7354)

SELECT*FROM
DELIVERY_BOY
```

The results section shows a table with the following data:

D_ID	NAME	PHONE	TRACKING_NO
501	REFAT	12345678910	7364
502	SAGOR	12345678911	7366
503	HASIN	12345678912	7264
504	RAHAT	12345678913	7304
505	SAJIB	12345678915	7354

Below the table, it says "5 rows returned in 0.00 seconds" and provides a "CSV Export" link. The bottom status bar indicates "Language: en-us" and "Application Express 21.0.0.0.39 Copyright © 1999, 2008, Oracle. All rights reserved."

CUSTOMER VALUE Insertion

```
INSERT INTO CUSTOMER VALUES (500,' SAJID ','100', '12345678911', 'NARSHINDI', 501)
INSERT INTO CUSTOMER VALUES (200, 'KAMAL' , '50' , '12345678912', 'DHAKA' , 502)
INSERT INTO CUSTOMER VALUES (300, 'ANIK' , '50','12345678901', 'SYLHET' , 503)
INSERT INTO CUSTOMER VALUES (400, 'SAAD', '100' , '1234578900', 'KHULNA' , 504)
INSERT INTO CUSTOMER VALUES (100, 'RAMIM',' NULL', '1234578916','BARISHAL' , 505)
```

SELECT* FROM CUSTOMER

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The SQL code entered is:

```
INSERT INTO CUSTOMER VALUES (102,' SAJID ','100', '12345678911', 'NARSHINDI', 501)
INSERT INTO CUSTOMER VALUES (200, 'KAMAL' , '50' , '12345678912', 'DHAKA' , 502)
INSERT INTO CUSTOMER VALUES (300, 'ANIK' , '50','12345678901', 'SYLHET' , 503)
INSERT INTO CUSTOMER VALUES (400, 'SAAD', '100' , '1234578900', 'KHULNA' , 504)
INSERT INTO CUSTOMER VALUES (100, 'RAMIM',' NULL', '1234578916','BARISHAL' , 505)

SELECT* FROM CUSTOMER
```

The results section displays the following table:

C_ID	NAME	VOUCHER	C_PHONE	ADDRESS	D_ID
102	SAJID	100	12345678911	NARSHINDI	501
200	KAMAL	50	12345678912	DHAKA	502
300	ANIK	50	12345678901	SYLHET	503
400	SAAD	100	1234578900	KHULNA	504
100	RAMIM	NULL	1234578916	BARISHAL	505

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

Application Express 2.1 0.00.39

CUSTOMER_INFO VALUE Insertion

```
INSERT INTO CUSTOMER_INFO VALUES (200, 401)
INSERT INTO CUSTOMER_INFO VALUES (300, 402)
INSERT INTO CUSTOMER_INFO VALUES (400, 403)
INSERT INTO CUSTOMER_INFO VALUES (100, 404)
INSERT INTO CUSTOMER_INFO VALUES (500, 405)
```

```
SELECT*FROM CUSTOMER_INFO
```

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The top navigation bar includes 'SQL Commands', a connection URL '127.0.0.1:8080/apex/f?p=4500:1003:1791459908809317::NO::', and icons for search, refresh, star, and more. Below the bar, it says 'User: SYSTEM' and 'Home > SQL > SQL Commands'. A toolbar at the top right has 'Autocommit' checked, 'Display 100', 'Save', and 'Run' buttons. The main area contains the following SQL code:

```
INSERT INTO CUSTOMER_INFO VALUES (200, 401)
INSERT INTO CUSTOMER_INFO VALUES (300, 402)
INSERT INTO CUSTOMER_INFO VALUES (400, 403)
INSERT INTO CUSTOMER_INFO VALUES (100, 404)
INSERT INTO CUSTOMER_INFO VALUES (500, 405)

SELECT*FROM CUSTOMER_INFO
DESC CUSTOMER_INFO
```

Below the code, there are two tabs: 'Results' (selected) and 'Explain', 'Describe', 'Saved SQL', and 'History'. The 'Results' tab displays a table with two columns, C_ID and W_ID, containing the following data:

C_ID	W_ID
200	401
300	402
400	403
100	404
500	405

At the bottom left, it says '5 rows returned in 0.00 seconds' and 'CSV Export'. At the bottom right, it says 'Application Express 2.1.0.00.39'.

DELIVERYBOY_INFO VALUE Insertion

```
INSERT INTO DELIVERY_BOY_INFO VALUES (501,'0154243557')
INSERT INTO DELIVERY_BOY_INFO VALUES (502,'0174243557')
INSERT INTO DELIVERY_BOY_INFO VALUES (503,'0187243557')
INSERT INTO DELIVERY_BOY_INFO VALUES (504,'0144243557')
INSERT INTO DELIVERY_BOY_INFO VALUES (505,'019743557')
```

```
SELECT *FROM DELIVERY_BOY_INFO
```

The screenshot shows the Oracle Application Express SQL Commands interface. The URL in the address bar is 127.0.0.1:8080/apex/?p=4500:1003:1791459908809317::NO::. The user is SYSTEM. The SQL Commands page displays the following SQL code:

```
INSERT INTO DELIVERY_BOY_INFO VALUES (501,'0154243557')
INSERT INTO DELIVERY_BOY_INFO VALUES (502,'0174243557')
INSERT INTO DELIVERY_BOY_INFO VALUES (503,'0187243557')
INSERT INTO DELIVERY_BOY_INFO VALUES (504,'0144243557')
INSERT INTO DELIVERY_BOY_INFO VALUES (505,'019743557')
SELECT *FROM DELIVERY_BOY_INFO
```

The results section shows a table with two columns: D_ID and PHONE. The data is:

D_ID	PHONE
501	0154243557
502	0174243557
503	0187243557
504	0144243557
505	019743557

Below the table, it says "5 rows returned in 0.00 seconds". There are "CSV Export" and "Application Express 2.1.0.00.39" links. The footer indicates the language is en-us.

MENU VALUE Insertion

```
INSERT INTO MENU VALUES(01,'PIZZA','120', 501)
INSERT INTO MENU VALUES(02,'FRIED CHICKEN','120', 502)
INSERT INTO MENU VALUES(03,'FRENCH FRY','80', 503)
INSERT INTO MENU VALUES(04,'PATTIS','70', 504)
INSERT INTO MENU VALUES(05,'BURGER','60', 505)
```

```
SELECT *FROM MENU
```

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

```
INSERT INTO MENU VALUES(02,'FRIED CHICKEN','120', 502)
INSERT INTO MENU VALUES(03,'FRENCH FRY','80', 503)
INSERT INTO MENU VALUES(04,'PATTIS','70', 504)
INSERT INTO MENU VALUES(05,'BURGER','60', 505)
SELECT *FROM MENU
```

Below the code, there is a command `DESC MENU`. The results section displays a table with the following data:

MENU_NO	NAME	PRICE	D_ID
1	PIZZA	120	501
2	FRIED CHICKEN	120	502
3	FRENCH FRY	80	503
4	PATTIS	70	504
5	BURGER	60	505

At the bottom of the results, it says "5 rows returned in 0.00 seconds". The interface also includes a "CSV Export" link and a footer note "Application Express 2.1.0.00.39".

ONLINE_INFO VALUE Insertion

```
INSERT INTO ONLINE_INFO VALUES(121,01)
INSERT INTO ONLINE_INFO VALUES(122,02)
INSERT INTO ONLINE_INFO VALUES(123,03)
INSERT INTO ONLINE_INFO VALUES(124,04)
INSERT INTO ONLINE_INFO VALUES(125,05)
```

```
SELECT * FROM ONLINE_INFO
```

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

```
INSERT INTO ONLINE_INFO VALUES(121,01)
INSERT INTO ONLINE_INFO VALUES(122,02)
INSERT INTO ONLINE_INFO VALUES(123,03)
INSERT INTO ONLINE_INFO VALUES(124,04)
INSERT INTO ONLINE_INFO VALUES(125,05)

DESC ONLINE_INFO
SELECT * FROM ONLINE_INFO
```

The results section shows a table with two columns: APP_ID and MENU_NO. The data is:

APP_ID	MENU_NO
121	1
122	2
123	3
124	4
125	5

Below the table, it says "5 rows returned in 0.00 seconds".

DML

INSERT

INSERT INTO MANAGER VALUES (106 , 'SAJID KHAN', 23000,'20-01-2020', 7757)
SELECT *FROM MANAGER

The screenshot shows the Oracle Application Express SQL Commands interface. The title bar says "SQL Commands". The URL is "127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO::". The user is "SYSTEM". The page title is "SQL Commands". The SQL editor contains the following code:

```
INSERT INTO MANAGER VALUES (106 , 'SAJID KHAN', 23000,'20-01-2020', 7757)
SELECT *FROM MANAGER
```

The "Run" button is highlighted. Below the editor, the results section shows a table with the following data:

M_ID	NAME	SALARY	HIREDATE	TRADE_LICENCE
101	ADNAN	22000	20-01-2020	7757
102	JOYDEP	20000	01-01-2020	7976
103	NIPUN	15000	20-01-2020	7767
104	SININ	18000	12-01-2020	7758
105	RAKIB	18000	20-01-2020	7759
106	SAJID KHAN	23000	20-01-2020	7757

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

Application Express 2.1.0.00.39

DELETE

DELETE FROM MANAGER WHERE M_ID = 106;
SELECT *FROM MANAGER

The screenshot shows a SQL developer interface. At the top, there's a toolbar with various icons. Below it is a header bar showing the URL: 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO:::. The main area has tabs for Home, SQL, and SQL Commands, with SQL Commands currently selected. A sub-menu bar below the tabs includes Autocommit (checked), Display (set to 10), Save, and Run. The SQL editor contains the following code:

```
DELETE FROM MANAGER WHERE M_ID = 106;
SELECT *FROM MANAGER
```

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

M_ID	NAME	SALARY	HIREDATE	TRADE_LICENCE
101	ADNAN	22000	20-01-2020	7757
102	JOYDEP	20000	01-01-2020	7976
103	NIPUN	15000	20-01-2020	7767
104	SININ	18000	12-01-2020	7758
105	RAKIB	18000	20-01-2020	7759

Below the table, a message says "5 rows returned in 0.00 seconds" and there's a link to "CSV Export". At the bottom of the interface, there are copyright notices: "Application Express 2.1 0.00.39" and "Copyright © 1999, 2006, Oracle. All rights reserved." The bottom left shows the language setting: "Language: en-us".

ALTER

UPDATE MANAGER SET SALARY =18000 WHRE M_ID=105
SELECT *FROM MANAGER

The screenshot shows the Oracle Application Express SQL Commands interface. The top bar displays the URL as 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO:: and the user as SYSTEM. The main area contains the following SQL code:

```
UPDATE MANAGER
SET SALARY = 18000 WHERE M_ID = 105;
SELECT *FROM MANAGER;
```

Below the code, the Results tab is selected, showing the following table output:

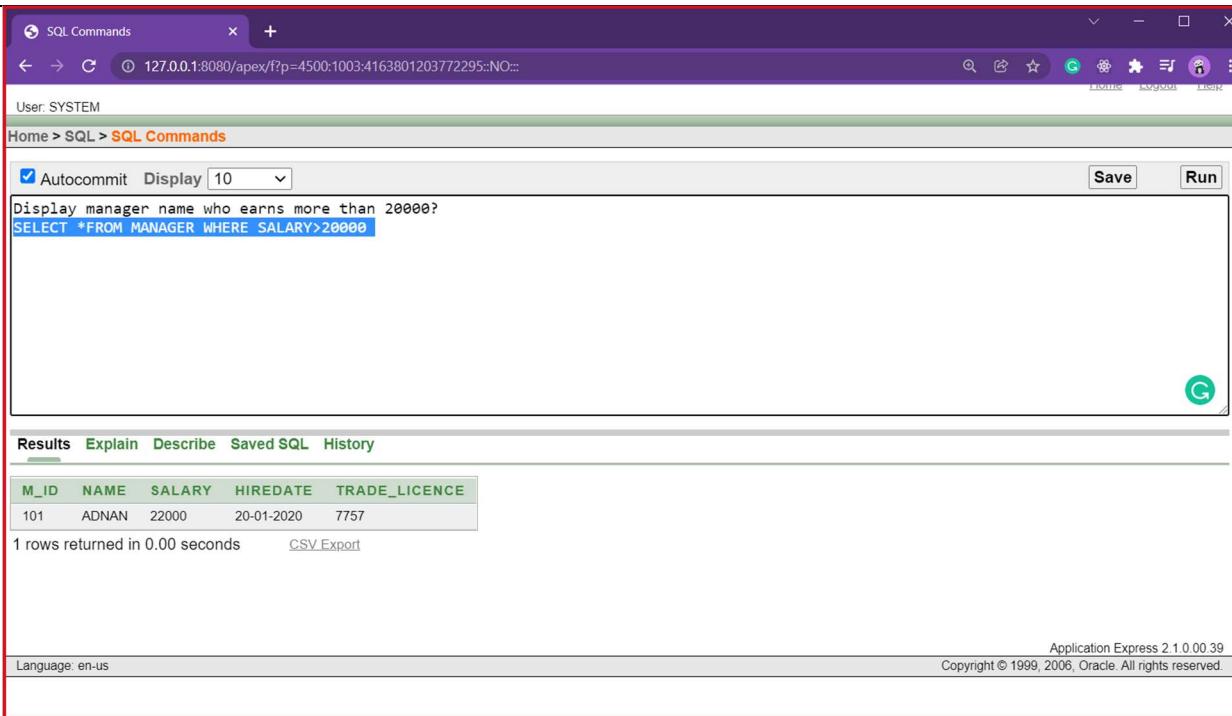
M_ID	NAME	SALARY	HIREDATE	TRADE_LICENCE
101	ADNAN	22000	20-01-2020	7757
102	JOYDEP	20000	01-01-2020	7976
103	NIPUN	15000	20-01-2020	7767
104	SININ	18000	12-01-2020	7758
105	RAKIB	18000	20-01-2020	7759

At the bottom, it says "5 rows returned in 0.00 seconds" and provides a "CSV Export" link. The footer indicates "Application Express 2.1.0.00.39" and "Copyright © 1999, 2006, Oracle. All rights reserved."

Query

1.1 Display manager name who earns more than 20000?

SELECT *FROM MANAGER WHERE SALARY>20000



The screenshot shows the Oracle SQL Developer interface. The SQL Commands window displays the following content:

```
Display manager name who earns more than 20000?
SELECT *FROM MANAGER WHERE SALARY>20000
```

The Results tab shows the query results:

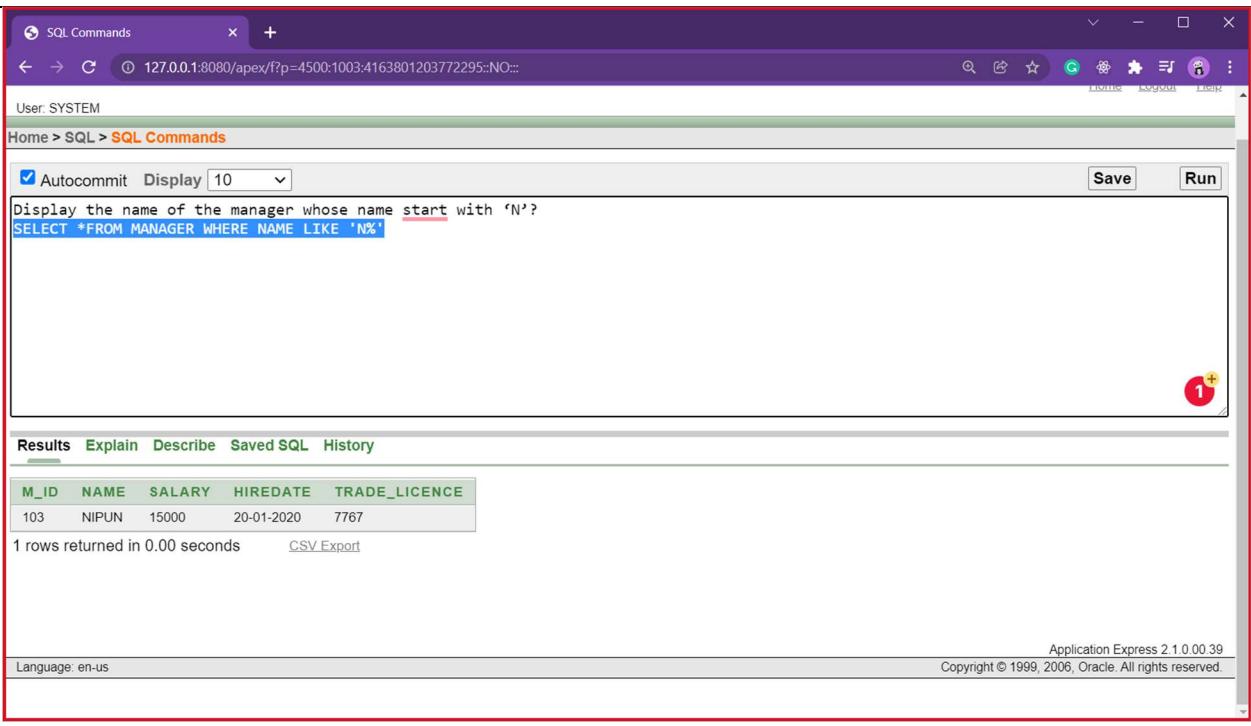
M_ID	NAME	SALARY	HIREDATE	TRADE_LICENCE
101	ADNAN	22000	20-01-2020	7757

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

Application Express 2.1.0.00.39
Copyright © 1999, 2006, Oracle. All rights reserved.

1.2 Display the name of the manager whose name start with 'N'?

SELECT *FROM MANAGER WHERE NAME LIKE 'N%'



The screenshot shows the Oracle Application Express SQL Commands interface. The URL is 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO... . The user is SYSTEM. The SQL command entered is:

```
Display the name of the manager whose name start with 'N'?
SELECT *FROM MANAGER WHERE NAME LIKE 'N%'
```

The results section shows a single row of data:

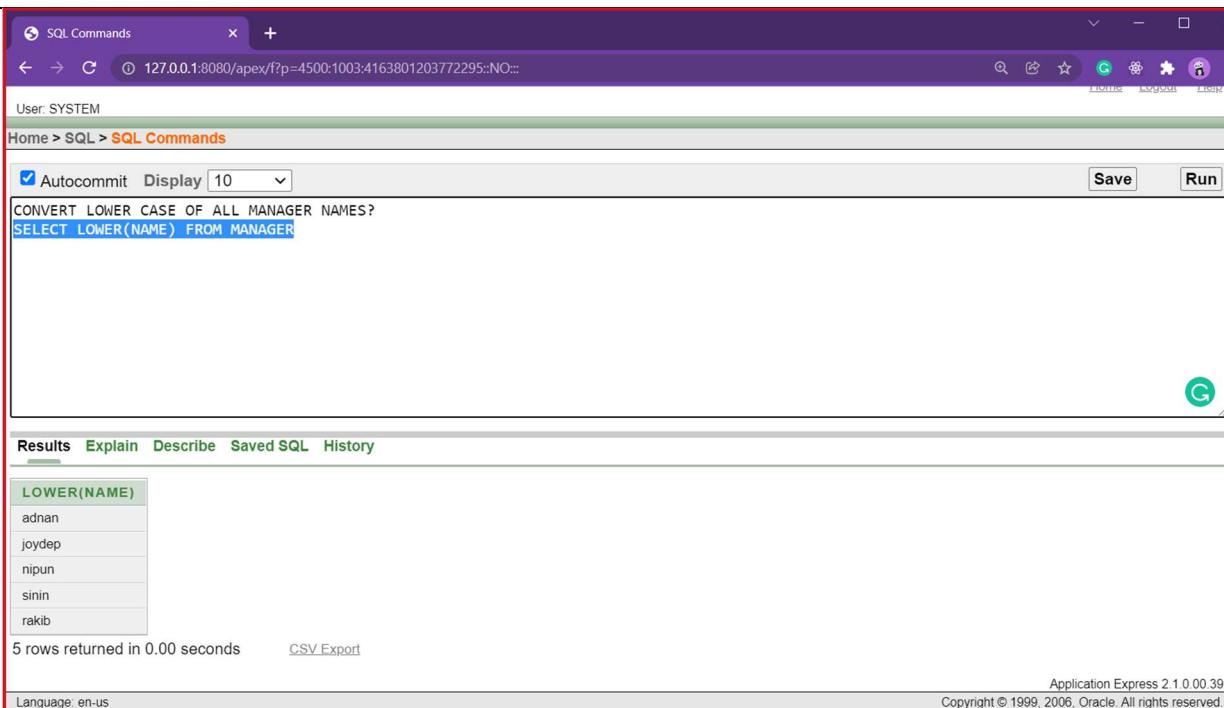
M_ID	NAME	SALARY	HIREDATE	TRADE_LICENCE
103	NIPUN	15000	20-01-2020	7767

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

Language: en-us Application Express 2.1.0.00.39 Copyright © 1999, 2006, Oracle. All rights reserved.

2. CONVERT LOWER CASE OF ALL MANAGER NAMES?

SELECT LOWER(NAME) FROM MANAGER



The screenshot shows the Oracle Application Express SQL Commands interface. The URL in the address bar is 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO:::. The user is SYSTEM. The page title is SQL Commands. The query entered is:

```
SELECT LOWER(NAME) FROM MANAGER
```

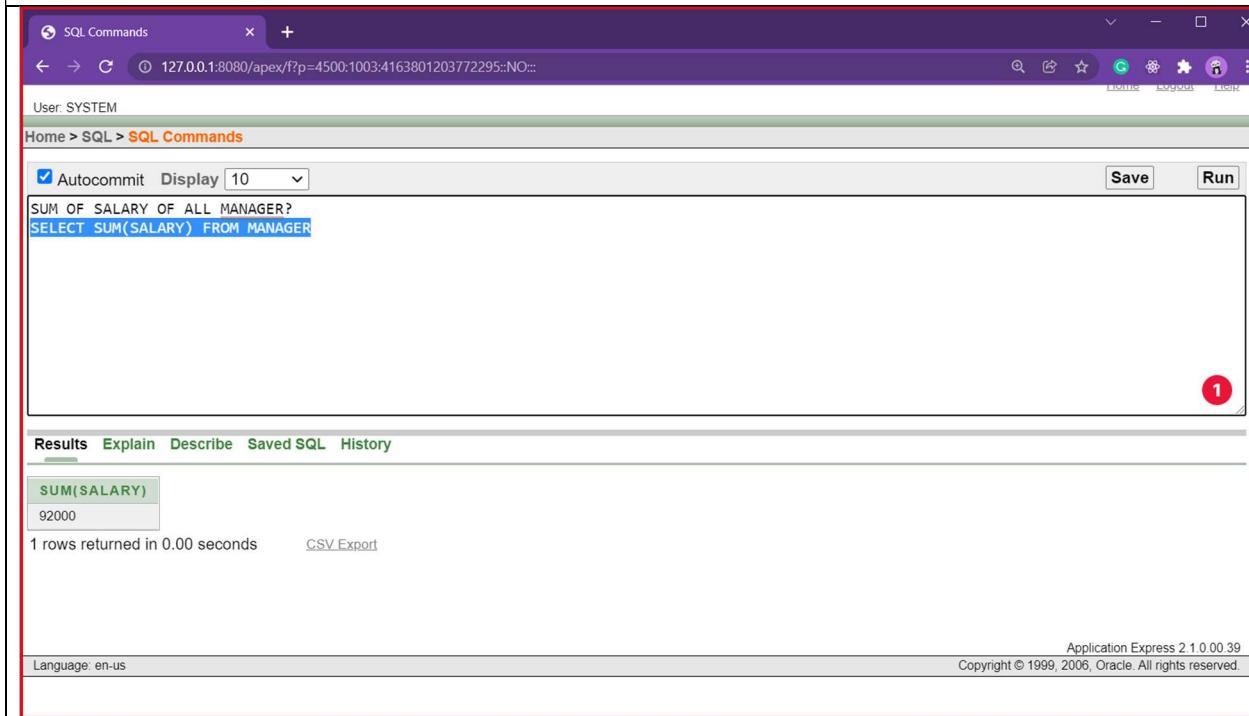
The results section displays the following data:

LOWER(NAME)
adnan
joydep
nipun
sinin
rakib

Below the table, it says "5 rows returned in 0.00 seconds". There are links for "CSV Export", "Results", "Explain", "Describe", "Saved SQL", and "History". At the bottom, it says "Language: en-us", "Application Express 2.1.0.00.39", and "Copyright © 1999, 2006, Oracle. All rights reserved".

3. Write a query to display the MANAGER WHERE SALARY BETWEEN 20000 AND 25000

SELECT *FROM MANAGER WHERE SALARY BETWEEN 20000 AND 25000



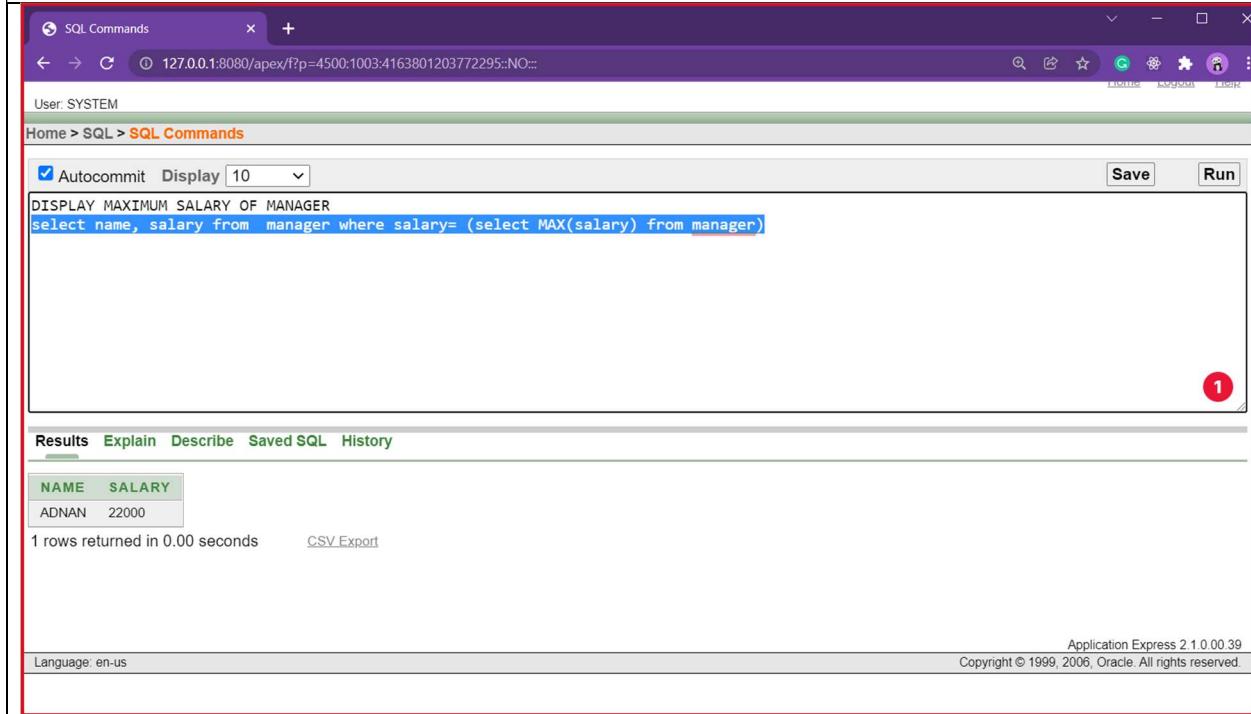
The screenshot shows a SQL command window in Oracle SQL Developer. The title bar says "SQL Commands". The URL is "127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO::". The user is "SYSTEM". The tabs at the top are "Home > SQL > SQL Commands". The toolbar has "Autocommit" checked and "Display 10" selected. The SQL editor contains the following code:

```
SUM OF SALARY OF ALL MANAGER?  
SELECT SUM(SALARY) FROM MANAGER
```

The results section shows a single row with the value "92000". Below the results, it says "1 rows returned in 0.00 seconds" and "CSV Export". At the bottom, it says "Language: en-us" and "Application Express 2.1 0 00 39 Copyright © 1999, 2006, Oracle. All rights reserved."

4.1 DISPLAY MAXIMUM SALARY OF MANAGER

select name, salary from manager where salary= (select MAX(salary) from manager)



The screenshot shows the Oracle Application Express SQL Commands interface. The query entered is:

```
DISPLAY MAXIMUM SALARY OF MANAGER
select name, salary from manager where salary= (select MAX(salary) from manager)
```

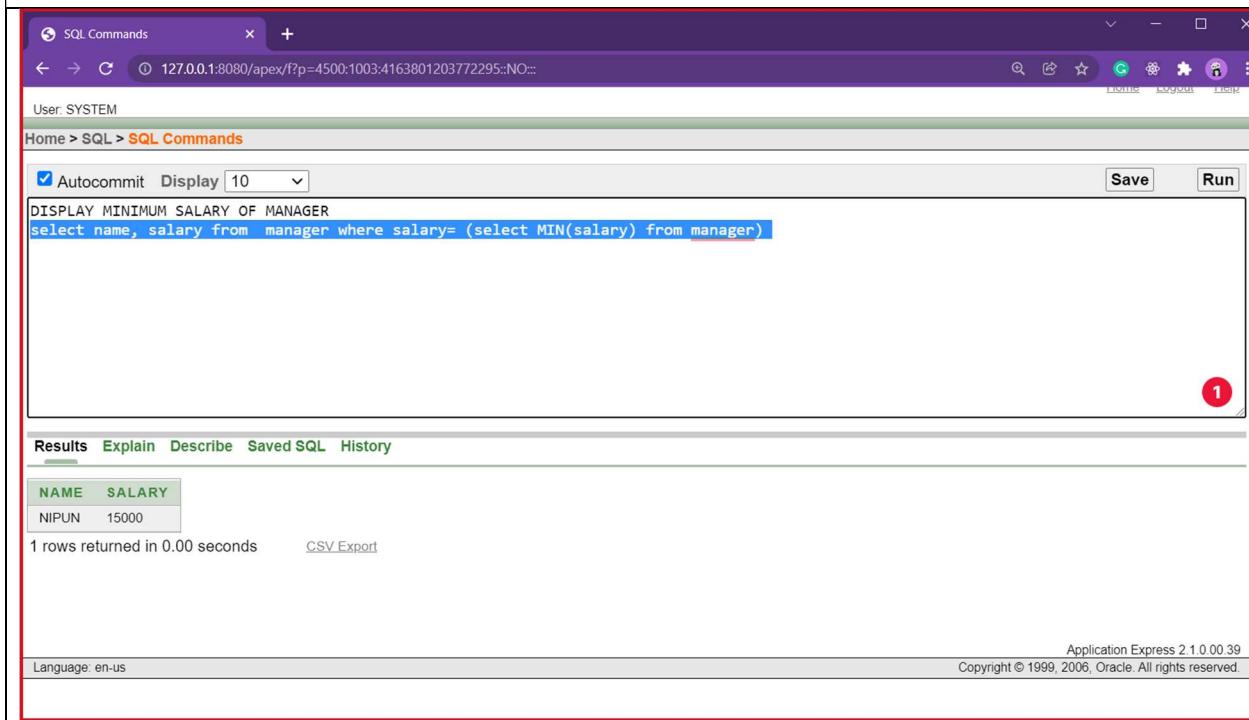
The results section displays a single row:

NAME	SALARY
ADNAN	22000

Below the results, it says "1 rows returned in 0.00 seconds". At the bottom, it shows the application version "Application Express 2.1.0.00.39" and copyright information "Copyright © 1999, 2006, Oracle. All rights reserved."

4.2 DISPLAY MINIMUM SALARY OF MANAGER

select name, salary from manager where salary= (select MIN(salary) from manager)



The screenshot shows the Oracle Application Express SQL Commands interface. The query entered is:

```
DISPLAY MINIMUM SALARY OF MANAGER
select name, salary from manager where salary= (select MIN(salary) from manager)
```

The results section displays a single row:

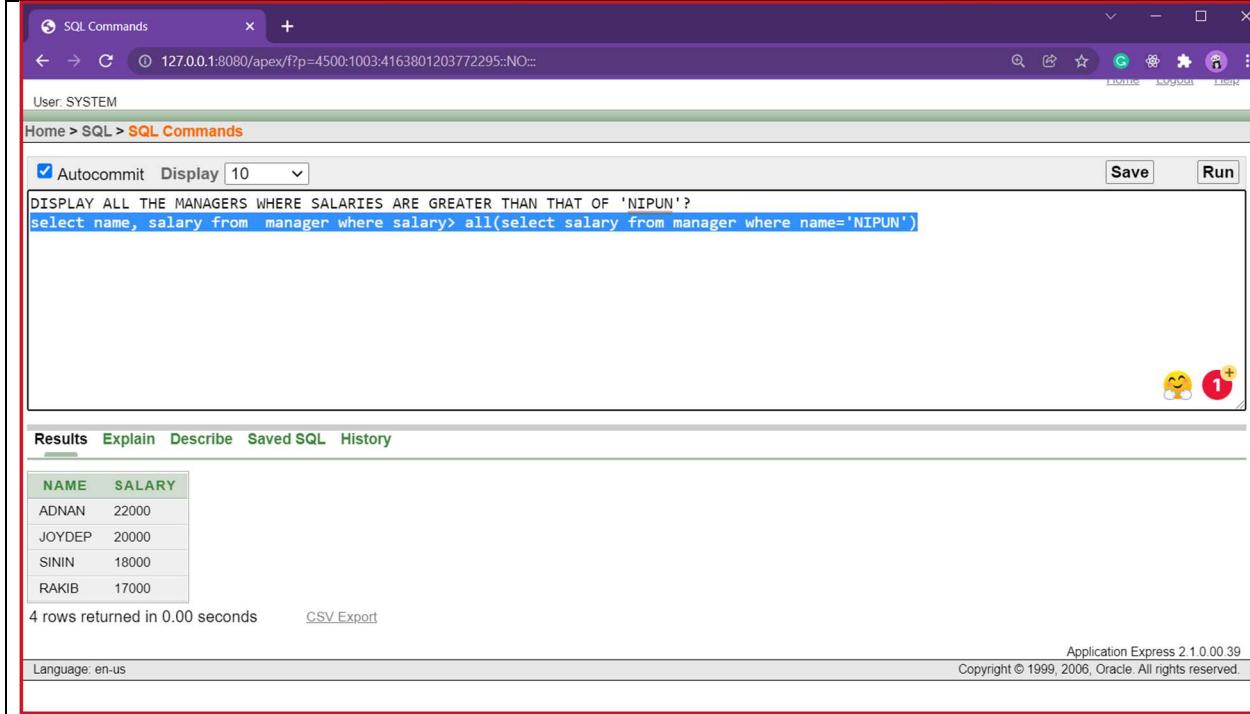
NAME	SALARY
NIPUN	15000

Below the results, it says "1 rows returned in 0.00 seconds".

At the bottom, it shows the application version "Application Express 2.1.0.00.39" and copyright information "Copyright © 1999, 2006, Oracle. All rights reserved."

5. DISPLAY ALL THE MANAGERS WHERE SALARIES ARE GREATER THAN THAT OF 'NIPUN'?

select name, salary from manager where salary > all(select salary from manager where name='NIPUN')



The screenshot shows the Oracle Application Express SQL Commands interface. The query entered is:

```
DISPLAY ALL THE MANAGERS WHERE SALARIES ARE GREATER THAN THAT OF 'NIPUN'?  
select name, salary from manager where salary > all(select salary from manager where name='NIPUN')
```

The results section displays a table with four rows:

NAME	SALARY
ADNAN	22000
JOYDEP	20000
SININ	18000

Below the table, it says "4 rows returned in 0.00 seconds".

At the bottom, it shows "Language: en-us" and "Application Express 2.1.0 00.39 Copyright © 1999, 2006, Oracle. All rights reserved."

6.1 Query to Find Second Highest Salary of MANAGER?

```
SELECT MAX(salary) as Salary  
FROM manager  
WHERE salary=(SELECT MAX(salary) FROM manager where salary< (SELECT  
MAX(salary)  
FROM manager )) ;
```

The screenshot shows the Oracle Application Express SQL Commands interface. The query is executed successfully, returning a single result of 20000.

```
Query to Find Second Highest Salary of MANAGER?  
SELECT MAX(salary) as Salary  
FROM manager  
WHERE salary=(SELECT MAX(salary) FROM manager where salary< (SELECT MAX(salary)  
FROM manager )) ;
```

Results

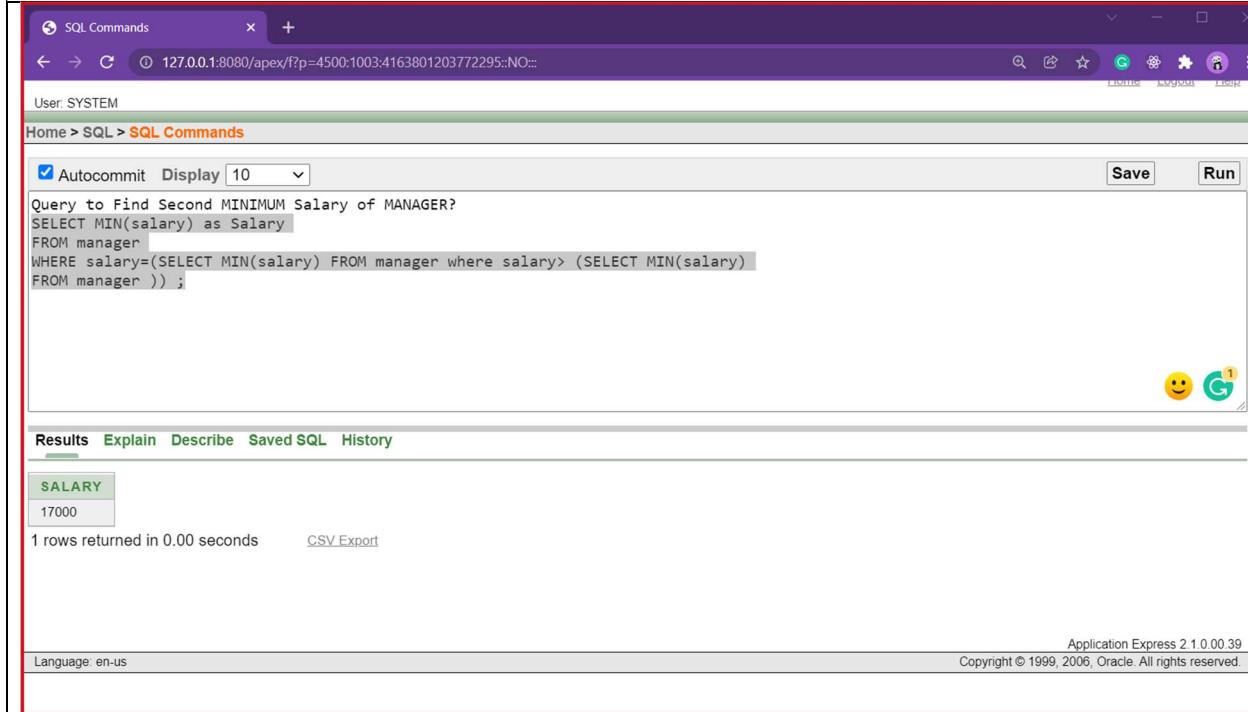
SALARY
20000

1 rows returned in 0.02 seconds [CSV Export](#)

Application Express 2.1.0.00.39
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Language: en-us

6.2 Query to Find Second MINIMUM Salary of MANAGER?

```
SELECT MIN(salary) as Salary  
FROM manager  
WHERE salary=(SELECT MIN(salary) FROM manager where salary> (SELECT  
MIN(salary)  
FROM manager )) ;
```



The screenshot shows the Oracle Application Express SQL Commands interface. The query is displayed in the SQL editor:

```
Query to Find Second MINIMUM Salary of MANAGER?  
SELECT MIN(salary) as Salary  
FROM manager  
WHERE salary=(SELECT MIN(salary) FROM manager where salary> (SELECT MIN(salary)  
FROM manager )) ;
```

The results section shows a single row with the value 17000 in the SALARY column.

SALARY
17000

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

Application Express 2.1.0.00.39
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Language: en-us

7.1 DISPLAY ALL THE INFO OF CASHIER (EQUI JOIN)

```
SELECT CH_ID,NAME,CITY FROM CASHIER,CASHIER_INFO WHERE  
CASHIER.CC_ID=CASHIER_INFO.CC_ID;
```

The screenshot shows the Oracle Application Express SQL Commands interface. The query entered is:

```
DISPLAY ALL THE INFO OF CASHIER | (EQUIJOIN)  
SELECT CH_ID,NAME,CITY FROM CASHIER,CASHIER_INFO WHERE CASHIER.CC_ID=CASHIER_INFO.CC_ID;
```

The results section displays the following data:

CH_ID	NAME	CITY
301	TANVIR	DHAKA
302	SADMAN	CHITTAGONG
303	DEEP	SYLHET
304	SELIM	BARISAL
305	MUNIM	TANGAIL

5 rows returned in 0.04 seconds [CSV Export](#)

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Language: en-us

7.2 Perform a non -equi join

```
select m_id,manager.name, manager.salary as manager_salary, cashier.salary as cashier_salary from manager, cashier where manager.salary<16000 and manager.salary>cashier.salary
```

The screenshot shows the Oracle Application Express SQL Commands interface. The SQL command entered is:

```
SELECT *FROM MANAGER  
SELECT *FROM CASHIER  
  
select m_id,manager.name, manager.salary as manager_salary, cashier.salary as cashier_salary from manager, cashier where manager.salary<16000 and manager.salary>cashier.salary
```

The results section displays a table with the following data:

M_ID	NAME	MANAGER_SALARY	CASHIER_SALARY
103	NIPUN	15000	10000
103	NIPUN	15000	12000
103	NIPUN	15000	8000
103	NIPUN	15000	9000
103	NIPUN	15000	7000

Below the table, it says "5 rows returned in 0.00 seconds". The interface includes standard navigation buttons like Results, Explain, Describe, Saved SQL, and History.

7.3 PERFORM LEFT OUTER JOIN IN CUSTOMER TABLE

```
SELECT *FROM CUSTOMER  
SELECT *FROM DELIVERY_BOY  
SELECT CUSTOMER.NAME, C_PHONE, ADDRESS, VOUCHER FROM CUSTOMER  
LEFT JOIN DELIVERY_BOY ON CUSTOMER.D_ID = DELIVERY_BOY.D_ID
```

The screenshot shows the Oracle Application Express SQL Commands interface. The URL is 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO:::. The user is SYSTEM. The SQL editor contains the following code:

```
PERFORM LEFT OUTER JOIN IN CUSTOMER TABLE  
SELECT *FROM CUSTOMER  
SELECT *FROM DELIVERY_BOY  
SELECT CUSTOMER.NAME, C_PHONE, ADDRESS, VOUCHER FROM CUSTOMER LEFT JOIN DELIVERY_BOY ON CUSTOMER.D_ID = DELIVERY_BOY.D_ID
```

The results section displays the following data:

NAME	C_PHONE	ADDRESS	VOUCHER
KAMAL	12345678912	DHAKA	50
ANIK	12345678901	SYLHET	50
SAAD	1234578900	KHULNA	100
RAMIM	1234578916	BARISHAL	NULL
SAJID	12345678911	NARSHINDI	100

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

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7.4 PERFORM RIGHT OUTER JOIN IN CUSTOMER TABLE

```
SELECT CUSTOMER.NAME, C_PHONE, ADDRESS, VOUCHER FROM CUSTOMER  
RIGHT JOIN DELIVERY_BOY ON CUSTOMER.D_ID = DELIVERY_BOY.D_ID
```

The screenshot shows the Oracle Application Express SQL Commands interface. The URL is 127.0.0.1:8080/apex/f?p=4500:1003:4163801203772295::NO:::. The query entered is:

```
PERFORM RIGHT OUTER JOIN IN CUSTOMER TABLE  
SELECT *FROM CUSTOMER  
SELECT *FROM DELIVERY_BOY  
SELECT CUSTOMER.NAME, C_PHONE, ADDRESS, VOUCHER FROM CUSTOMER RIGHT JOIN DELIVERY_BOY ON CUSTOMER.D_ID = DELIVERY_BOY.D_ID
```

The results section displays the following data:

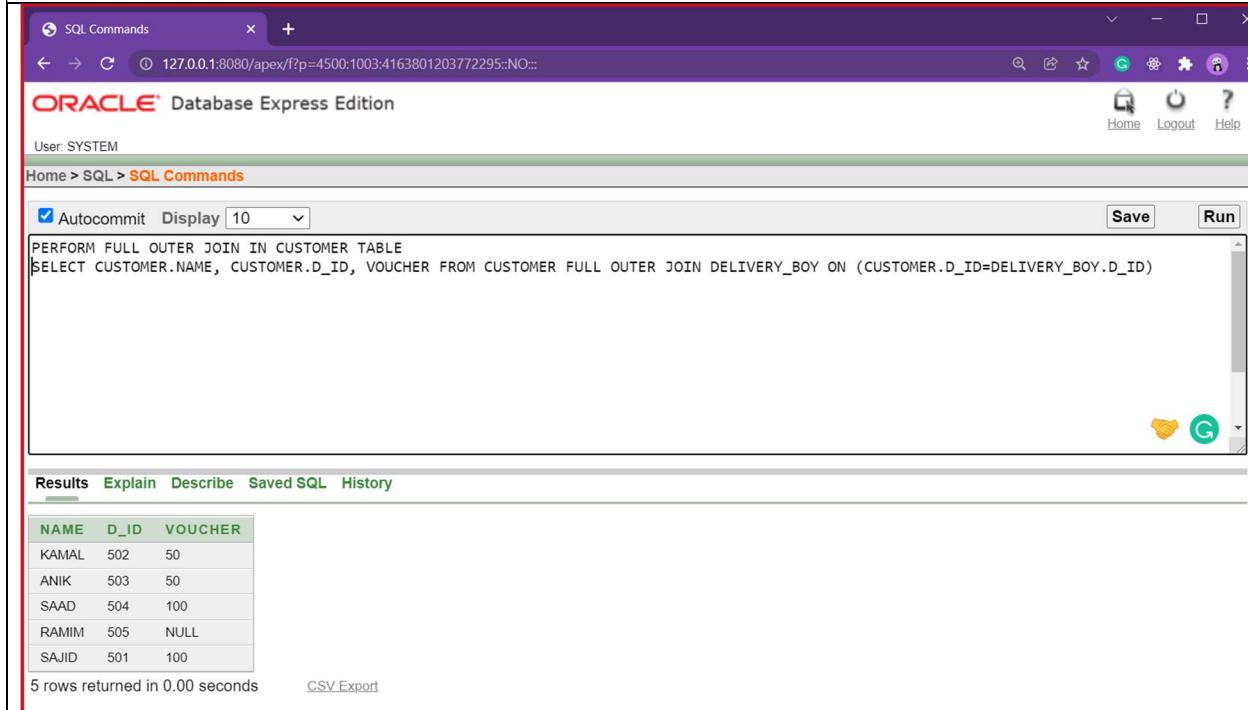
NAME	C_PHONE	ADDRESS	VOUCHER
KAMAL	12345678912	DHAKA	50
ANIK	12345678901	SYLHET	50
SAAD	12345678900	KHULNA	100
RAMIM	12345678916	BARISHAL	NULL
SAJID	12345678911	NARSHINDI	100

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

Application Express 2.1 0 00 39
Language: en-us Copyright © 1999, 2006, Oracle. All rights reserved.

7.5 PERFORM FULL OUTER JOIN IN CUSTOMER TABLE

```
SELECT CUSTOMER.NAME, CUSTOMER.D_ID, VOUCHER FROM CUSTOMER FULL  
OUTER JOIN DELIVERY_BOY ON (CUSTOMER.D_ID=DELIVERY_BOY.D_ID)
```



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

```
PERFORM FULL OUTER JOIN IN CUSTOMER TABLE  
SELECT CUSTOMER.NAME, CUSTOMER.D_ID, VOUCHER FROM CUSTOMER FULL OUTER JOIN DELIVERY_BOY ON (CUSTOMER.D_ID=DELIVERY_BOY.D_ID)
```

The results pane displays the following table:

NAME	D_ID	VOUCHER
KAMAL	502	50
ANIK	503	50
SAAD	504	100
RAMIM	505	NULL
SAJID	501	100

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

7.6. PERFORM FULL OUTER JOIN IN CUSTOMER TABLE

After normalization we cannot find any table where we can perform self joining.

8. CREATE A VIEW FROM MANAGER TABLE

```
CREATE VIEW MANAGERVIEW AS SELECT M_ID ,NAME ,SALARY FROM MANAGER  
WHERE M_ID=101
```

```
SELECT * FROM MANAGERVIEW
```

The screenshot shows the Oracle Application Express SQL Commands interface. The SQL editor contains the following code:

```
CREATE A VIEW FROM MANAGER TABLE  
CREATE VIEW MANAGERVIEW AS SELECT M_ID ,NAME ,SALARY FROM MANAGER WHERE M_ID=101  
SELECT * FROM MANAGERVIEW
```

The results panel displays a single row of data from the view:

M_ID	NAME	SALARY
101	ADNAN	22000

1 rows returned in 0.02 seconds [CSV Export](#)

Language: en-us

Application Express 2.1 0.00 39
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9. CREATE A SEQUENCE FROM MANAGER TABLE

```
CREATE SEQUENCE MANAGER_SEQ  
MINVALUE 10  
MAXVALUE 100  
START WITH 10  
INCREMENT BY 10;
```

```
INSERT INTO MANAGER VALUES (MANAGER_SEQ.NEXTVAL,'KABIR',22000,'11-2-  
2020',7757)  
INSERT INTO MANAGER VALUES (106,'SAKIB',25000,'10-1-2020',7757)
```

```
SELECT *FROM MANAGER
```

The screenshot shows the Oracle Application Express SQL Commands interface. The SQL editor contains the following code:

```
CREATE SEQUENCE MANAGER_SEQ  
MINVALUE 10  
MAXVALUE 100  
START WITH 10  
INCREMENT BY 10;  
  
INSERT INTO MANAGER VALUES (MANAGER_SEQ.NEXTVAL,'KABIR',22000,'11-2-2020',7757)  
INSERT INTO MANAGER VALUES (106,'SAKIB',25000,'10-1-2020',7757)  
SELECT *FROM MANAGER
```

The results section displays the data from the MANAGER table:

M_ID	NAME	SALARY	HIREDATE	TRADE_LICENCE
101	ADNAN	22000	20-01-2020	7757
102	JOYDEP	20000	01-01-2020	7976
103	NIPUN	15000	20-01-2020	7758
104	SININ	18000	12-01-2020	7758
105	RAKIB	17000	20-01-2020	7759
106	SAKIB	25000	10-1-2020	7757
10	KABIR	22000	11-2-2020	7757

Below the table, it says "7 rows returned in 0.00 seconds" and "CSV Export". At the bottom, it shows "Language: en-us", "Application Express 2.1.0.00.39", and "Copyright © 1999, 2006, Oracle. All rights reserved."

