

## 5-2 Milestone Four: Enhancement Three: Databases

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### Artifact:

For my ePortfolio, I've selected the Inventory Tracking System project from DAD 220:

Intro to Structural Database Environments. The original version of this artifact was a

simple MySQL database created and managed through the terminal. This project

involved creating basic tables, defining relationships between them, and executing SQL

commands to manage the data. While functional, the original system lacked user

interaction and complex features that would make it more practical for real-world

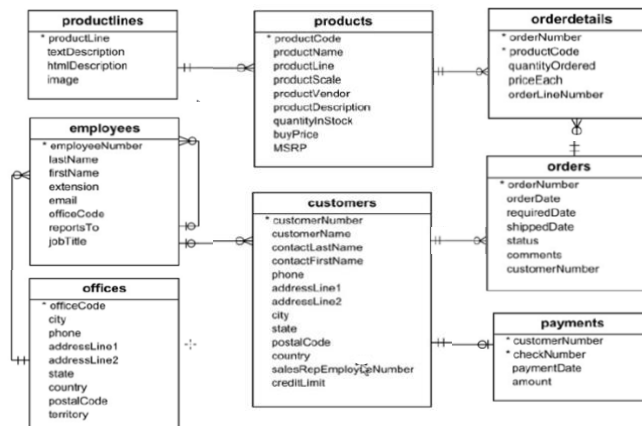
applications.

### MYSQL Schema & Tables:

```
mysql> CREATE TABLE Customers (
  -> CustomerID INT,
  -> FirstName VARCHAR(25),
  -> LastName VARCHAR(25),
  -> Street VARCHAR(50),
  -> City VARCHAR(50),
  -> State VARCHAR(25),
  -> ZipCode VARCHAR(10),
  -> Telephone VARCHAR(15));
Query OK, 0 rows affected (0.06 sec)
```

Field	Type	Null	Key	Default	Extra
CustomerID	int(11)	NO	PRI	0	
FirstName	varchar(25)	YES		NULL	
LastName	varchar(25)	YES		NULL	
Street	varchar(50)	YES		NULL	
City	varchar(50)	YES		NULL	
State	varchar(25)	YES		NULL	
ZipCode	varchar(10)	YES		NULL	
Telephone	varchar(15)	YES		NULL	

8 rows in set (0.00 sec)

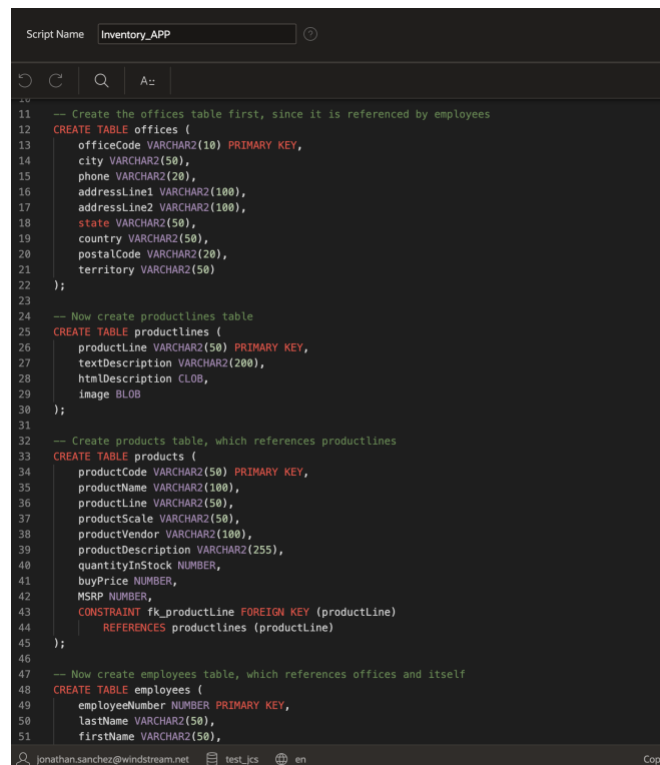


## Enhanced Version:

For the enhancement, I decided to transform the ERD (Entity-Relation Diagram) from the MySQL Database into a fully functional Oracle APEX application. I created schemas, tables, and relationships based on the original ERD and implemented a user-friendly interface for managing inventory, customers, and orders. I also added a reporting dashboard to generate insights on stock levels and sales trends. Key features of the enhanced version include:

- **Database Implementation:** I converted the ERD into SQL tables and implemented the necessary relationships such as one-to-many and self-referencing.
- **CRUD Operations:** The application allows for Create, Read, Update, and Delete operations on inventory items, orders, and customers.
- **Reporting Dashboard:** I created SQL queries to generate useful reports, such as tracking low-stock items and analyzing sales trends.
- **User Interface:** I built forms to interact with the database and designed a simple yet functional interface to input and manage data.
- **Data Seeding:** I seeded the database with sample data to demonstrate functionality and test queries.

## Tables:



```
Script Name: Inventory_APP

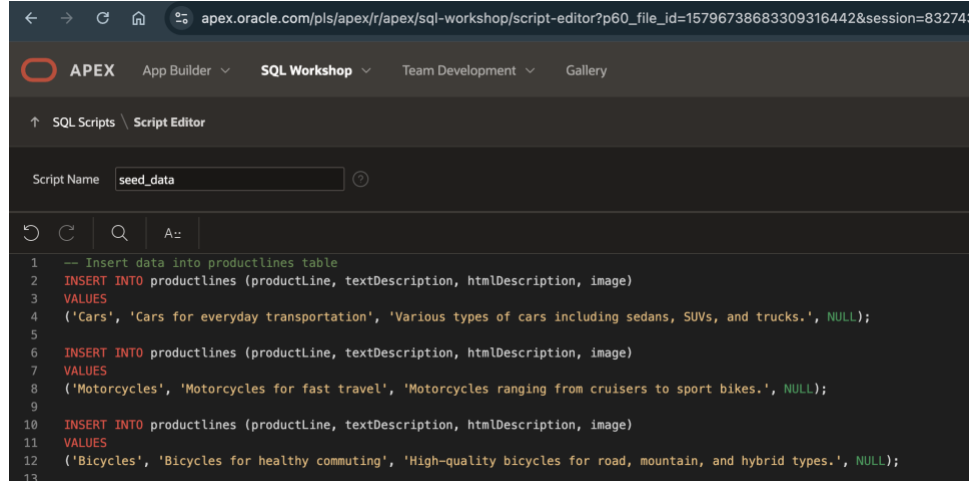
-- Create the offices table first, since it is referenced by employees
CREATE TABLE offices (
  officeCode VARCHAR2(10) PRIMARY KEY,
  city VARCHAR2(50),
  phone VARCHAR2(20),
  addressLine1 VARCHAR2(100),
  addressLine2 VARCHAR2(100),
  state VARCHAR2(50),
  country VARCHAR2(50),
  postalCode VARCHAR2(20),
  territory VARCHAR2(50)
);

-- Now create productlines table
CREATE TABLE productlines (
  productLine VARCHAR2(50) PRIMARY KEY,
  textDescription VARCHAR2(200),
  htmlDescription CLOB,
  image BLOB
);

-- Create products table, which references productlines
CREATE TABLE products (
  productCode VARCHAR2(50) PRIMARY KEY,
  productName VARCHAR2(100),
  productLine VARCHAR2(50),
  productScale VARCHAR2(50),
  productVendor VARCHAR2(100),
  productDescription VARCHAR2(255),
  quantityInStock NUMBER,
  buyPrice NUMBER,
  MSRP NUMBER,
  CONSTRAINT fk_productLine FOREIGN KEY (productLine)
    REFERENCES productlines (productLine)
);

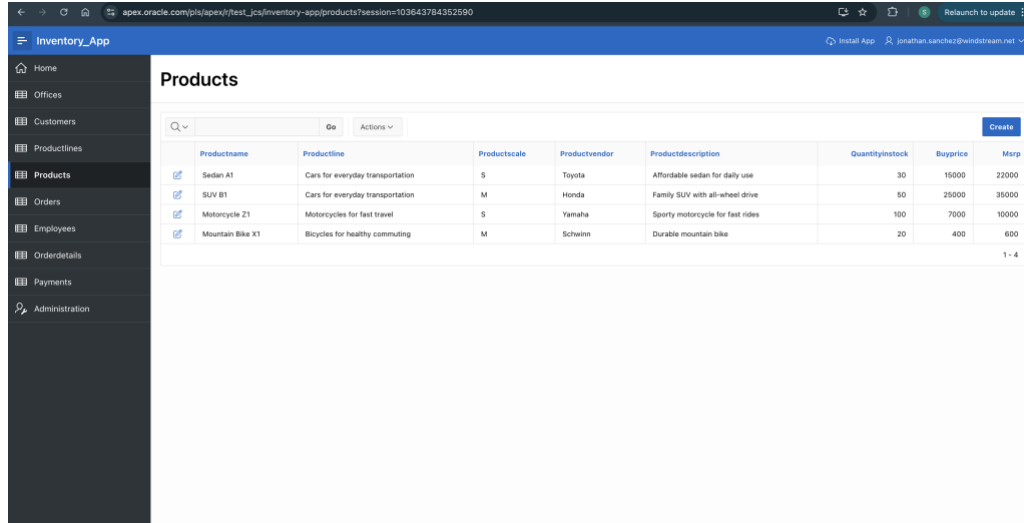
-- Now create employees table, which references offices and itself
CREATE TABLE employees (
  employeeNumber NUMBER PRIMARY KEY,
  lastName VARCHAR2(50),
  firstName VARCHAR2(50),
```

## Seeding:



```
1 -- Insert data into productlines table
2 INSERT INTO productlines (productline, textDescription, htmlDescription, image)
3 VALUES
4 ('Cars', 'Cars for everyday transportation', 'Various types of cars including sedans, SUVs, and trucks.', NULL);
5
6 INSERT INTO productlines (productline, textDescription, htmlDescription, image)
7 VALUES
8 ('Motorcycles', 'Motorcycles for fast travel', 'Motorcycles ranging from cruisers to sport bikes.', NULL);
9
10 INSERT INTO productlines (productline, textDescription, htmlDescription, image)
11 VALUES
12 ('Bicycles', 'Bicycles for healthy commuting', 'High-quality bicycles for road, mountain, and hybrid types.', NULL);
13
```

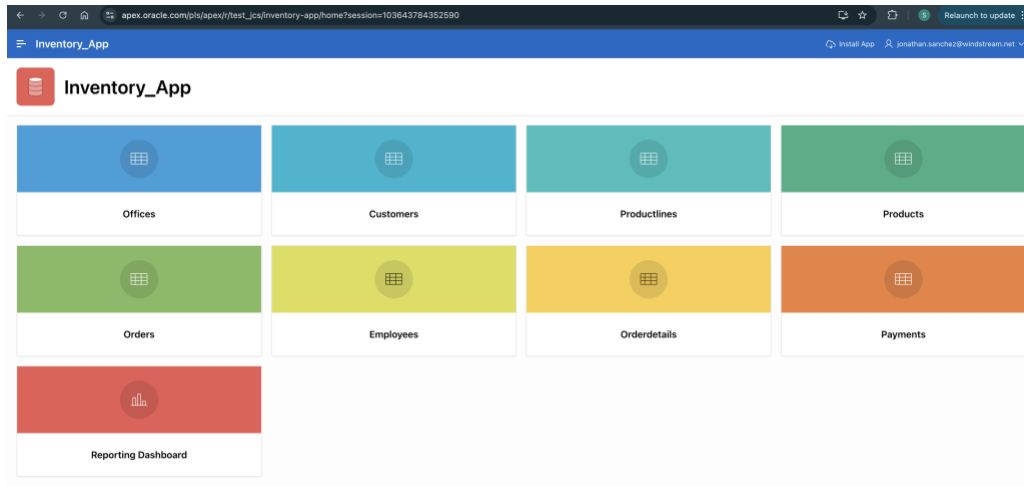
## Products:



The screenshot shows the 'Products' page of the 'Inventory\_App'. It features a table with columns: Productname, Productline, Productscale, Productvendor, Productdescription, Quantityinstock, Buyprice, and Marg. The table contains four rows of data for different vehicle types.

Productname	Productline	Productscale	Productvendor	Productdescription	Quantityinstock	Buyprice	Marg
Sedan A1	Cars for everyday transportation	S	Toyota	Affordable sedan for daily use	30	15000	22000
SUV B1	Cars for everyday transportation	M	Honda	Family SUV with all-wheel drive	50	25000	35000
Motorcycle Z1	Motorcycles for fast travel	S	Yamaha	Sporty motorcycle for fast rides	100	7000	10000
Mountain Bike X1	Bicycles for healthy commuting	M	Schwinn	Durable mountain bike	20	400	600

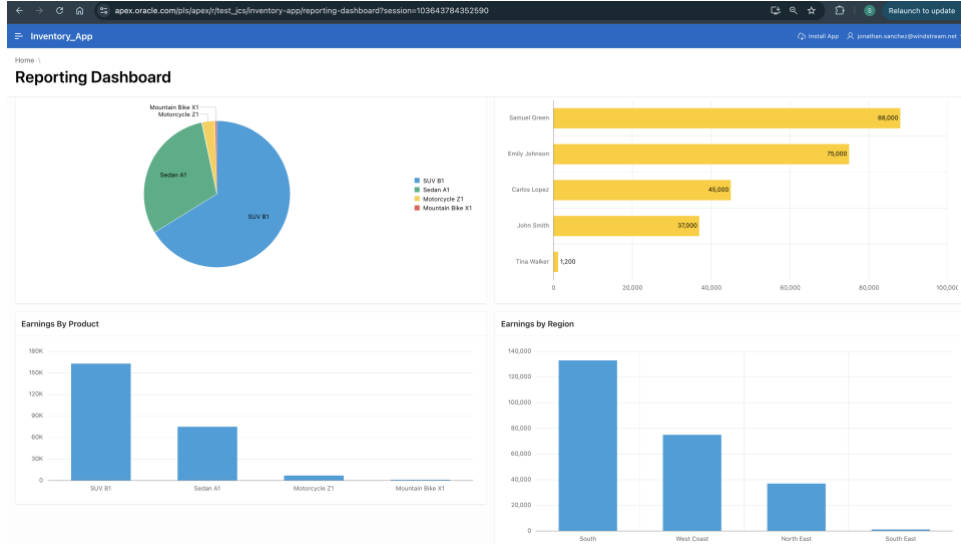
## Home:



The screenshot shows the 'Home' page of the 'Inventory\_App'. It features a grid of buttons for navigating to different sections: Offices, Customers, Productlines, Products, Orders, Employees, Orderdetails, Payments, and a Reporting Dashboard.

Offices	Customers	Productlines	Products
Orders	Employees	Orderdetails	Payments
Reporting Dashboard			

## Reporting Dashboard:



## Justification:

I chose this artifact because it allowed me to combine my theoretical understanding of database design with practical application development. This project helped me develop skills in database management, SQL querying, and Oracle APEX application-building. The following components of the artifact highlight the skills I demonstrated:

- **Database Design:** I took the initial ERD and transformed it into a fully functioning database, demonstrating my understanding of normalization, table relationships, and data integrity.
- **SQL Querying:** I wrote SQL queries for reports that track inventory levels, sales, and customer data, showcasing my ability to work with data efficiently.
- **Application Development:** By using Oracle APEX, I developed an interactive system that allows for the management and manipulation of data through forms and reports.
- **User Interface Development:** The forms I built made it easy for users to interact with the database, making the system more practical for real-world use.
- **Security Considerations:** I followed best practices to ensure the data was handled securely, particularly when handling customer and order data.

## Course Alignment:

This enhancement helped me meet several key course outcomes:

- **Design and Evaluate Solutions:** I turned the conceptual ERD into a practical, interactive application, demonstrating my ability to design systems that meet functional requirements.
- **Database Management:** I demonstrated my ability to create and manage complex relational databases, ensuring data integrity through the use of primary and foreign keys.
- **SQL Querying and Data Analysis:** The SQL queries I developed for reporting and analysis helped me apply my knowledge of SQL to solve real-world problems.
- **Security Mindset:** Though security wasn't a primary focus, I ensured best practices were followed when dealing with data, particularly in user input and form management.
- **Professional-Quality Communication:** The system's user interface was designed to be intuitive and easy to use, which demonstrates my ability to deliver user-friendly applications in a professional manner.

### Reflection:

As I worked through this enhancement, I encountered several challenges that helped me grow:

- **Learning Oracle APEX:** Although I had worked with databases before and Oracle APEX, neither are my strongest skills. It took some time to learn the tools I wanted to use in my application, particularly how to set up forms and reports in the APEX environment.
- **Database Relationships:** Setting up complex relationships, especially the self-referencing one between employees, required extra attention to detail to ensure that the integrity of the data was maintained.
- **Optimizing Queries:** As I implemented more reports and queries, I had to focus on optimizing their performance to ensure they could handle large datasets efficiently. This was a valuable exercise in query optimization.

### Summary:

This project allowed me to showcase my skills in database design, SQL querying, and application development. By converting a conceptual ERD into a fully functioning Oracle APEX system, I created a practical tool that helps manage inventory and analyze data effectively. If I were to revisit this project in the future, I would enhance the system by implementing more advanced features and improving security by implementing roles.

This artifact reflects my ability to apply course concepts in a real-world project while developing key skills for future software development work.