Southern New Hampshire University

5-2 Milestone Four: Enhancement Three: Databases

Jonathan C. Sanchez

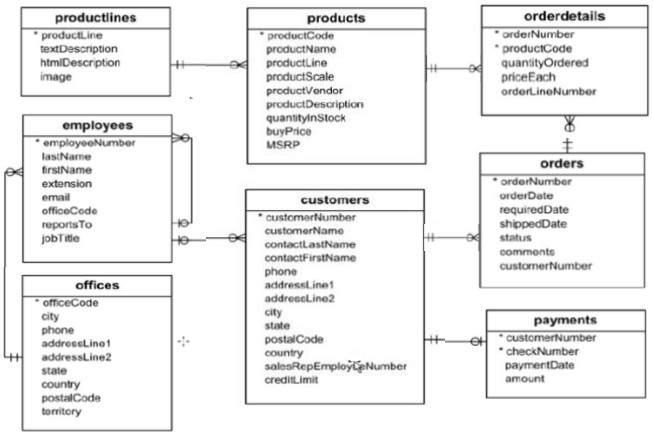
Artifact:

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)
```

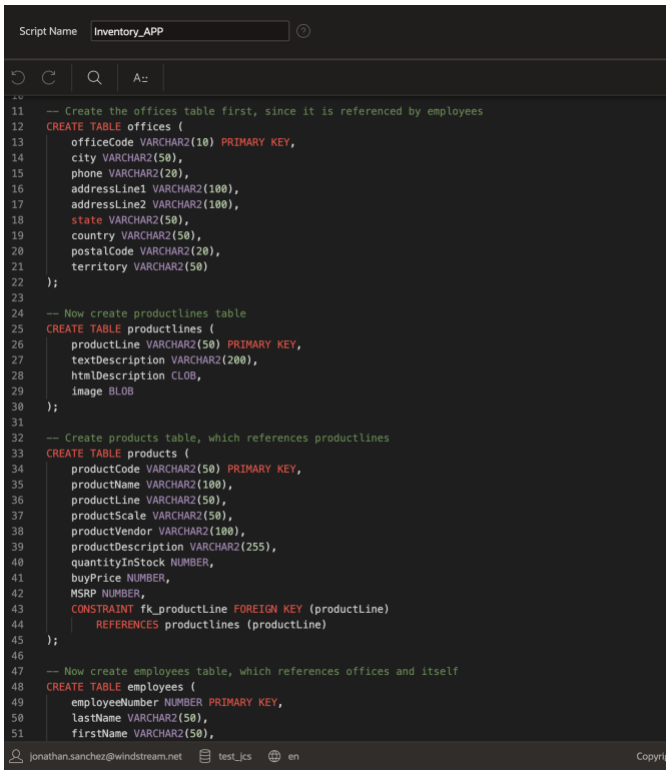


Enhanced Version:

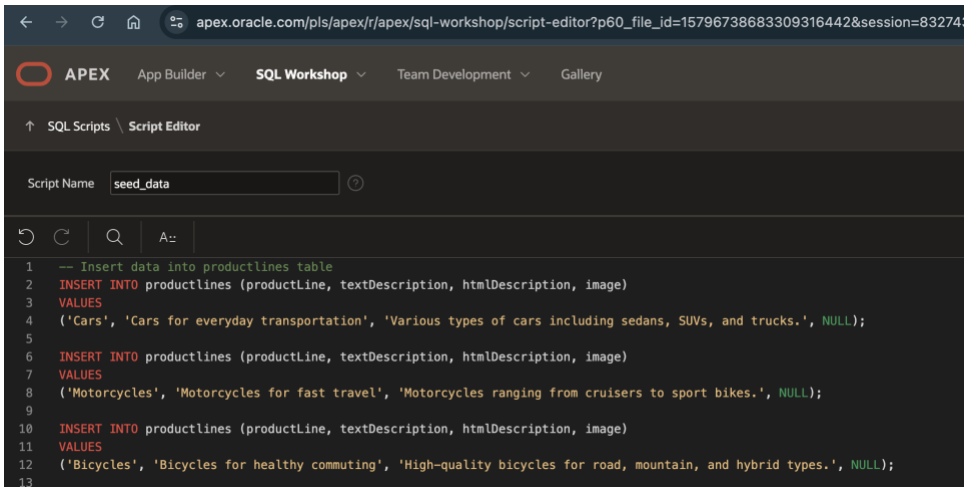
For the enhancement, I decided to transform the ERD (Entity-Relation Diagram) from the MySQL Database into a fully functional Oracle APEX application. I created schemas, tables, and relationships based on the original ERD and implemented a user-friendly interface for managing inventory, customers, and 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.

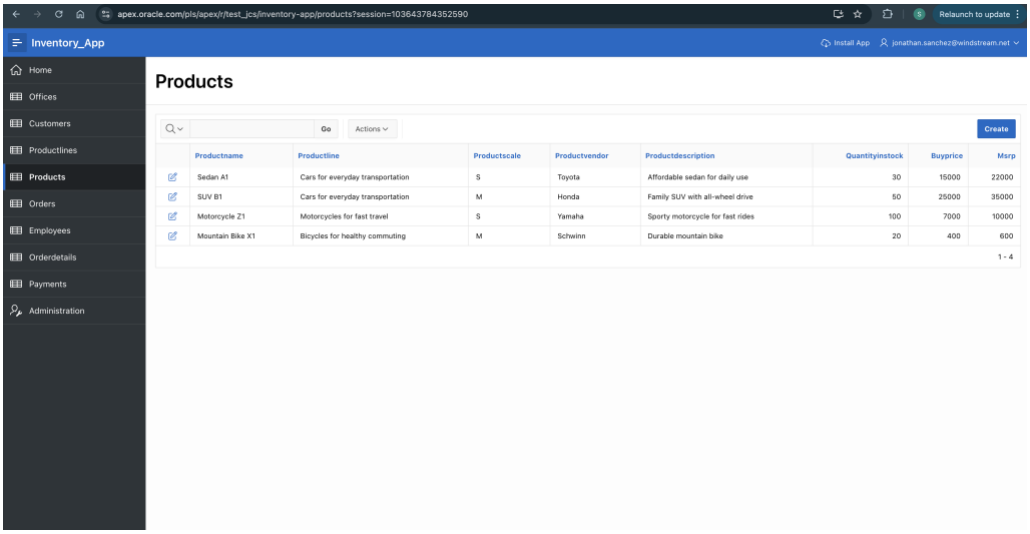
Tables:



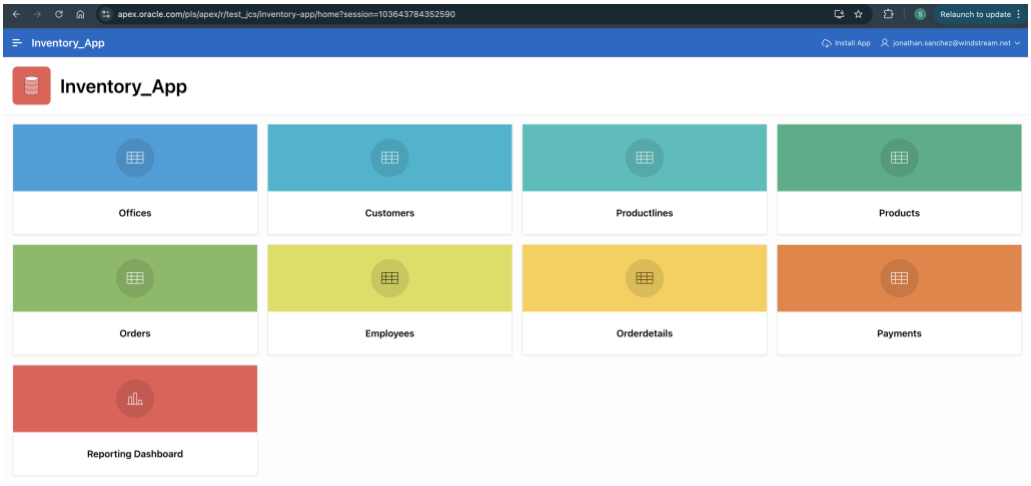
Seeding:



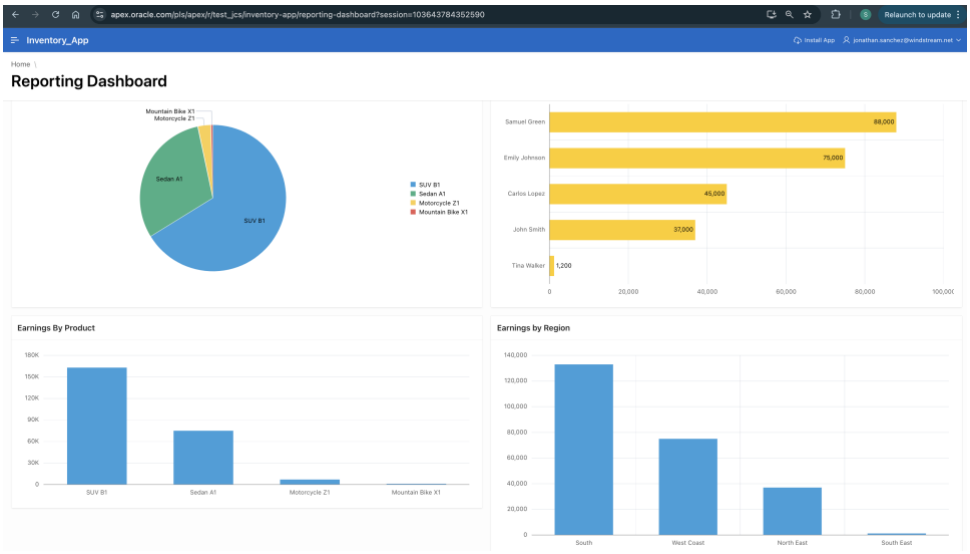
Products:



Home:



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.