



AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)

FACULTY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

INTRODUCTION TO DATABASE

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Project Title

Domain and Hosting Service Selling Management System

Course Instructor

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1. Case Study

ZEM Hosting is a domain and hosting company that provides website hosting services to small businesses and individuals. The company has a website where customers can register domains, choose hosting plans, and manage their hosting accounts. ZEM Hosting has decided to implement a database system to manage customer information and improve its service offerings.

ZEM Hosting wants to store Information of each customer who registers with ZEM Hosting. Each customer is identified by their customer ID. The system also stores customer's name, address, phone number, email, and payment information. Address includes city and country also.

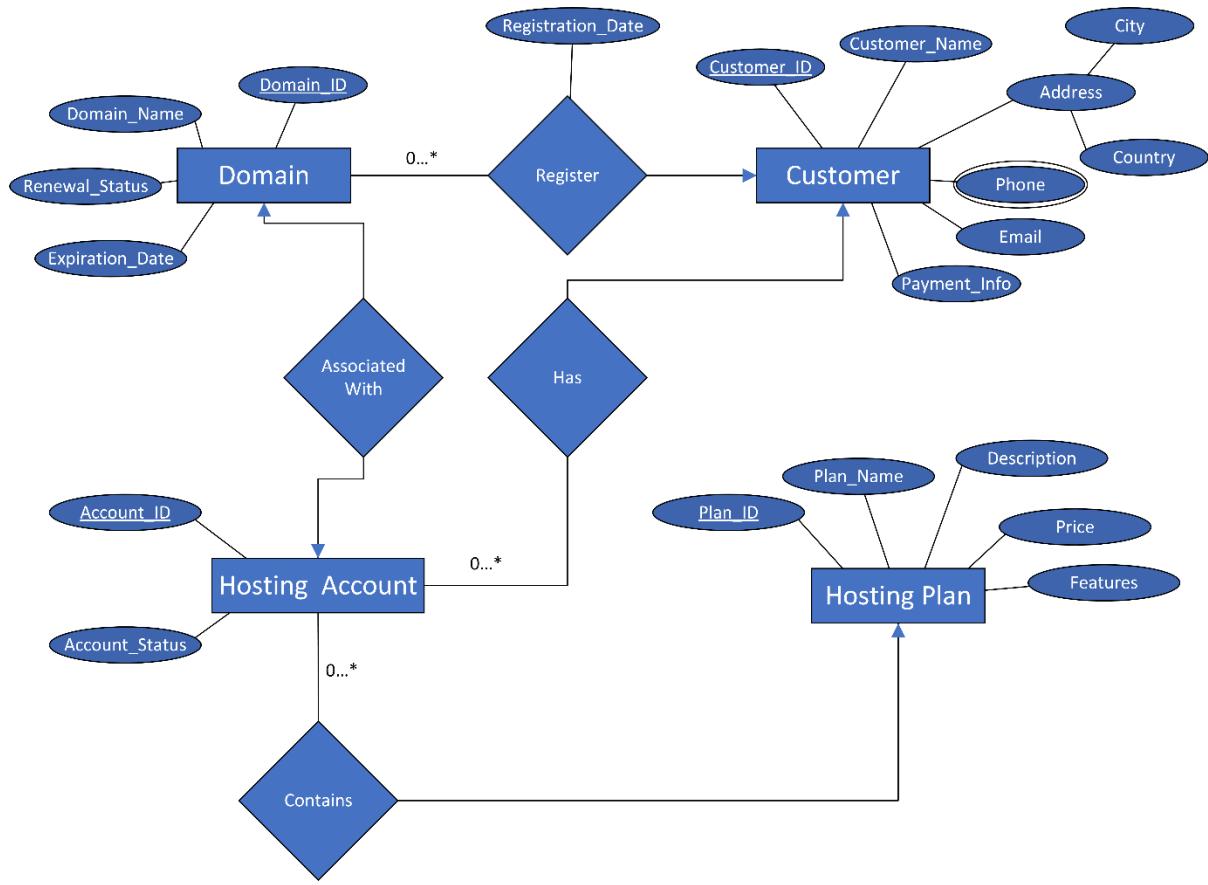
ZEM Hosting offers Domain registration service also. So, they must store domains information. Domains are identified by domain ID. The Domains registered by the ZEM Hosting customers also contains domain name, expiration date, and renewal status. The registration date is also stored during registration.

ZEM Hosting provides different hosting plans for customers. Those plans are identified by the plan ID. Each hosting plan offered by ZEM Hosting contains plan name, description, price, and its features also.

To use the hosting and domain registration services, customer must have a hosting account. The Hosting Accounts held by the ZEM Hosting customers identified by the account ID. The system also stores the account status.

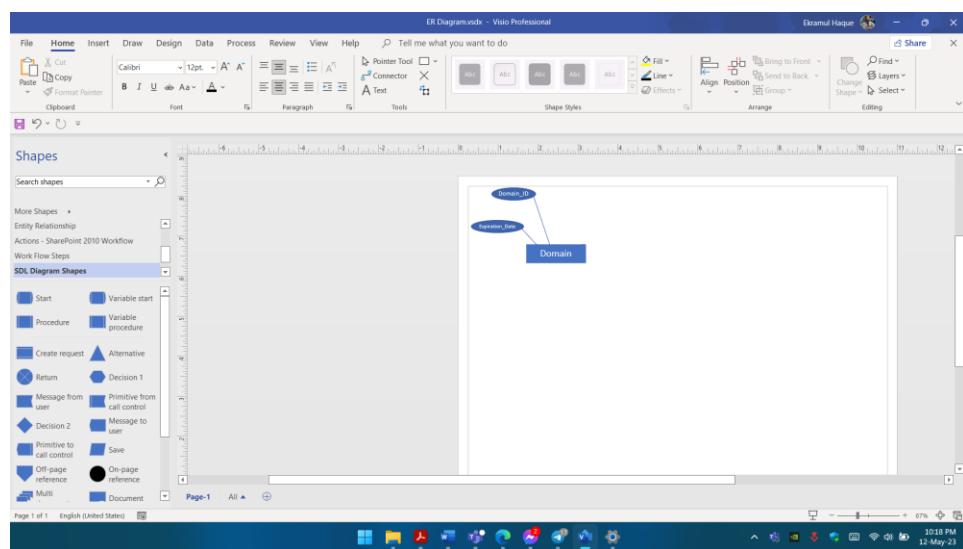
A customer can register zero or many domains in ZEM Hosting. A domain can be registered by only one customer. A customer can have zero or many hosting accounts. A hosting account can be owned by only one customer. One hosting account is associated with only one domain. One domain can be associated with only one hosting account. A hosting account contains only one hosting plan. A hosting plan can be associated with zero or many hosting accounts.

2. ER Diagram

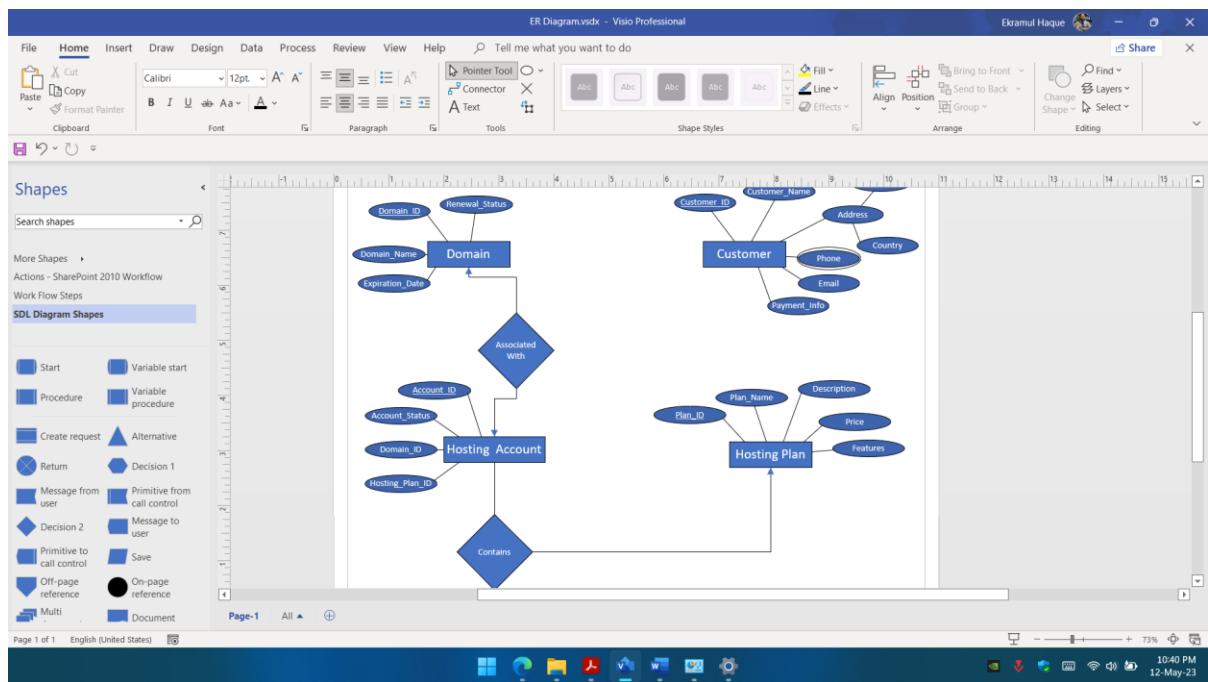


Screenshots

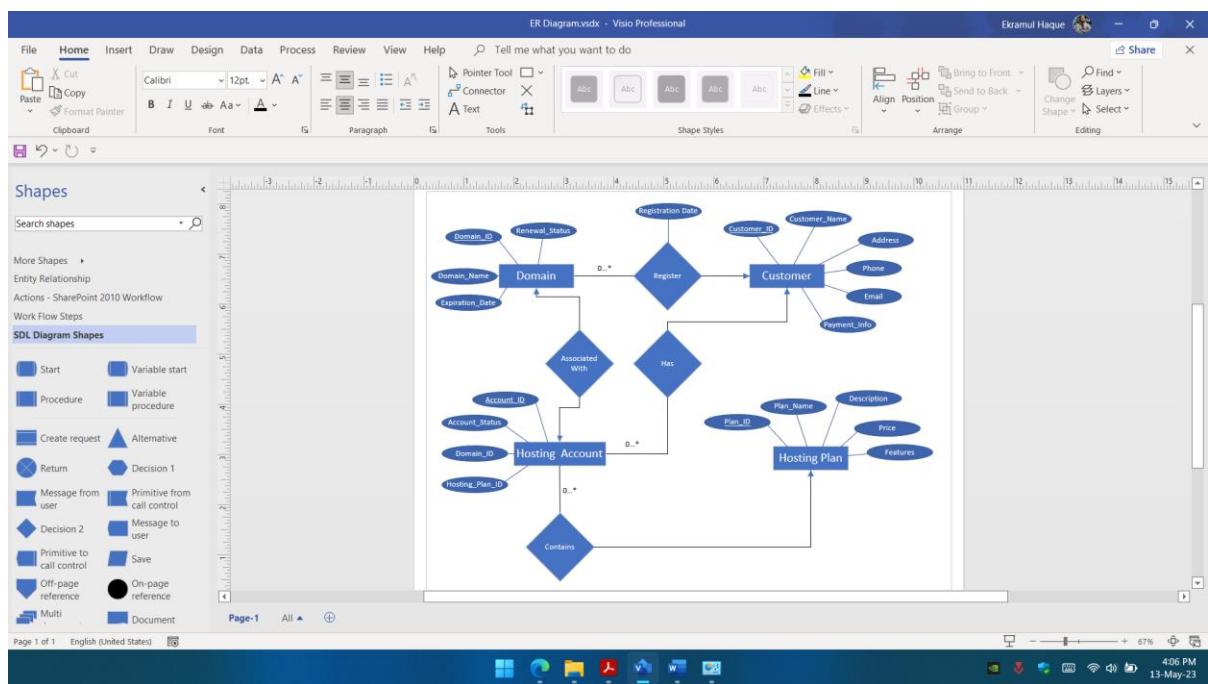
Beginning of Drawing



Middle of Drawing



Nearly end of Drawing



3. Normalization & Functional Dependencies

Register

Relation: Customer Register Domain

UNF:

Domain ID, Domain_Name, Renewal_Status, Expiration_Date, Registration_Date,
Customer ID, Customer_Name, City, Country, Phone, Email, Payment_Info

1NF:

Domain ID, Customer ID, Phone, Domain_Name, Renewal_Status, Expiration_Date,
Registration_Date, Customer_Name, City, Country, Email, Payment_Info

2NF:

- 1) Domain ID, Customer ID, Domain_Name, Renewal_Status, Expiration_Date,
Registration_Date
- 2) Customer ID, Phone, Customer_Name, City, Country, Email, Payment_Info

3NF:

- 1) Domain ID, Customer ID, Domain_Name, Renewal_Status, Expiration_Date,
Registration_Date
- 2) Customer ID, Phone
- 3) Customer ID, Customer_Name, City, Email, Payment_Info
- 4) City, Country

Associated With

Relation: Domain Associated with Hosting Account

UNF:

Domain ID, Domain_Name, Renewal_Status, Expiration_Date, Account ID,
Account_Status

1NF:

Domain ID, Account ID, Domain_Name, Renewal_Status, Expiration_Date,
Account_Status

2NF:

- 1) Domain ID, Domain_Name, Renewal_Status, Expiration_Date
- 2) Account ID, Account_Status
- 3) Domain ID, Account ID

3NF:

- 1) Domain ID, Domain_Name, Renewal_Status, Expiration_Date
- 2) Account ID, Account_Status
- 3) Domain ID, Account ID

Has

Relation: **Customer Has Hosting Account**

UNF: Customer ID, Customer_Name, City, Country, Phone, Email, Payment_Info, Account ID, Account_Status

1NF:

Customer ID, Account ID, Phone, Customer_Name, City, Country, Email, Payment_Info, Account_Status

2NF:

- 1) Customer ID, Phone, Customer_Name, City, Country, Email, Payment_Info
- 2) Account ID, Customer ID, Account_Status

3NF:

- 1) Customer ID, Phone, Customer_Name, City, Email, Payment_Info
- 2) City, Country
- 3) Account ID, Customer ID, Account_Status

Contains

Relation: **Hosting Account Contains Hosting Plan**

UNF:

Account ID, Account_Status, Plan ID, Plan_Name, Description, Price, Features

1NF:

Account ID, Plan ID, Account_Status, Plan_Name, Description, Price, Features

2NF:

- 1) Account ID, Plan ID, Account_Status
- 2) Plan ID, Plan_Name, Description, Price, Features

3NF:

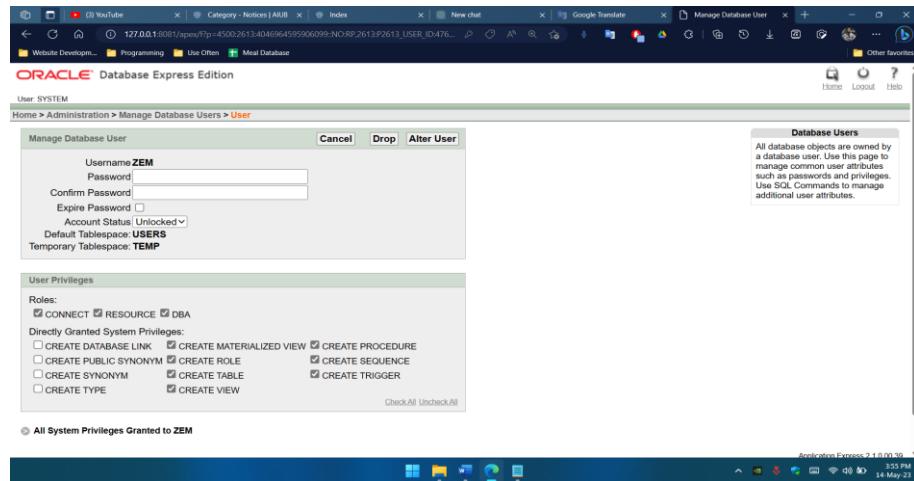
- 1) Account ID, Plan ID, Account_Status
- 2) Plan ID, Plan_Name, Description, Price, Features

FINAL TABLES

- 1) **Address:** City, Country
- 2) **Phone:** Customer ID, Phone
- 3) **Customer:** Customer ID, Customer_Name, City, Email, Payment_Info
- 4) **DC_Link:** Domain ID, Customer ID, Domain_Name, Registration_Date, Expiration_Date, Renewal_Status
- 5) **Domain:** Domain ID, Domain_Name, Expiration_Date, Renewal_Status
- 6) **Hosting Account:** Account ID, Account_Status
- 7) **DHA_Link:** Domain ID, Account ID
- 8) **CHA_Link:** Account ID, Customer ID, Account_Status
- 9) **Hosting Plan:** Plan ID, Plan_Name, Description, Price, Features
- 10) **PHA_Link:** Account ID, Plan ID, Account_Status

4. Schema User Creation

create user ZEM identified by ZEM;
grant connect, resource, unlimited tablespace to ZEM;
ALTER USER ZEM DEFAULT TABLESPACE USERS;
ALTER USER ZEM TEMPORARY TABLESPACE TEMP;



5. Table Creation

Address Table

CREATE TABLE Address (
City VARCHAR2(50),
Country VARCHAR2(50),
CONSTRAINT PK_Address PRIMARY KEY (City)
);
DESCRIBE Address;

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
ADDRESS	CITY	Varchar2	50	-	-	1	-	-	-
	COUNTRY	Varchar2	50	-	-	-	✓	-	-

Phone_Number Table

```
CREATE TABLE Phone_Number (
    Customer_ID INT,
    Phone VARCHAR2(20),
    CONSTRAINT PK_Phone_Number PRIMARY KEY(Customer_ID, Phone)
);
DESCRIBE Phone_Number;
```

The screenshot shows the Oracle Database Express Edition SQL Commands interface. The SQL command window contains the code for creating the Phone_Number table and describing it. Below the command window is a table of columns for the PHONE_NUMBER table.

Object Type	Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
PHONE_NUMBER	CUSTOMER_ID	Number	-	-	0	1	-	-	-	-
	PHONE	VARCHAR2	20	-	-	2	-	-	-	-

Customer Table

```
CREATE TABLE Customer (
    Customer_ID INT,
    Customer_Name VARCHAR2(50),
    City VARCHAR2(50),
    Email VARCHAR2(50),
    Payment_Info VARCHAR2(150),
    CONSTRAINT PK_CUSTOMER PRIMARY KEY(Customer_ID),
    CONSTRAINT FK_Customer_City FOREIGN KEY (City) REFERENCES Address(City)
);
DESCRIBE Customer;
```

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

```

CREATE TABLE Customer (
    Customer_ID INT,
    Customer_Name VARCHAR2(50),
    City VARCHAR2(50),
    Email VARCHAR2(50),
    Payment_Info VARCHAR2(150),
    CONSTRAINT PK_CUSTOMER PRIMARY KEY(Customer_ID),
    CONSTRAINT FK_Customer_City FOREIGN KEY (City) REFERENCES Address(City)
);

DESCRIBE Customer;

```

Below the code, there is a table description for the CUSTOMER table:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMER	CUSTOMER_ID	Number	-	-	0	1	-	-	-
	CUSTOMER_NAME	Varchar2	50	-	-	-	✓	-	-
	CITY	Varchar2	50	-	-	-	✓	-	-
	EMAIL	Varchar2	50	-	-	-	✓	-	-
	PAYMENT_INFO	Varchar2	150	-	-	-	✓	-	-

At the bottom of the interface, it says "Application Express 2.1.0.00.39" and "12:00 AM 15-May-23".

DC_Link Table

CREATE TABLE DC_Link (

```

Domain_ID INT,
Customer_ID INT,
Domain_Name VARCHAR2(50),
Registration_Date DATE,
Expiration_Date DATE,
Renewal_Status VARCHAR2(50),
CONSTRAINT PK_DC_Link PRIMARY KEY (Domain_ID),
CONSTRAINT FK_DC_Link_Customer FOREIGN KEY (Customer_ID) REFERENCES
Customer(Customer_ID)
);

```

DESCRIBE DC_Link;

The screenshot shows the Oracle Database Express Edition interface. In the SQL Commands window, the following SQL code is run:

```

CREATE TABLE DC_Link (
    Domain_ID INT,
    Customer_ID INT,
    Domain_Name VARCHAR2(50),
    Registration_Date DATE,
    Expiration_Date DATE,
    Renewal_Status VARCHAR2(50),
    CONSTRAINT PK_DC_Link PRIMARY KEY (Domain_ID),
    CONSTRAINT FK_DC_Link_Customer FOREIGN KEY (Customer_ID) REFERENCES Customer(Customer_ID)
);

DESCRIBE DC_Link;

```

The results show the table structure:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DC_Link	DomainID	Number	-	0	1	-	-	-	
	CustomerID	Number	-	0	-	✓	-	-	
	Domain_Name	VARCHAR2	50	-	-	✓	-	-	
	Registration_Date	Date	7	-	-	✓	-	-	
	Expiration_Date	Date	7	-	-	✓	-	-	
	Renewal_Status	VARCHAR2	50	-	-	✓	-	-	

1 - 6

Language: en-us Application Express 2.1 0.00.39 Copyright © 1999, 2006, Oracle. All rights reserved.

Domain Table

CREATE TABLE Domain (

 Domain_ID INT,

 Domain_Name VARCHAR2(50),

 Expiration_Date DATE,

 Renewal_Status VARCHAR2(50),

 CONSTRAINT PK_Domain PRIMARY KEY (Domain_ID)

);

DESCRIBE Domain;

The screenshot shows the Oracle Database Express Edition interface. In the SQL Commands window, the following SQL code is run:

```

CREATE TABLE Domain (
    Domain_ID INT,
    Domain_Name VARCHAR2(50),
    Expiration_Date DATE,
    Renewal_Status VARCHAR2(50),
    CONSTRAINT PK_Domain PRIMARY KEY (Domain_ID)
);

DESCRIBE Domain;

```

The results show the table structure:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DOMAIN	DOMAIN_ID	Number	-	0	1	-	-	-	
	DOMAIN_NAME	VARCHAR2	50	-	-	-	✓	-	
	EXPIRATION_DATE	Date	7	-	-	-	✓	-	
	RENEWAL_STATUS	VARCHAR2	50	-	-	-	✓	-	

1 - 4

6:45 PM 5/14/2023

Hosting Account Table

```
CREATE TABLE Hosting_Account (
    Account_ID INT,
    Account_Status VARCHAR2(50),
    CONSTRAINT PK_Hosting_Account PRIMARY KEY (Account_ID)
);
```

```
DESCRIBE Hosting_Account;
```

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

```
CREATE TABLE Hosting_Account (
    Account_ID INT,
    Account_Status VARCHAR2(50),
    CONSTRAINT PK_Hosting_Account PRIMARY KEY (Account_ID)
);
DESCRIBE Hosting_Account;
```

Below the code, the Results tab is selected, showing the table structure:

Object Type	Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
HOSTING_ACCOUNT	ACCOUNT_ID	Number	-	-	0	1	-	-	-	-
HOSTING_ACCOUNT	ACCOUNT_STATUS	Varchar2	50	-	-	-	-	✓	-	-

At the bottom right of the interface, it says "Application Express 2.1.0.00.39" and "Copyright © 1999, 2006, Oracle. All rights reserved."

DHA_Link Table

```
CREATE TABLE DHA_Link (
    Domain_ID INT,
    Account_ID INT,
    CONSTRAINT PK_DHA_Link PRIMARY KEY (Domain_ID, Account_ID)
);
```

```
DESCRIBE DHA_Link;
```

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

```
CREATE TABLE DHA_Link (
  Domain_ID INT,
  Account_ID INT,
  CONSTRAINT PK_DHA_Link PRIMARY KEY (Domain_ID, Account_ID)
);

DESCRIBE DHA_Link;
```

The results pane shows the table structure:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DHA_LINK	DOMAIN_ID	Number	-	-	0	1	-	-	-
	ACCOUNT_ID	Number	-	-	0	2	-	-	-
							1 - 2		

Below the table structure, the text "1 row(s) selected" is visible.

CHA_Link Table

```
CREATE TABLE CHA_Link (
  Account_ID INT,
  Customer_ID INT,
  Account_Status VARCHAR2(50),
  CONSTRAINT PK_CHA_Link PRIMARY KEY (Account_ID),
  CONSTRAINT FK_CHA_Link_Customer FOREIGN KEY (Customer_ID) REFERENCES
Customer(Customer_ID)
);

DESCRIBE CHA_Link;
```

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

```

CREATE TABLE CHA_Link (
    Account_ID INT,
    Customer_ID INT,
    Account_Status VARCHAR2(50),
    CONSTRAINT PK_CHA_Link PRIMARY KEY (Account_ID),
    CONSTRAINT FK_CHA_Link_Customer FOREIGN KEY (Customer_ID) REFERENCES Customer(Customer_ID)
);

DESCRIBE CHA_Link;

```

Below the code, the results of the DESCRIBE command are shown in a table:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CHA_LINK	ACCOUNT_ID	Number	-	-	0	1	-	-	-
	CUSTOMER_ID	Number	-	-	0	-	✓	-	-
	ACCOUNT_STATUS	VARCHAR2	50	-	-	-	✓	-	-

At the bottom of the interface, it says "Language: en-us" and "Application Express 2.1.0.00.39 Copyright © 1999-2006, Oracle. All rights reserved."

Hosting_Plan Table

```

CREATE TABLE Hosting_Plan (
    Plan_ID INT,
    Plan_Name VARCHAR2(50),
    Description VARCHAR2(255),
    Price NUMBER(10,2),
    Features VARCHAR2(255),
    CONSTRAINT PK_Hosting_Plan PRIMARY KEY (Plan_ID)
);

```

DESCRIBE Hosting_Plan;

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

```

CREATE TABLE Hosting_Plan (
    Plan_ID INT,
    Plan_Name VARCHAR2(50),
    Description VARCHAR2(255),
    Price NUMBER(10,2),
    Features VARCHAR2(255),
    CONSTRAINT PK_Hosting_Plan PRIMARY KEY (Plan_ID)
);

DESCRIBE Hosting_Plan;

```

Below the code, the results of the DESCRIBE command are shown in a table:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
HOSTING_PLAN	PLAN_ID	Number	-	-	0	1	-	-	-
	PLAN_NAME	VARCHAR2	50	-	-	-	✓	-	-
	DESCRIPTION	VARCHAR2	255	-	-	-	✓	-	-
	PRICE	Number	-	10	2	-	✓	-	-
	FEATURES	VARCHAR2	255	-	-	-	✓	-	-

At the bottom of the interface, it says "Language: en-us" and "Application Express 2.1.0.00.39 Copyright © 1999-2006, Oracle. All rights reserved."

PHA_Link Table

```
CREATE TABLE PHA_Link (
    Account_ID INT CONSTRAINT PK_PHA_Link PRIMARY KEY,
    Plan_ID INT,
    Account_Status VARCHAR2(50),
    CONSTRAINT FK_PHA_Link_Plan_ID FOREIGN KEY (Plan_ID) REFERENCES
    Hosting_Plan(Plan_ID)
);

DESCRIBE PHA_Link;
```

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

```
CREATE TABLE PHA_Link (
    Account_ID INT CONSTRAINT PK_PHA_Link PRIMARY KEY,
    Plan_ID INT,
    Account_Status VARCHAR2(50),
    CONSTRAINT FK_PHA_Link_Plan_ID FOREIGN KEY (Plan_ID) REFERENCES Hosting_Plan(Plan_ID)
);
DESCRIBE PHA_Link;
```

Below the code, the Results tab is selected, displaying the table structure:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
PHA_LINK	ACCOUNT_ID	Number	-	-	0	1	-	-	-
	PLAN_ID	Number	-	-	0	-	✓	-	-
	ACCOUNT_STATUS	Varchar2	50	-	-	-	✓	-	-

6. Data Insertion

Address

- INSERT INTO Address (City, Country) VALUES ('New York', 'USA');
- INSERT INTO Address (City, Country) VALUES ('London', 'UK');
- INSERT INTO Address (City, Country) VALUES ('Paris', 'France');
- INSERT INTO Address (City, Country) VALUES ('Delhi', 'India');
- INSERT INTO Address (City, Country) VALUES ('Dhaka', 'Bangladesh');

Phone_Number

- a) INSERT INTO Phone_Number(Customer_ID, Phone) VALUES (1001, '+16468146310');
- b) INSERT INTO Phone_Number(Customer_ID, Phone) VALUES (1002, '+442073777000');
- c) INSERT INTO Phone_Number(Customer_ID, Phone) VALUES (1003, '+33142494949');
- d) INSERT INTO Phone_Number(Customer_ID, Phone) VALUES (1004, '+913322298787');
- e) INSERT INTO Phone_Number(Customer_ID, Phone) VALUES (1004, '+913340116800');
- f) INSERT INTO Phone_Number(Customer_ID, Phone) VALUES (1005, '+0966502186178');
- g) INSERT INTO Phone_Number(Customer_ID, Phone) VALUES (1006, '+8801756983077');
- h) INSERT INTO Phone_Number(Customer_ID, Phone) VALUES (1007, '+8801992555805');

Customer

- a) INSERT INTO Customer (Customer_ID, Customer_Name, City, Email, Payment_Info) VALUES (1001, 'John Doe', 'New York', 'john.doe@email.com', 'Credit Card: 3141592653589793');
- b) INSERT INTO Customer (Customer_ID, Customer_Name, City, Email, Payment_Info) VALUES (1002, 'Jane Smith', 'London', 'jane.smith@email.com', 'Pioneer: jane.smith@email.com');
- c) INSERT INTO Customer (Customer_ID, Customer_Name, City, Email, Payment_Info) VALUES (1003, 'Bob Johnson', 'Paris', 'bob.johnson@email.com', 'PayPal: bob.johnson@email.com');
- d) INSERT INTO Customer (Customer_ID, Customer_Name, City, Email, Payment_Info) VALUES (1004, 'Rakesh', 'Delhi', 'rakeshin@yahoo.com', 'Paytm: 012044656456');
- e) INSERT INTO Customer (Customer_ID, Customer_Name, Email, Payment_Info) VALUES (1005, 'Abdullah', 'Abdulla.12@gmail.com', 'Bank A/C: 98765432');

- f) INSERT INTO Customer (Customer_ID, Customer_Name, City, Email, Payment_Info)
VALUES (1006, Zahidul Islam, 'Dhaka', mdzahidofficial@gmail.com', 'Bkash:
01756983077');
- g) INSERT INTO Customer (Customer_ID, Customer_Name, City, Email, Payment_Info)
VALUES (1007, 'Afif', 'Dhaka', afif@gmail.com, 'Rocket: 019925558057');

DC_Link

- a) INSERT INTO DC_Link(Domain_ID, Customer_ID, Domain_Name, Registration_Date,
Expiration_Date, Renewal_Status) VALUES (200001, 1003, 'bobwings.com', '01-JAN-
22', '10-DEC-24', 'Renewed');
- b) INSERT INTO DC_Link(Domain_ID, Customer_ID, Domain_Name, Registration_Date,
Expiration_Date, Renewal_Status) VALUES (200002, 1005, 'abdwiz.xyz', '14-SEP-19',
'10-NOV-22', 'Not Renewed');
- c) INSERT INTO DC_Link(Domain_ID, Customer_ID, Domain_Name, Registration_Date,
Expiration_Date, Renewal_Status) VALUES (200003, 1001, 'doejohn.com', '15-AUG-
2015', '01-MAY-23', 'Renewal Pending');
- d) INSERT INTO DC_Link(Domain_ID, Customer_ID, Domain_Name, Registration_Date,
Expiration_Date, Renewal_Status) VALUES (200004, 1004, 'wingsman.org', '14-MAY-
23', '05-AUG-24', 'Renewed');
- e) INSERT INTO DC_Link(Domain_ID, Customer_ID, Domain_Name, Registration_Date,
Expiration_Date, Renewal_Status) VALUES (200005, 1002, 'codeyssey.com', '28-DEC-
15', '23-DEC-21', 'Not Renewed');

Domain

- a) NSERT INTO Domain(Domain_ID, Domain_Name, Expiration_Date, Renewal_Status)
VALUES (200001, 'bobwings.com', '10-DEC-24', 'Renewed');
- b) INSERT INTO Domain(Domain_ID, Domain_Name, Expiration_Date, Renewal_Status)
VALUES (200002, 'abdwiz.xyz', '10-NOV-22', 'Not Renewed');
- c) INSERT INTO Domain(Domain_ID, Domain_Name, Expiration_Date, Renewal_Status)
VALUES (200003, 'doejohn.com', '01-MAY-23', 'Renewal Pending');
- d) INSERT INTO Domain(Domain_ID, Domain_Name, Expiration_Date, Renewal_Status)
VALUES (200004, 'wingsman.org', '05-AUG-24', 'Renewed');

e) INSERT INTO Domain(Domain_ID, Domain_Name, Expiration_Date, Renewal_Status)
VALUES (200005, 'codeyssey.com', '23-DEC-21', 'Not Renewed');

Hosting_Account

- a) INSERT INTO Hosting_Account(Account_ID, Account_Status) VALUES (9001, 'Inactive');
- b) INSERT INTO Hosting_Account(Account_ID, Account_Status) VALUES (9002, 'Inactive');
- c) INSERT INTO Hosting_Account(Account_ID, Account_Status) VALUES (9003, 'Active');
- d) INSERT INTO Hosting_Account(Account_ID, Account_Status) VALUES (9004, 'Active');
- e) INSERT INTO Hosting_Account(Account_ID, Account_Status) VALUES (9005, 'Active');

DHA_Link

- a) INSERT INTO DHA_Link(Domain_ID, Account_ID) VALUES (200002, 9001);
- b) INSERT INTO DHA_Link(Domain_ID, Account_ID) VALUES (200005, 9002);
- c) INSERT INTO DHA_Link(Domain_ID, Account_ID) VALUES (200004, 9003);
- d) INSERT INTO DHA_Link(Domain_ID, Account_ID) VALUES (200001, 9004);
- e) INSERT INTO DHA_Link(Domain_ID, Account_ID) VALUES (200003, 9005);

CHA_Link

- a) INSERT INTO CHA_Link(Account_ID, Customer_ID, Account_Status) VALUES (9001, 1005, 'Inactive');
- b) INSERT INTO CHA_Link(Account_ID, Customer_ID, Account_Status) VALUES (9002, 1002, 'Inactive');
- c) INSERT INTO CHA_Link(Account_ID, Customer_ID, Account_Status) VALUES (9003, 1004, 'Active');
- d) INSERT INTO CHA_Link(Account_ID, Customer_ID, Account_Status) VALUES (9004, 1003, 'Active');
- e) INSERT INTO CHA_Link(Account_ID, Customer_ID, Account_Status) VALUES (9005, 1001, 'Active');

Hosting_Plan

- a) INSERT INTO Hosting_Plan(Plan_ID, Plan_Name, Description, Price, Features) VALUES (301, 'Basic', 'Ideal for personal websites and small businesses with low traffic.', 9.99, '10GB storage, SSL Certified, 10 Email, Basic website builder');
- b) INSERT INTO Hosting_Plan(Plan_ID, Plan_Name, Description, Price, Features) VALUES (302, 'Basic Plus', 'Designed for businesses with moderate traffic', 19.99, '20GB storage, SSL Certified, 30 Email, Basic website builder');
- c) INSERT INTO Hosting_Plan(Plan_ID, Plan_Name, Price, Features) VALUES (303, 'Standard', 29.99, '50GB storage, SSL Certified, 50 Email, Advanced website builder');
- d) INSERT INTO Hosting_Plan(Plan_ID, Plan_Name, Description, Price, Features) VALUES (304, 'Premium', 'Suitable for high-traffic websites and e-commerce stores.', 39.99, '100GB storage, SSL Certified, Unlimited Email, Priority customer support, Premium website builder');

PHA_Link

- a) INSERT INTO PHA_Link(Account_ID, Plan_ID, Account_Status) VALUES (9001, 302, 'Inactive');
- b) INSERT INTO PHA_Link(Account_ID, Plan_ID, Account_Status) VALUES (9002, 301, 'Inactive');
- c) INSERT INTO PHA_Link(Account_ID, Plan_ID, Account_Status) VALUES (9003, 302, 'Active');
- d) INSERT INTO PHA_Link(Account_ID, Plan_ID, Account_Status) VALUES (9004, 302, 'Active');
- e) INSERT INTO PHA_Link(Account_ID, Plan_ID, Account_Status) VALUES (9005, 304, 'Active');

7. Joining

Equijoin Question:

1. What are the customer names and their corresponding hosting plan names and prices?

Answer:

```
SELECT Customer.Customer_Name, Hosting_Plan.Plan_Name, Hosting_Plan.Price  
FROM Customer, CHA_Link, PHA_Link, Hosting_Plan  
WHERE ( (Customer.Customer_ID = CHA_Link.Customer_ID) and  
(CHA_Link.Account_ID = PHA_Link.Account_ID) and (PHA_Link.Plan_ID =  
Hosting_Plan.Plan_ID) );
```

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

```
1. What are the customer names and their corresponding hosting plan names and prices?  
Answer:  
SELECT Customer.Customer_Name, Hosting_Plan.Plan_Name, Hosting_Plan.Price  
FROM Customer, CHA_Link, PHA_Link, Hosting_Plan  
WHERE ( (Customer.Customer_ID = CHA_Link.Customer_ID) and (CHA_Link.Account_ID = PHA_Link.Account_ID) and (PHA_Link.Plan_ID = Hosting_Plan.Plan_ID) );
```

The Results tab shows the query output:

CUSTOMER_NAME	PLAN_NAME	PRICE
John Doe	Premium	39.99
Jane Smith	Basic	9.99
Bob Johnson	Basic Plus	19.99
Rakesh	Basic Plus	19.99
Abdullah	Basic Plus	19.99

5 rows returned in 0.00 seconds

CSV Export

Application Express 2.1.0.0.39
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Outer Join Questions:

- 1) What are the customer id, customer names, customer email and their corresponding domain id, domain names including customers who do not have any domains?

Answer:

```
SELECT Customer.CUSTOMER_ID, Customer.CUSTOMER_NAME,  
Customer.EMAIL, DC_Link.Domain_ID, DC_Link.Domain_Name  
FROM Customer, DC_Link
```

WHERE (DC_Link.Customer_ID (+) = Customer.Customer_ID);

```

1) What are the customer id, customer names, customer email and their corresponding domain id, domain names including customers who do not have any domains?
Answer:
SELECT Customer.CUSTOMER_ID,Customer.CUSTOMER_NAME,Customer.EMAIL, DC_Link.Domain_ID, DC_Link.Domain_Name
FROM Customer, DC_Link
WHERE (Customer.Customer_ID = DC_Link.Customer_ID (+));

```

CUSTOMER_ID	CUSTOMER_NAME	EMAIL	DOMAIN_ID	DOMAIN_NAME
1003	Bob Johnson	bob.johnson@gmail.com	200001	bobwings.com
1005	Abdullah	Abdulla.12@gmail.com	200002	abdwiz.xyz
1001	John Doe	john.doe@gmail.com	200003	doejohn.com
1004	Rakesh	rakesh@yahoo.com	200004	wingsman.org
1002	Jane Smith	jane.smith@gmail.com	200005	codyssy.com
1006	Zahidul Islam	msdzahidofficial@gmail.com	-	-
1007	Aff	aff@gmail.com	-	-

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

- 2) What are the hosting plan id, plan name, price, features, and their corresponding hosting account id, including hosting plan that are not linked to any hosting account?

Answer:

```

SELECT Hosting_Plan.Plan_ID,Hosting_Plan.Plan_Name,Hosting_Plan.Price,
Hosting_Plan.Features, PHA_Link.Account_ID
FROM Hosting_Plan, PHA_Link
WHERE (Hosting_Plan.Plan_ID = PHA_Link.Plan_ID (+));

```

```

2) What are the hosting plan id, plan name, price, features and their corresponding hosting account id, including hosting plan that are not linked to any hosting account?
Answer:
SELECT Hosting_Plan.Plan_ID,Hosting_Plan.Plan_Name,Hosting_Plan.Price, Hosting_Plan.Features, PHA_Link.Account_ID
FROM Hosting_Plan, PHA_Link
WHERE (Hosting_Plan.Plan_ID = PHA_Link.Plan_ID (+));

```

PLAN_ID	PLAN_NAME	PRICE	FEATURES	ACCOUNT_ID
302	Basic Plus	19.99	20GB storage, SSL Certified, 30 Email, Basic website builder	9001
301	Basic	9.99	10GB storage, SSL Certified, 10 Email, Basic website builder	9002
302	Basic Plus	19.99	20GB storage, SSL Certified, 30 Email, Basic website builder	9003
302	Basic Plus	19.99	20GB storage, SSL Certified, 30 Email, Basic website builder	9004
304	Premium	39.99	100GB storage, SSL Certified, Unlimited Email, Priority customer support, Premium website builder	9005
303	Standard	29.99	50GB storage, SSL Certified, 50 Email, Advanced website builder	-

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

Self-Join Question:

- 1) What are the customer names and the names of other customers who live in the same city as them?

Answer:

```
SELECT c1.Customer_ID, c1.Email, c1.Customer_Name, c2.Customer_Name as  
Same_City_Customer
```

```
FROM Customer c1, Customer c2
```

```
WHERE c1.City = c2.City AND c1.Customer_ID <> c2.Customer_ID;
```

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

```
1) What are the customer names and the names of other customers who live in the same city as them?  
Answer:  
SELECT c1.Customer_ID, c1.Email, c1.Customer_Name, c2.Customer_Name as Same_City_Customer  
FROM Customer c1, Customer c2  
WHERE c1.City = c2.City AND c1.Customer_ID <> c2.Customer_ID;
```

The results section displays the following table:

CUSTOMER_ID	EMAIL	CUSTOMER_NAME	SAME_CITY_CUSTOMER
1007	aff@gmail.com	Aff	Zahidul Islam
1008	mzahidofficial@gmail.com	Zahidul Islam	Aff

2 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.

8. Subquery

- 1) What is the total number of domains owned by customers who live in the city "New York"?

Answer:

```
SELECT COUNT(*) AS DOMAIN  
FROM DC_Link  
WHERE Customer_ID IN (  
SELECT Customer_ID  
FROM Customer  
WHERE City = 'New York'  
);
```

The screenshot shows a Windows desktop environment with a browser window open to the Oracle Database Express Edition SQL Commands interface. The URL is 127.0.0.1:8081/jspw/f?p=4500:1003:2972356912931645:NO:::1. The page title is 'ORACLE® Database Express Edition'. The user is 'ZEM'. The current location is 'Home > SQL > SQL Commands'. A dropdown menu shows 'Autocommit' is checked and 'Display / 5000' is selected. The SQL query is:

```

1) What is the total number of domains owned by customers who live in the city "New York"?
Answer:
SELECT COUNT(*) AS DOMAIN
FROM DC_Link
WHERE Customer_ID IN (
  SELECT Customer_ID
  FROM Customer
  WHERE City = 'New York'
);

```

The results table has one row with 'DOMAIN' value '1'. Below the table, it says '1 rows returned in 0.00 seconds' and there is a 'CSV Export' link. At the bottom right of the browser window, it says 'Application Express 2.1 0.00.39' and 'Copyright © 1999, 2006, Oracle. All rights reserved.' The desktop taskbar at the bottom shows various icons.

- 2) What is the average price of hosting plans for customers who live in London?

Answer:

```

SELECT AVG(Price)
FROM Hosting_Plan
WHERE Plan_ID IN (
  SELECT Plan_ID
  FROM PHA_Link
  WHERE Account_ID IN (
    SELECT Account_ID
    FROM CHA_Link
    WHERE Customer_ID IN (
      SELECT Customer_ID
      FROM Customer
      WHERE City = 'London'
    )
  )
);

```

```

SELECT AVG(Price)
FROM Hosting_Plan
WHERE Plan_ID IN (
    SELECT Plan_ID
    FROM PHA_Link
    WHERE Account_ID IN (
        SELECT Account_ID
        FROM CHA_Link
        WHERE Customer_ID IN (
            SELECT Customer_ID
            FROM Customer
            WHERE City = 'London'
        )));

```

The screenshot shows the Oracle Database Express Edition interface. A SQL command is entered in the main pane to calculate the average price of hosting plans for customers in London. The results show a single row with an average price of 9.99. The interface includes tabs for Results, Explain, Describe, Saved SQL, and History.

- 3) What are the id, name and emails of all customers who have at least one active hosting account?

Answer:

```

SELECT Customer_ID, Customer_Name, Email
FROM Customer
WHERE Customer_ID IN (
    SELECT Customer_ID
    FROM CHA_Link
    WHERE Account_Status = 'Active'
);

```

);

```

SELECT Customer_ID, Customer_Name, Email
FROM Customer
WHERE Customer_ID IN (
    SELECT Customer_ID
    FROM CHA_Link
    WHERE Account_Status = 'Active'
);

```

The screenshot shows the Oracle Database Express Edition interface. A SQL command is entered to select customer details where the account status is Active. The results show three rows of data: Customer_ID 1001 (John Doe), Customer_ID 1003 (Bob Johnson), and Customer_ID 1004 (Rakesh). The interface includes tabs for Results, Explain, Describe, Saved SQL, and History.

9. View

Simple View:

- 1) Create a view that shows the customer ID, customer name, and email for all customers.

Answer:

```
CREATE VIEW customer_info AS  
SELECT Customer_ID, Customer_Name, Email  
FROM Customer;
```

```
SELECT *  
FROM customer_info;
```

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

```
1) Create a view that shows the customer ID, customer name, and email for all customers.  
CREATE VIEW customer_info AS  
SELECT Customer_ID, Customer_Name, Email  
FROM Customer;  
  
SELECT *  
FROM customer_info;
```

Below the code, the results are displayed in a table:

CUSTOMER_ID	CUSTOMER_NAME	EMAIL
1001	John Doe	john.doe@email.com
1002	Jane Smith	jane.smith@email.com
1003	Bob Johnson	bob.johnson@email.com
1004	Rakesh	rakesh@yahoo.com
1005	Abdullah	Abdulla.12@gmail.com
1006	Zahidul Islam	mdzrahidofficial@gmail.com
1007	Afif	afif@gmail.com

7 rows returned in 0.00 seconds

Complex View:

- 1) What is the total revenue generated from each customer's hosting plans?

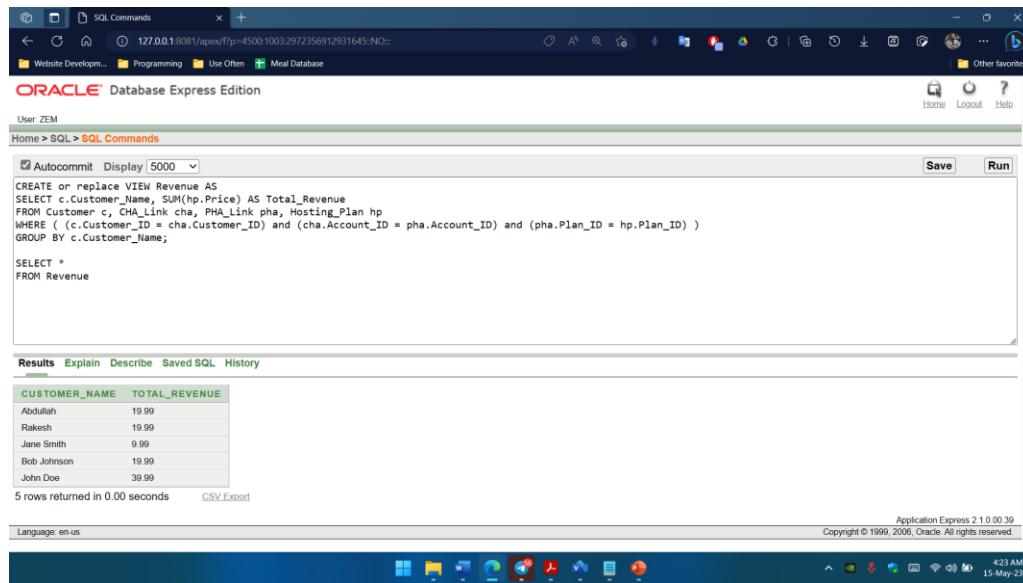
Answer:

CREATE or replace VIEW Revenue AS

```
SELECT c.Customer_Name, SUM(hp.Price) AS Total_Revenue
FROM Customer c, CHA_Link cha, PHA_Link pha, Hosting_Plan hp
WHERE ( (c.Customer_ID = cha.Customer_ID) and (cha.Account_ID =
pha.Account_ID) and (pha.Plan_ID = hp.Plan_ID) )
GROUP BY c.Customer_Name;
```

SELECT *

FROM Revenue



The screenshot shows the Oracle Database Express Edition interface. In the top navigation bar, there are links for Website Development, Programming, Use Often, and Mail Database. The main window title is "SQL Commands". Below the title, it says "User: ZEM". The URL in the address bar is "127.0.0.1:8081/apex/f?p=4500:1003:2972356912931645::NO:::". The "Display" dropdown is set to "5000". The SQL command entered is:

```
CREATE or replace VIEW Revenue AS
SELECT c.Customer_Name, SUM(hp.Price) AS Total_Revenue
FROM Customer c, CHA_Link cha, PHA_Link pha, Hosting_Plan hp
WHERE ( (c.Customer_ID = cha.Customer_ID) and (cha.Account_ID =
pha.Account_ID) and (pha.Plan_ID = hp.Plan_ID) )
GROUP BY c.Customer_Name;

SELECT *
FROM Revenue
```

Below the SQL area, the "Results" tab is selected. The results show a table with two columns: CUSTOMER_NAME and TOTAL_REVENUE. The data is:

CUSTOMER_NAME	TOTAL_REVENUE
Abdullah	19.99
Rakesh	19.99
Jane Smith	9.99
Bob Johnson	19.99
John Doe	39.99

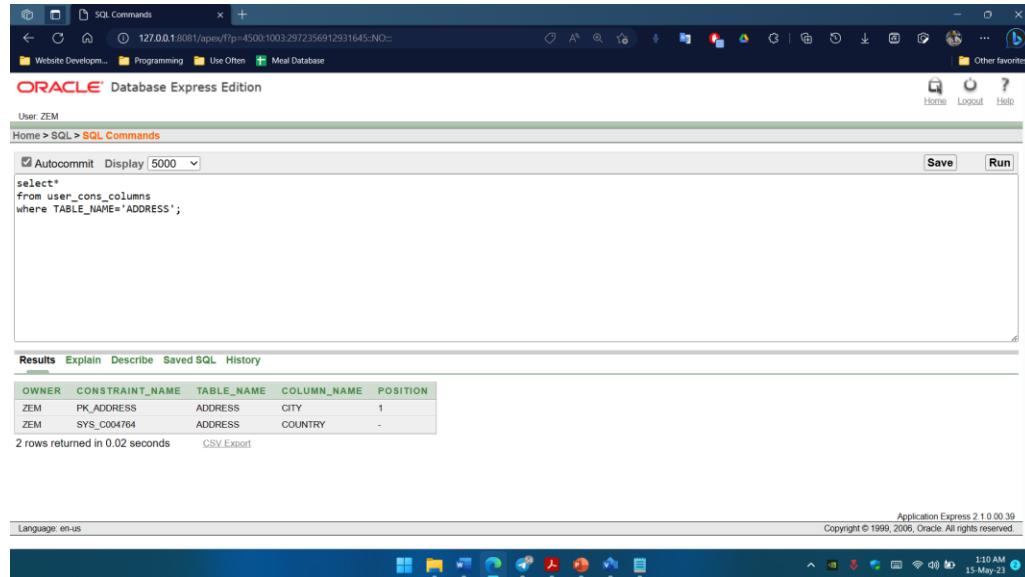
At the bottom of the results, it says "5 rows returned in 0.00 seconds". There is also a "CSV Export" link.

In the bottom right corner of the interface, it says "Application Express 2.1 10.00.30" and "Copyright © 1999, 2006, Oracle. All rights reserved."

10. Constraints of Tables

Address Table

ALTER TABLE Address MODIFY Country NOT NULL;



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

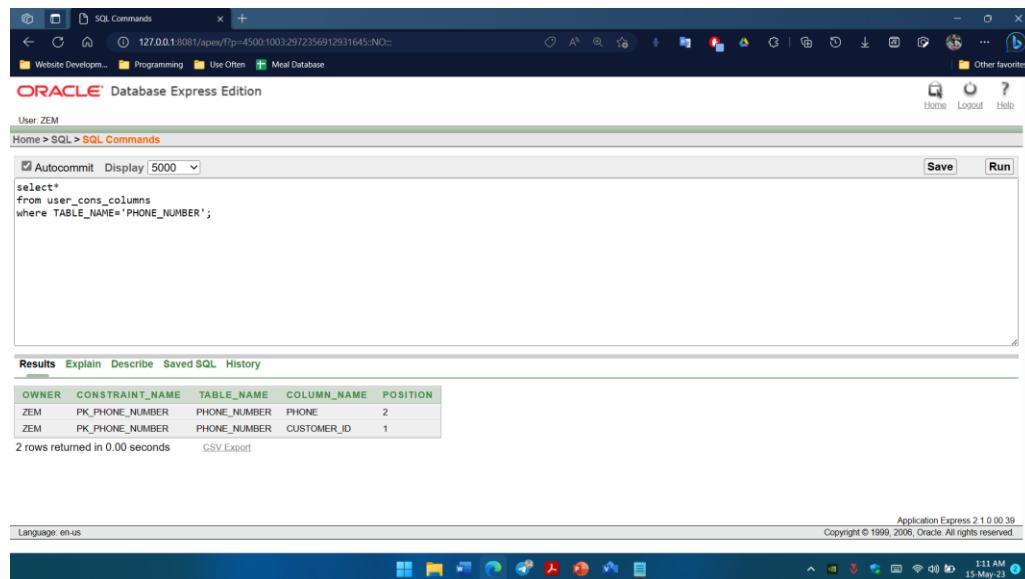
```
select*
from user_cons_columns
where TABLE_NAME='ADDRESS';
```

The results pane shows a table with the following data:

OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	PK_ADDRESS	ADDRESS	CITY	1
ZEM	SYS_C004764	ADDRESS	COUNTRY	-

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

Phone_Number



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

```
select*
from user_cons_columns
where TABLE_NAME='PHONE_NUMBER';
```

The results pane shows a table with the following data:

OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	PK_PHONE_NUMBER	PHONE_NUMBER	PHONE	2
ZEM	PK_PHONE_NUMBER	PHONE_NUMBER	CUSTOMER_ID	1

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

Customer Table

```
ALTER TABLE Customer MODIFY Customer_Name NOT NULL;  
ALTER TABLE Customer MODIFY Payment_Info NOT NULL;  
ALTER TABLE Customer MODIFY Email NOT NULL;
```

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

```
select*  
from user_cons_columns  
where TABLE_NAME='CUSTOMER';
```

The results pane shows a table with the following data:

OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	PK_CUSTOMER	CUSTOMER	CUSTOMER_ID	1
ZEM	FK_CUSTOMER_CITY	CUSTOMER	CITY	1
ZEM	SYS_C004793	CUSTOMER	EMAIL	-
ZEM	SYS_C004794	CUSTOMER	PAYMENT_INFO	-
ZEM	SYS_C004795	CUSTOMER	CUSTOMER_NAME	-

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

DC_Link

```
ALTER TABLE DC_Link MODIFY Renewal_Status NOT NULL;  
ALTER TABLE DC_Link MODIFY Expiration_Date NOT NULL;  
ALTER TABLE DC_Link MODIFY Registration_Date NOT NULL;  
ALTER TABLE DC_Link MODIFY Domain_Name NOT NULL;  
ALTER TABLE DC_Link MODIFY Customer_ID NOT NULL;  
alter table DC_Link add constraint UQ_DC_Link UNIQUE (Domain_Name);
```

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

```
select*  
from user_cons_columns  
where TABLE_NAME='DC_LINK';
```

The results pane shows a table with the following data:

OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	FK_DC_LINK_CUSTOMER	DC_LINK	CUSTOMER_ID	1
ZEM	PK_DC_LINK	DC_LINK	DOMAIN_ID	1
ZEM	UQ_DC_LINK	DC_LINK	DOMAIN_NAME	1
ZEM	SYS_C004797	DC_LINK	CUSTOMER_ID	-
ZEM	SYS_C004798	DC_LINK	DOMAIN_NAME	-
ZEM	SYS_C004799	DC_LINK	REGISTRATION_DATE	-
ZEM	SYS_C004800	DC_LINK	EXPIRATION_DATE	-
ZEM	SYS_C004801	DC_LINK	RENEWAL_STATUS	-

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

Domain table

```
ALTER TABLE Domain MODIFY Renewal_Status NOT NULL;  
ALTER TABLE Domain MODIFY Expiration_Date NOT NULL;  
ALTER TABLE Domain MODIFY Domain_Name NOT NULL;  
alter table Domain add constraint UQ_DC_Link UNIQUE (Domain_Name);
```

The screenshot shows the Oracle Database Express Edition interface. In the SQL Commands window, the following SQL code is run:

```
select*  
from user_cons_columns  
where TABLE_NAME='DOMAIN';
```

The results show four constraints:

OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	PK_DOMAIN	DOMAIN	DOMAIN_ID	1
ZEM	SYS_C004774	DOMAIN	DOMAIN_NAME	-
ZEM	SYS_C004775	DOMAIN	EXPIRATION_DATE	-
ZEM	SYS_C004776	DOMAIN	RENEWAL_STATUS	-

4 rows returned in 0.00 seconds

Hosting_Account Table

```
ALTER TABLE Hosting_Account MODIFY Account_Status NOT NULL;
```

The screenshot shows the Oracle Database Express Edition interface. In the SQL Commands window, the following SQL code is run:

```
select*  
from user_cons_columns  
where TABLE_NAME='HOSTING_ACCOUNT';
```

The results show two constraints:

OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	PK_HOSTING_ACCOUNT	HOSTING_ACCOUNT	ACCOUNT_ID	1
ZEM	SYS_C004777	HOSTING_ACCOUNT	ACCOUNT_STATUS	-

2 rows returned in 0.01 seconds

CHA_Link Table

ALTER TABLE CHA_Link MODIFY Account_Status NOT NULL;

ALTER TABLE CHA_Link MODIFY Customer_ID NOT NULL;

The screenshot shows the Oracle Database Express Edition interface. In the SQL Commands window, the following SQL code is run:

```
select*
from user_cons_columns
where TABLE_NAME='CHA_LINK';
```

The results show four rows of constraints:

OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	FK_CHA_LINK_CUSTOMER	CHA_LINK	CUSTOMER_ID	1
ZEM	PK_CHA_LINK	CHA_LINK	ACCOUNT_ID	1
ZEM	SYS_C004802	CHA_LINK	CUSTOMER_ID	-
ZEM	SYS_C004803	CHA_LINK	ACCOUNT_STATUS	-

4 rows returned in 0.00 seconds

Hosting_Plan Table

ALTER TABLE Hosting_Plan MODIFY Features NOT NULL;

ALTER TABLE Hosting_Plan MODIFY Price NOT NULL;

ALTER TABLE Hosting_Plan MODIFY Plan_Name NOT NULL;

ALTER TABLE Hosting_Plan MODIFY Description DEFAULT 'N/A';

The screenshot shows the Oracle Database Express Edition interface. In the SQL Commands window, the following SQL code is run:

```
select*
from user_cons_columns
where TABLE_NAME='HOSTING_PLAN';
```

The results show four rows of constraints:

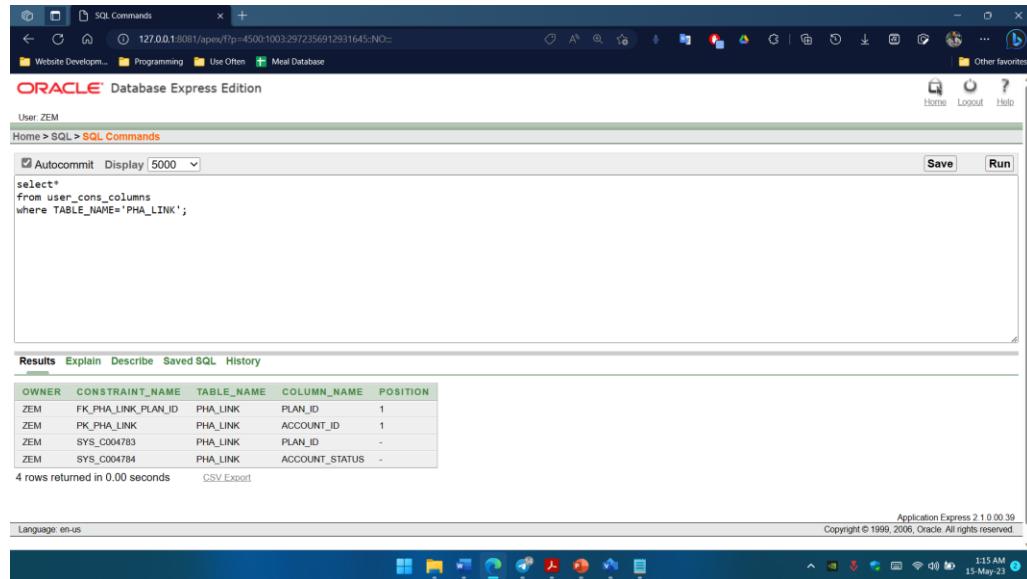
OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	PK_HOSTING_PLAN	HOSTING_PLAN	PLAN_ID	1
ZEM	SYS_C004780	HOSTING_PLAN	PLAN_NAME	-
ZEM	SYS_C004781	HOSTING_PLAN	FEATURES	-
ZEM	SYS_C004782	HOSTING_PLAN	PRICE	-

4 rows returned in 0.01 seconds

PHA_Link Table

ALTER TABLE PHA_Link MODIFY Account_Status NOT NULL;

ALTER TABLE PHA_Link MODIFY Plan_ID NOT NULL;



The screenshot shows a Windows desktop environment with a taskbar at the bottom. The taskbar includes icons for File Explorer, Task View, Start, Task Switcher, and several pinned applications. The system tray shows the date (15-May-23), time (11:15 AM), battery level, and signal strength.

The main window is titled "SQL Commands" and is part of the "ORACLE Database Express Edition" interface. The URL in the address bar is "127.0.0.1:8081/apex/f?p=4500:1003:2972356912931645::NO::". The page navigation bar includes "Home", "Logout", and "Help".

The SQL command entered is:

```
select*
from user_cons_columns
where TABLE_NAME='PHA_LINK';
```

The results section displays the following table:

OWNER	CONSTRAINT_NAME	TABLE_NAME	COLUMN_NAME	POSITION
ZEM	FK_PHA_LINK_PLAN_ID	PHA_LINK	PLAN_ID	1
ZEM	PK_PHA_LINK	PHA_LINK	ACCOUNT_ID	1
ZEM	SYS_C004783	PHA_LINK	PLAN_ID	-
ZEM	SYS_C004784	PHA_LINK	ACCOUNT_STATUS	-

Below the table, it says "4 rows returned in 0.00 seconds" and there are "CSV Export" and "Excel" buttons.

At the bottom of the window, it says "Language: en-us" and "Application Express 2.1.0.00.39 Copyright © 1999, 2006, Oracle. All rights reserved".

11. Discussion & Conclusion

Hosting and domain management is a crucial aspect of website development and maintenance. The development of a database relational schema project for hosting and domain management is essential in providing a systematic and efficient method of managing web hosting and domain activities.

The project included the creation of several tables, each with a specific purpose and data structure. Each table has its unique primary key and foreign key constraints, which ensures the data integrity of the system.

The project's relational schema provides a structured and organized way of managing web hosting and domain management activities. The use of primary and foreign keys and constraints ensures that the data stored in the system is accurate, reliable, and consistent.