MIS 320 Project Final Report
Iowa State University Dining

Group 7
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Introduction

Business Description

Iowa State University Dining is a campus-wide business that serves a variety of customers through multiple different food services. Iowa State University created ISU Dining as it recognized a business opportunity to help enhance student and faculty experience at the university. ISU Dining works with student and faculty groups within the Iowa State community to ensure that all food service needs are being met. Since there are a variety of customer types throughout campus, ISU Dining must have multiple services, such as buffets, take-out options, café experiences, and more. For ISU Dining to succeed with its food services business, it must accurately track its services within a database system to ensure that the services can be maintained.

The mission of ISU Dining is to be, "dedicated to providing a variety of quality and sustainable culinary experiences that enhance the educational and cultural aspects of Iowa State University." The business continuously meets its mission goals by creating an organizational structure that allows each food service to be monitored and adapted depending on current and developing needs. Currently, ISU Dining has five principle administrators and of these individuals has a role in determining ISU Dining company principles, policies, procedures and services for the different ISU Dining locations.The role of each location is to contribute to the growth of ISU Dining as it wishes to keep providing quality food choices to the customers it serves. If ISU Dining fails to keep track of the services it offers accurately, the business will not be able to generate enough profits to continue its growth on campus.

Currently, ISU Dining caters to a university population of more than thirty-six thousand students, along with over three thousand faculty employees. Although not all of the Iowa State community utilizes ISU Dining, many have interacted with the business at some point in their personal Iowa State experience. This is true because of the many dining and convenience store locations strategically placed around campus. The ease of utilizing the variety of its food service

options makes it more likely that students and staff will come into contact with ISU Dining regularly.

Continuing the variety of food service options is vital to keeping its customers satisfied. As ISU Dining continues to grow and add more food service options, it needs to allow for those options to be tracked in an accurate database system. Ensuring that these aspects are taken into account will help ISU Dining continue to satisfy its mission for the Iowa State community.

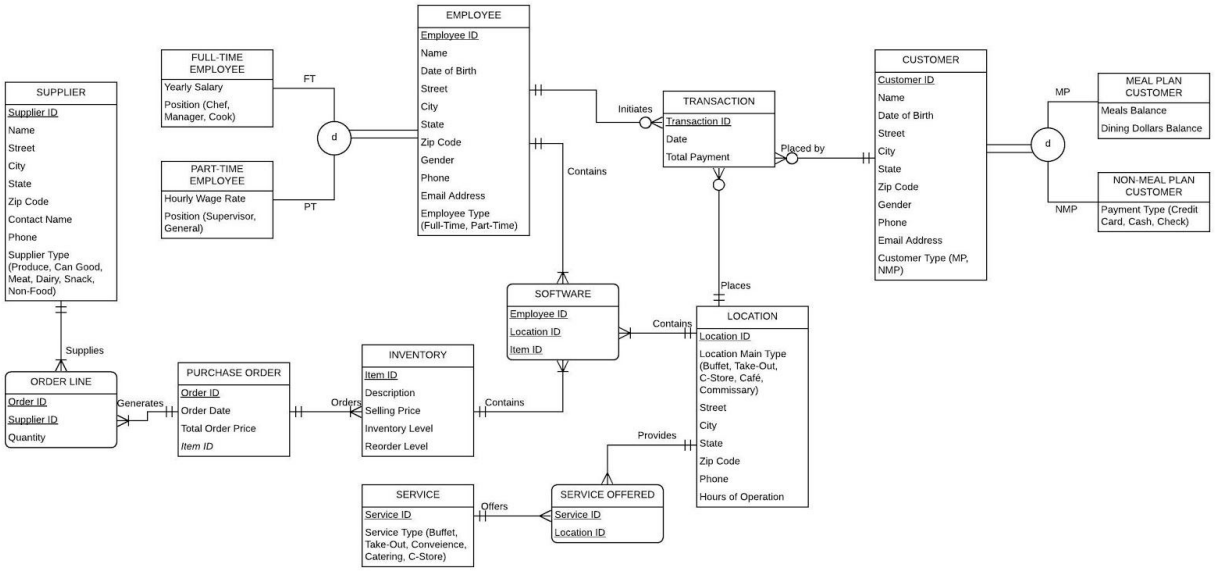
Current Database Implementation

Currently, ISU Dining uses multiple database systems to track all of the information for the business. This means that when information needs to be changed in one database, it may also need to be changed in another database as well. If ISU Dining were to use just one database for all of the information the business tracks, it helps eliminate the probability that errors will be made from individuals trying to input the same data into multiple databases. This is the basis for how we have designed our database for ISU Dining.

Design of Database

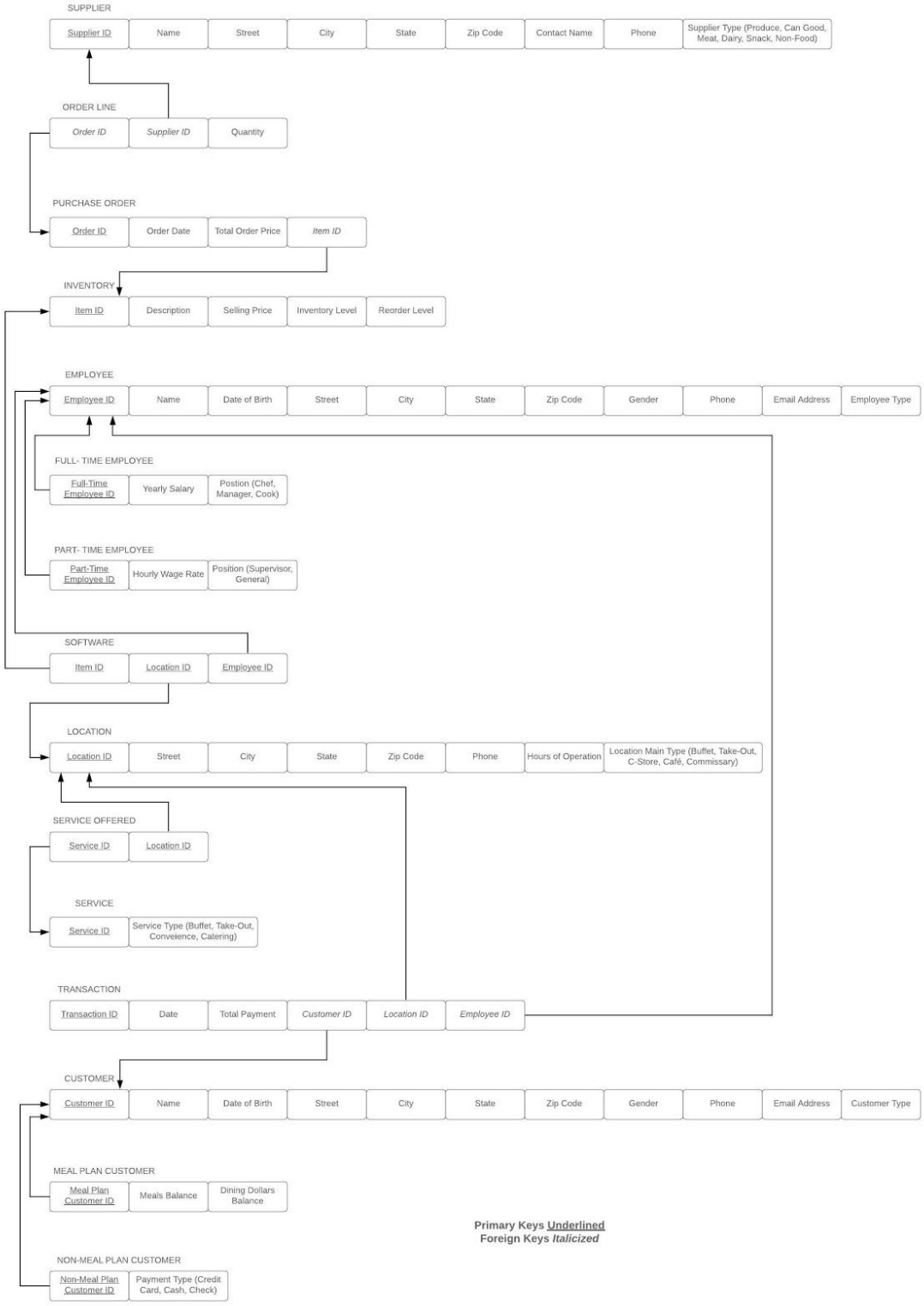
EER Diagram

LucidChart was the tool used to create the ISU Dining EER Diagram.



Relational Schema

LucidChart was the tool used to create the ISU Dining Relational Schema.



Business Rules

1. **Customer:** Can either be a meal plan customer or a non-meal plan customer. A customer cannot be both a meal plan customer and a non-meal plan customer at the same time.
2. **Meal Plan Customer:** Can be students and faculty.
3. **Non-Meal Plan Customer:** Can be organization/ businesses, regular persons, students, or faculty.
4. **Transaction:** A transaction must be between a valid customer and an ISU Dining location.
5. **Employee:** Employees are either full-time or part-time. An employee cannot be both full-time and part-time at the same time. An employee must work in at least one ISU Dining location but can work at many locations.
6. **Full-Time Employee:** Works up to 40 hours or more and can be a chef, manager, or cook.
7. **Part-Time Employee:** Works 20 hours or less and can be a supervisor or general worker.
8. **Location:** ISU Dining has many locations. Each location must have a unique location ID. Each location offers a service and has hours of operation. A location must have at least one employee working, but can employ many workers.
9. **Service:** Service is one of the following: convenience, catering, buffet, or carry-out.
10. **Software:** software record the the employee, transaction and item in inventory
    Inventory: Items are located in inventory. Inventory monitors the prices and quantity of items.
11. **Purchase Order:** Is an order for items that ISU Dining needs.
12. **Supplier:** A supplier must supply the items necessary to run ISU Dining facilities.

Entity Definitions

1. **Supplier:** An entity that ISU Dining works with to provide different types of goods
    a. **Supplier ID:** Primary Key of entity Supplier. This is a unique ID that each Supplier will have
    b. **Name:** The name of the Supplier

c. **Street:** The street name that the Supplier is located on
d. **City:** The city that the Supplier is located in
e. **State:** The state the Supplier is located in
f. **Zip Code:** The zip code that the Supplier has
g. **Contact Name:** The name of the individual or team that is the point of contact for the specified Supplier
h. **Phone:** The phone number that ISU Dining can call if they need to reach out to the Supplier
i. **Supplier Type:** The type of goods that the Supplier provides. Can be Produce, Can Good, Meat, Dairy, Snack, or Non-Food

2. **Purchase Order:** An entity that represents an order from the Supplier
    a. **Order ID:** Primary Key of entity Purchase Order. This is a unique ID that each order will have
    b. **Order Date:** The date that the order was placed
    c. **Total Order Price:** The total price for the order placed through the Supplier
3. **Inventory:** An entity that represents the items in inventory.
    a. **Item ID:** Primary Key of entity Inventory. Each specific item has its own Item ID
    b. **Description:** Description of the Item
    c. **Selling Price:** The price that the Item was sold at
    d. **Inventory Level:** The amount of the item that ISU Dining currently has on hand
    e. **Reorder Level:** The amount of the item that the Inventory needs to fall below in order to reorder said item
4. **Location:** An entity that represents the location of the ISU Dining eateries.
    a. **Location ID:** Primary Key of entity Location. Each Location has its own Location ID
    b. **Location Main Type:** Represents the type of Location that the dining location is. It can be Buffet, Take-Out, C-Store, Cafeé, or Commissary.
    c. **Street:** The street name that the Dining Center Location is located on
    d. **City:** The city that the Dining Center Location is located in

e. **State:** The state the Dining Center Location is located in
f. **Zip Code:** The zip code that the Dining Center Location has
g. **Phone:** The phone number of the Dining Center Location
h. **Hours of Operation:** The hours that the Dining Center Location are open

5. **Service:** An entity that represents the type of service that each Dining Center Location
    a. **Service ID:** Primary Key of entity Service. Each Service within a specific location has its own Service ID
    b. **Service Type:** Represents the type of service that is being provided at this Location. Can be Buffet, Take-Out, C-Store, Cafe, or Commissary
6. **Transaction:** An entity that represents a Transaction that happens within a dining location.
    a. **Transaction ID:** Primary Key of entity Transaction. Each Transaction has a Transaction ID.
    b. **Transaction Location:** The Location where the Transaction was created.
    c. **Transaction Date:** The date when the Transaction was created.
    d. **Total Transaction Payment:** The total amount paid for the Transaction
7. **Employee:** A supertype entity that represents an Employee of ISU Dining. This entity has two total specialized subtypes, which are Full-Time Employee and Part-Time Employee.
    a. **Employee ID:** Primary key of entity Employee. Each Employee will have their own Employee ID
    b. **Name:** The name of the Employee
    c. **Date of Birth:** The date of birth of the Employee
    d. **Street:** The street name that the Employee is located on
    e. **City:** The city that the Employee is located in
    f. **State:** The state the Employee is located in
    g. **Zip Code:** The zip code that the Employee has
    h. **Gender:** The gender of the Employee
    i. **Phone Number:** A phone number where the Employee can be reached at

j. **Email Address:** An email address where the Employee can be reached at.
k. **Employee Type:** The type of Employee. The Employee can either be Part-Time or Full-Time.

8. **Full-Time Employee:** The entity that represents a Full-Time Employee of ISU Dining. This entity is a total specialized subtype of Employee.
    a. **Yearly Salary:** The amount that the Full-Time Employee is paid per year.
    b. **Position:** The position that the full-time employee holds at ISU Dining. This can either be Chef, Manager, or Cook.
9. **Part-Time Employee:** The entity that represents a Part-Time Employee of ISU Dining. This entity is a total specialized subtype of Employee.
    a. **Hourly Wage Rate:** The amount that the Part-Time Employee is paid per hour.
    b. **Position:** The position that the part-time employee holds at ISU Dining. This can either be Supervisor or General Staff
10. **Customer:** The supertype entity that represents a Customer of ISU Dining Services. This entity has two total specialized subtypes, which are Meal Plan Customer and Non-Meal Plan Customer.
    a. **Customer ID:** The primary key of entity Customer. Each Customer has their own Customer ID
    b. **Name:** The name of the Customer
    c. **Date of Birth:** The Date of Birth of the Customer
    d. **Street:** The street name that the Customer is located on
    e. **City:** The city that the Customer is located in
    f. **State:** The state the Customer is located in
    g. **Zip Code:** The zip code that the Customer has
    h. **Age:** The Age of the Customer
    i. **Gender:** The Gender of the Customer
    j. **Phone Number:** The Phone Number where a Customer can be contacted
    k. **Email Address:** The Email Address where a Customer can be contacted

    l. **Customer Type:** The kind of Customer that the specific Customer is classified as. The Customer is either considered a Meal Plan Customer, or a Non-Meal Plan Customer.

11. **Meal Plan Customer:** The entity that represents a Customer that is choosing to pay using a Meal Plan. This entity is a total specialized subtype of Customer.
    a. **Meals Balance:** Represents the amount of meals that the Meal Plan Customer still has in their account.
    b. **Dining Dollars Balance:** Represents the amount of Dining Dollars that a Meal Plan Customer still has in their account.
12. **Non-Meal Plan Customer:** The entity that represents a Customer that is choosing to pay using an option that is not a Meal Plan or Dining Dollars. This entity is a total specialized subtype of Customer.
    a. **Payment Type:** Represents the Payment Type that the Non-Meal Plan Customer is using. This can either be Credit Card, Cash, or Check.
13. **Software :** the entity represent the data storage that will connect transaction, employee and location.
14. **Order Line:** The associative entity that represents the order and the supplier of the order.
    a. **Quantity:** Represents the number of items on an order

Assumptions

1. A third-party business is considered a supplier once ISU Dining has made at least one purchase order from them.
2. ISU Dining orders items other than food products, such as napkins, plates, and silverware, which can be categorized as “non-food”.
3. Not all inventory items have a selling price. For example, buffet food items would not have a set selling price, along with non-food items.
4. Non-meal plan customers can be tracked through only through ISU Dining catering services. Non-meal plan customers making a transaction at an ISU Dining center

location would not be able to be tracked since no additional information is required from them to make a purchase.

5. One type of software is used by ISU Dining to track locations, employees, and inventory.

EER Relationship Definitions

Orders - Is a binary relationship between Inventory and Purchase Order. This relationship allows for many orders but there must be at least one item in an order.

Offers - Is a binary relationship between Service and Service Offered. In this relationship, there must be at least one service offered but there can be more than one service offered.

Provides - Is a binary relationship between Service Offered and Location. Each ISU Dining location must provide at least one service and can provide many services.

Places - Is a binary relationship between Transaction and Location. There can be any number of transactions placed or there can be no transactions placed at all.

Placed by - Is a binary relationship between Transaction and Customer. There must be one transaction for every customer. There can be many transactions from customers or no transactions from customers.

Supplies - Is a binary relationship between Supplier and Order Line. In this relationship, a supplier supplies at least one order or any number of orders.

Generates - Is a binary relationship between Purchase Order and Order Line. Purchase order generates any number of orders but must generate at least one order.

Initiates - Is a binary relationship between Employee and Transaction. An employee initiates a transaction. An employee can initiate many transactions but must initiate at least one transaction per order.

Contains - Is a binary relationship for Location, Inventory, and Employee between Software. In this relationship, Software contains a lot of information from Location, Employee and Inventory. It must have at least some sort of information from each entity.

Implementation of Database

SQL Code

```
create table employee
        (employeeID number(9) not null,
        e_fname varchar2(40),
        e_lname varchar2(40),
        e_dob date,
        e_street varchar2(40),
        e_city varchar2(40),
        e_state varchar2(2),
        e_zipcode varchar2(5),
        e_gender varchar2(40),
        e_phonenumber varchar2(15),
        e_emailaddress varchar2(40),
        e_employeetype varchar2(15) check(e_employeetype IN ('Part Time', 'Full Time')),
        constraint pk_emp1 primary key (employeeID));


create table customer
(customerID number(9) not null,
c_fname varchar2(40),
c_lname varchar2(40),
c_dob varchar2(40),
c_street varchar2(40),
c_city varchar2(40),
c_state varchar2(2),
c_zipcode number(5),
c_gender varchar2(40),
c_phonenumber varchar2(15),
c_emailaddress varchar2(40),
```

```
c_customertype varchar2(15) check(c_customertype IN ('Meal Plan', 'Non-Meal Plan')),
constraint pk_cust primary key (customerID));

create table location
(l_location_ID number(30) not null,
l_street varchar2(40),
l_city varchar2(40),
l_state varchar2(20),
l_zipcode number(5),
l_phonenumber number (10),
l_hour_operation varchar2(30),
constraint pk_location primary key (l_location_ID));

create table Supplier
(SupplierID number(9) not null,
S_name varchar2(40),
S_street varchar2(40),
S_city varchar2(40),
S_state varchar2(2),
S_zipcode varchar2(5),
Contact_Name varchar2(40),
S_phonenumber varchar2(15),
S_Suppliertype varchar2(7) check(S_Suppliertype IN('Produce', 'Can Good', 'Meat', 'Dairy',
'Snack', 'Non-Food')),
constraint pk_supplier primary key (SupplierID));

create table service
(serviceID number(9),
```

```
service_type varchar2(10) check (service_type IN ('Buffet', 'Take-Out', 'C-Store', 'Cafe',
'Commissary')),
constraint pk_service primary key (serviceID));

create table inventory
(i_itemID number(9),
i_description varchar2(40),
i_inventorylevel number(9),
i_sellingprice number(7,2),
i_reorderlevel number(9),
constraint pk_inv primary key(i_itemID));

create table Purchase_Order
(order_ID varchar2(40),
i_itemID number(9),
Order_Date date,
TTL_Order_Price number(7,2),
constraint pk_purchase_order primary key (order_id),
constraint fk_item1 foreign key(i_itemID) references inventory(i_itemID));

create table transaction
(transactionID number(9) constraint pk_trans primary key,
t_location varchar2(40),
t_date varchar2(40),
total_t_payment number(9),
customerID number(9),
l_location_ID number(9),
employeeID number(9),
constraint fk_inv foreign key(customerID) references customer(customerID),
```

```
constraint fk_inv1 foreign key(l_location_ID) references location(l_location_ID),
constraint fk_inv2 foreign key(employeeID) references employee(employeeID));

create table parttime_emp
(employeeID number(9) not null,
p_hourly_wage number(4,2),
p_position varchar2 (40),
constraint pk_partemp primary key(employeeID),
constraint fk_employee foreign key(employeeID) references employee(employeeID));

create table mealplan
(customerID number(9) not null,
mp_mealsbalance number(3),
mp_diningdollar number(8.2),
constraint pk_mealplan primary key(customerID),
constraint fk_customer foreign key(customerID) references customer(customerID));

create table non_mealplan
(customerID number(9) not null,
nm_paymenttype varchar(20) default 'cash',
check (nm_paymenttype IN('cash', 'debit', 'credit', 'studentID')),
constraint pk_nonmealplan primary key(customerID),
constraint fk_customer1 foreign key(customerID) references customer(customerID));

create table Full_Time_Employee
(employeeID number(9) not null,
Yearly_Salary number(4,2),
Position varchar(25),
constraint pk_fullemp primary key(employeeID),
```

```
constraint fk_employee1 foreign key(employeeID) references employee(employeeID));

CREATE TABLE orderline
(order_ID varchar2(40),
SupplierID number(9),
quantity number(10),
constraint fk1_orderline foreign key (order_ID) references purchase_order(order_ID),
constraint fk_orderline foreign key (supplierID) references supplier(supplierID));

create table software
(l_location_ID number(30),
i_itemID number(9),
employeeID number(9),
constraint fk_software foreign key(l_location_ID) references location(l_location_ID),
constraint fk1_software foreign key(i_itemID) references inventory(i_itemID),
constraint fk2_software foreign key(employeeID) references employee(employeeID));

create table service_offered
(serviceID number(9) not null,
l_location_ID number(30) not null,
constraint pk_serviceoff primary key (serviceID, l_location_ID),
constraint fk_serviceoff1 foreign key (serviceID) references service(serviceID),
constraint fk_serviceoff2 foreign key (l_location_ID) references location(l_location_ID));
```

Functions

Function 1: Shows the itemID and Description for any items under the re-order level.

Query 1 -

```
Select i_itemID, i_description
From inventory
Where i_inventorylevel < i_reorderlevel;
```

Function 2: Shows how many employees are in the system for each employee type.

Query 2 -

```
Select e_employeetype, count(e_employeetype) as total
From employee
Group by e_employeetype;
```

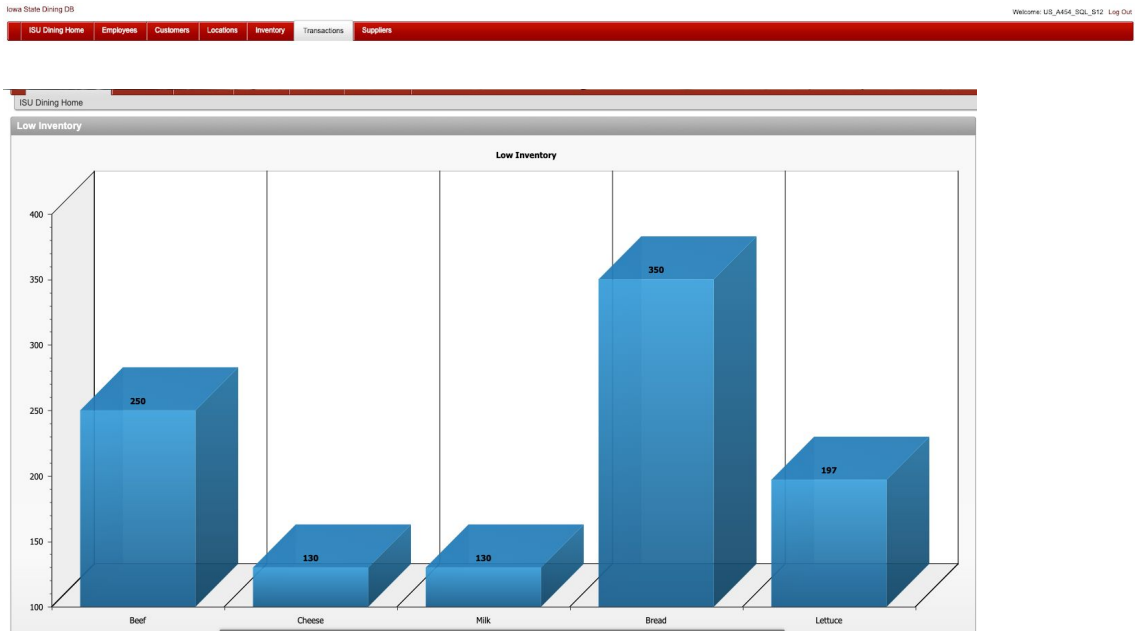
Function 3: Shows the Meal Plan and Dining Dollar balance for Meal Plan Customers.

Query 3 -

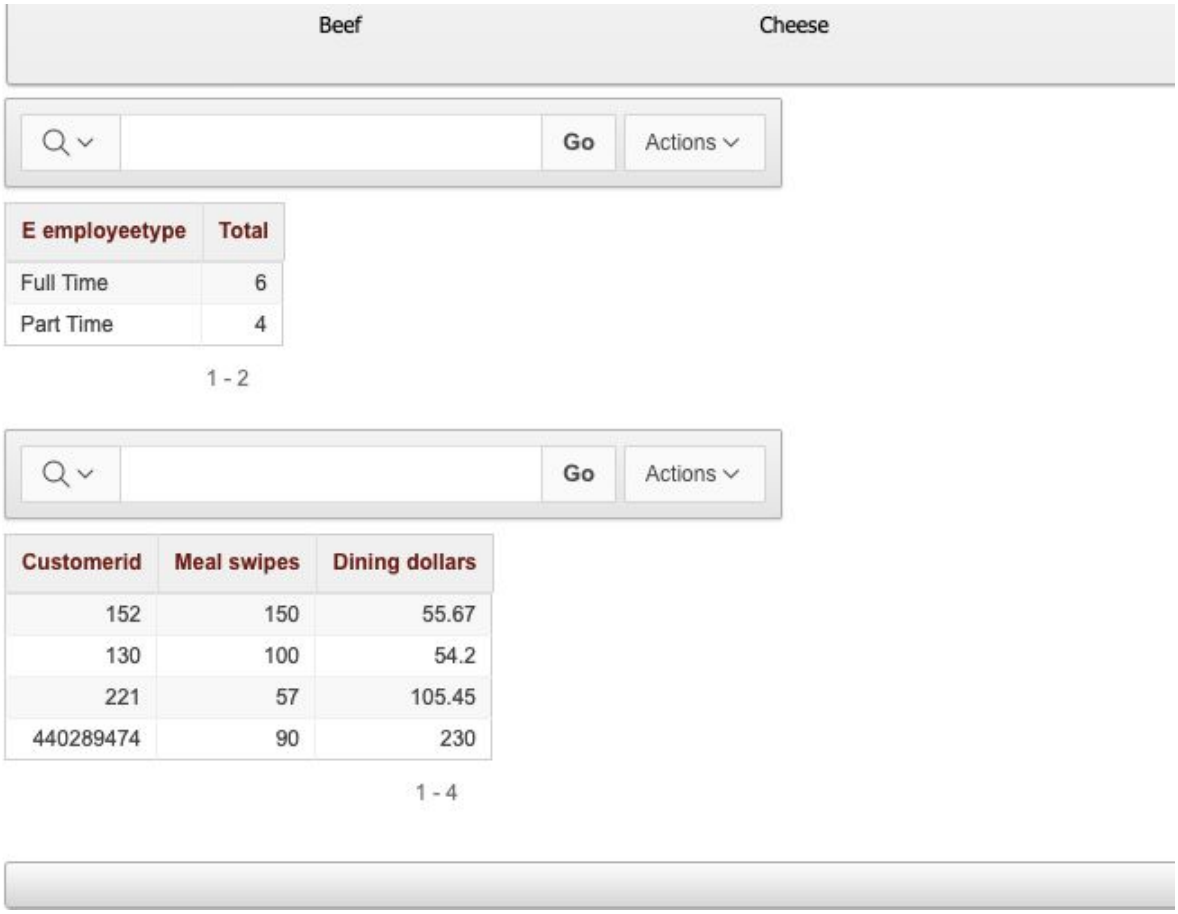
```
Select c.customerID, mp_mealsbalance as Meal_Swipes, mp_diningdollar as Dining_Dollars
From customer c, mealplan m
Where c.customerID = m.customerID and c_customertype = 'Meal Plan';
```

Application Development

Listed below are screenshots of the application for ISU Dining. Below each screenshot is a brief description of each screenshot.

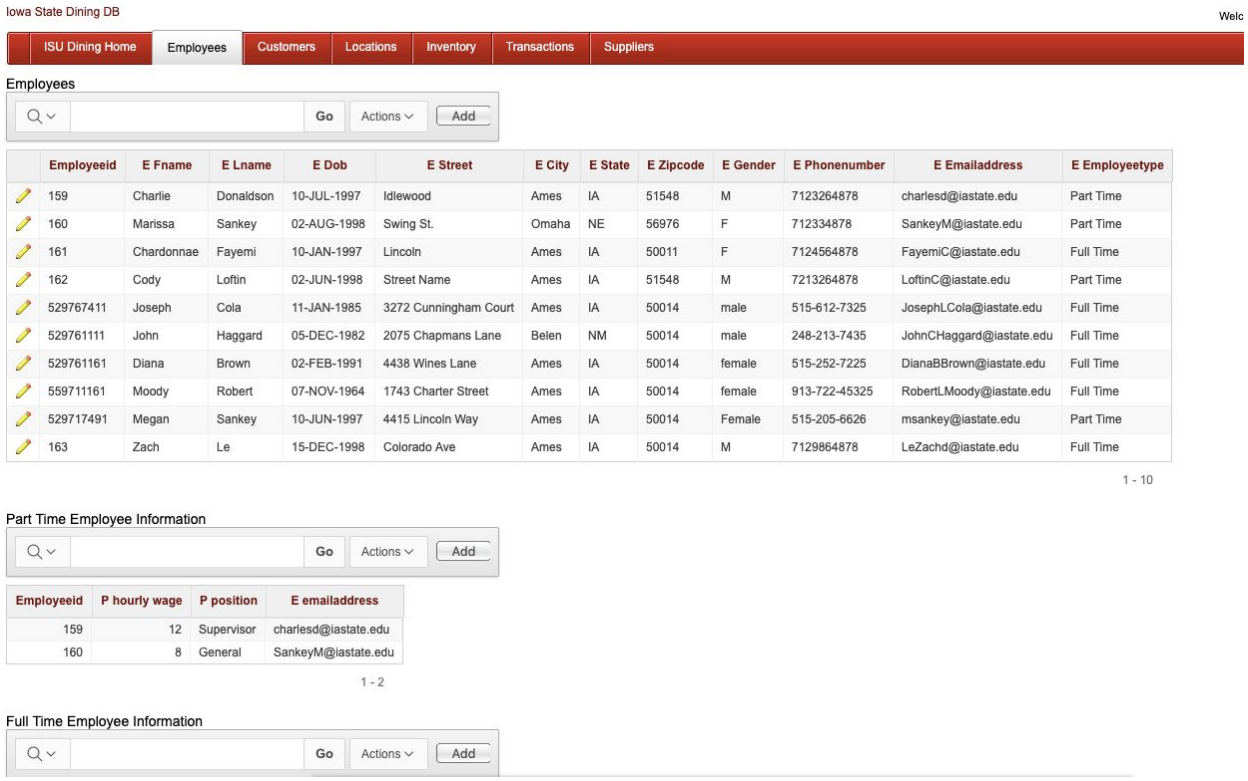


Homepage of ISU Dining. This is a graphical representation of Function 1 labeled as Low Inven

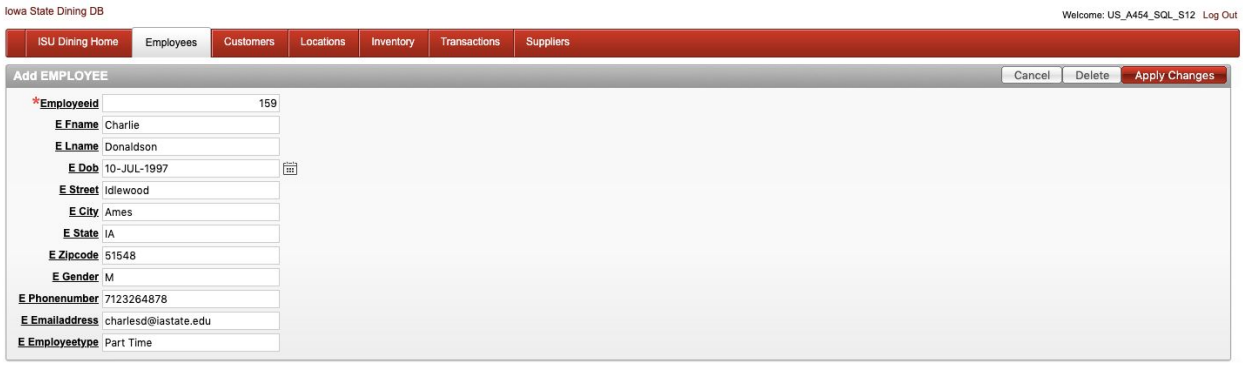


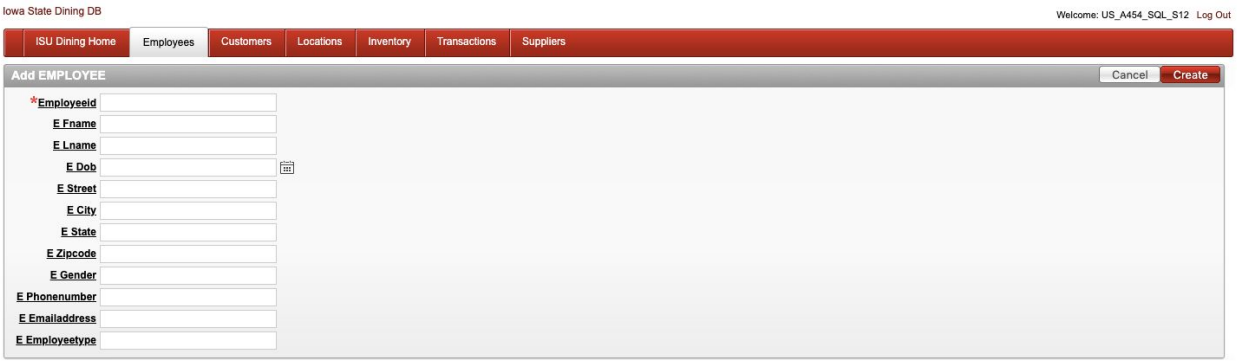
This image is from the Homepage of ISU Dining. The first table represents Function 2 and the

second table represents Function 3.



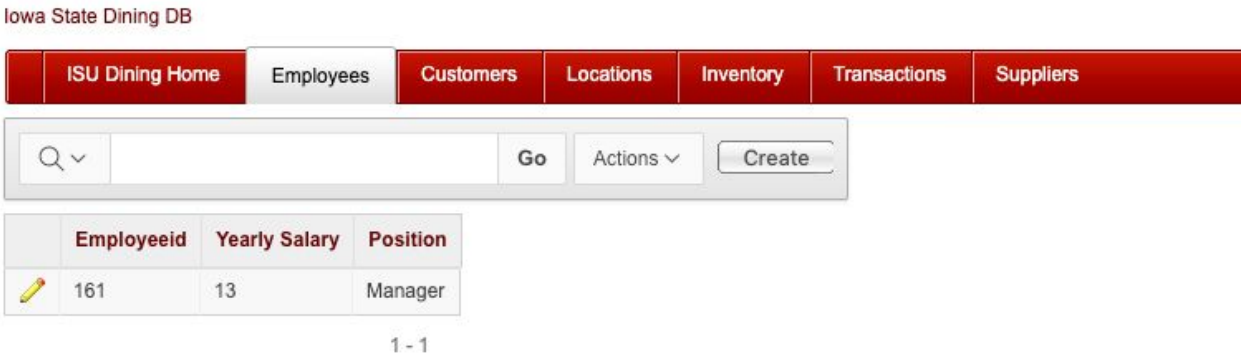
This is the view from the Employee page. Listed are Employee, Part Time Employee Information, and Full Time Employee Information tables.



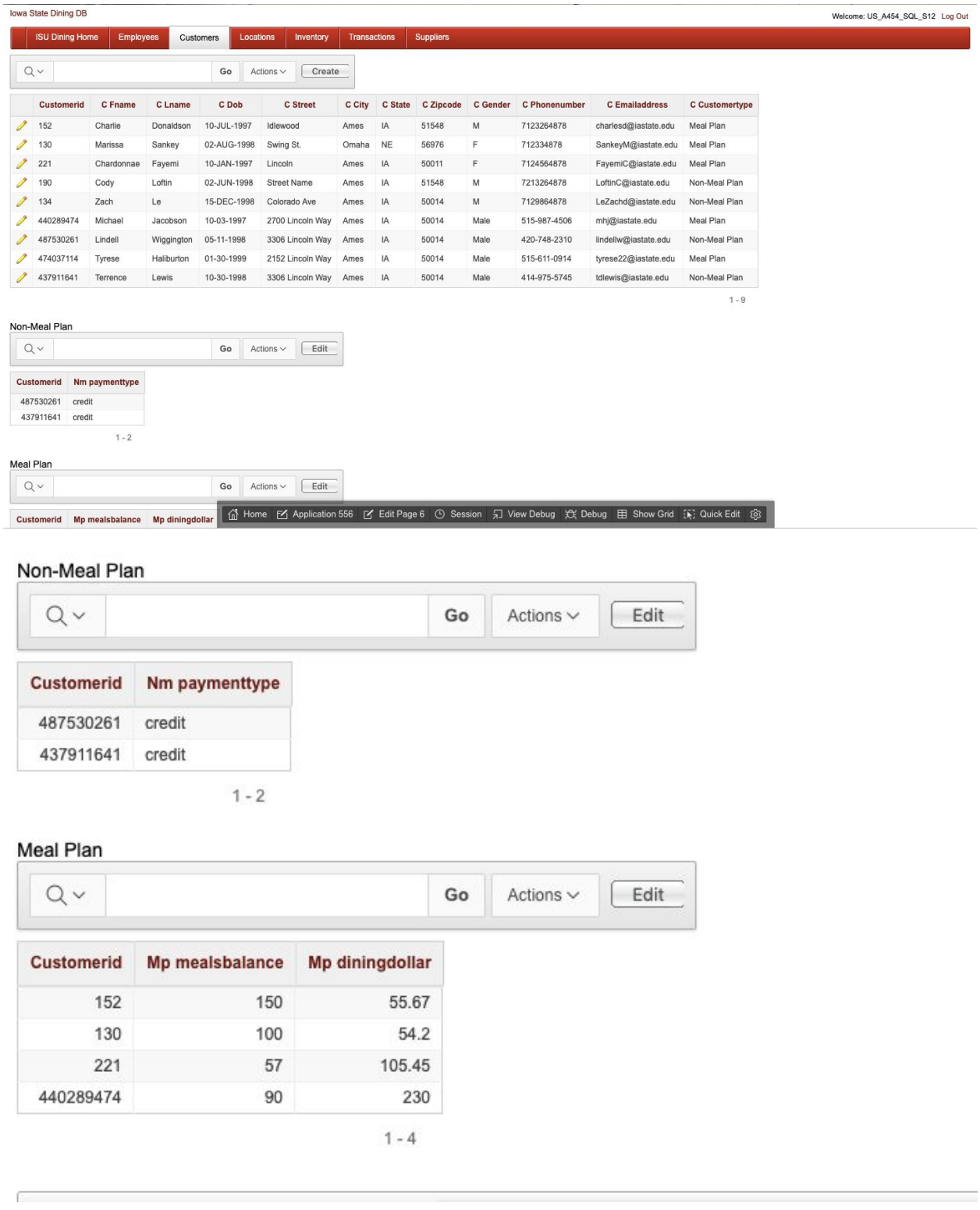


In the first image you are able to edit current rows in the Employee table. In the second image you can add new employees into the Employee table.

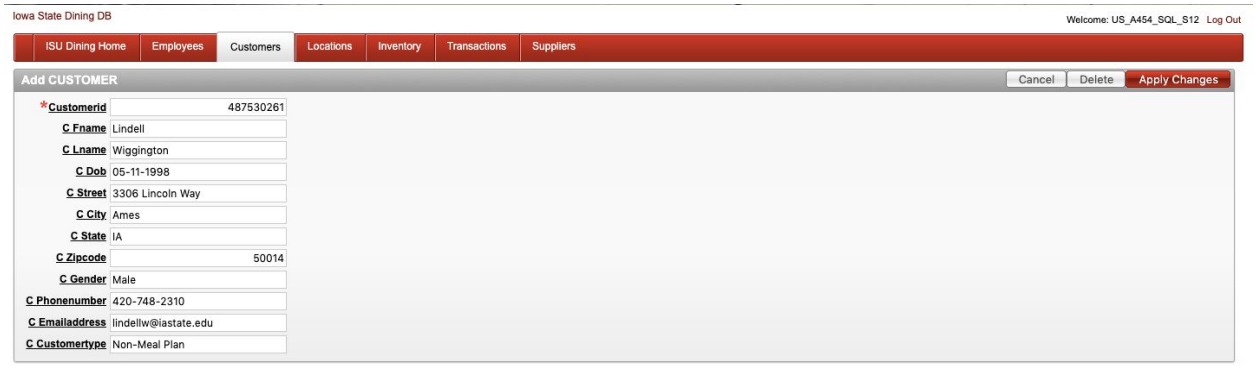
In the first image you can edit current part time employee data in the Part Time Employee table. In the second image you can add new part time employees into the Part Time Employee table.

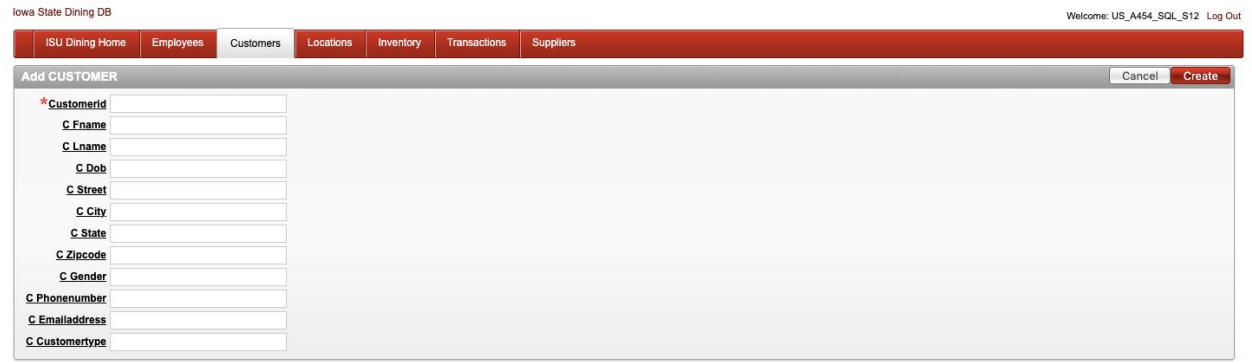


In the first image you are allowed to edit current employee information in the Full Time Employee Table. In the second image you can add new full time employees into the Full Time Table.

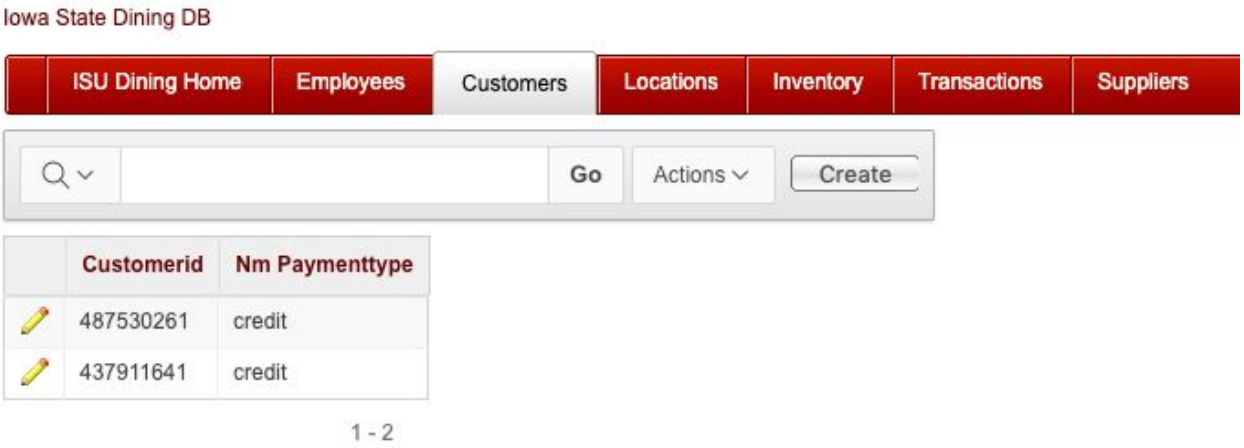


These two images display the view of the Customer page. It displays the Customer, Non-Meal Plan, and Meal Plan tables.



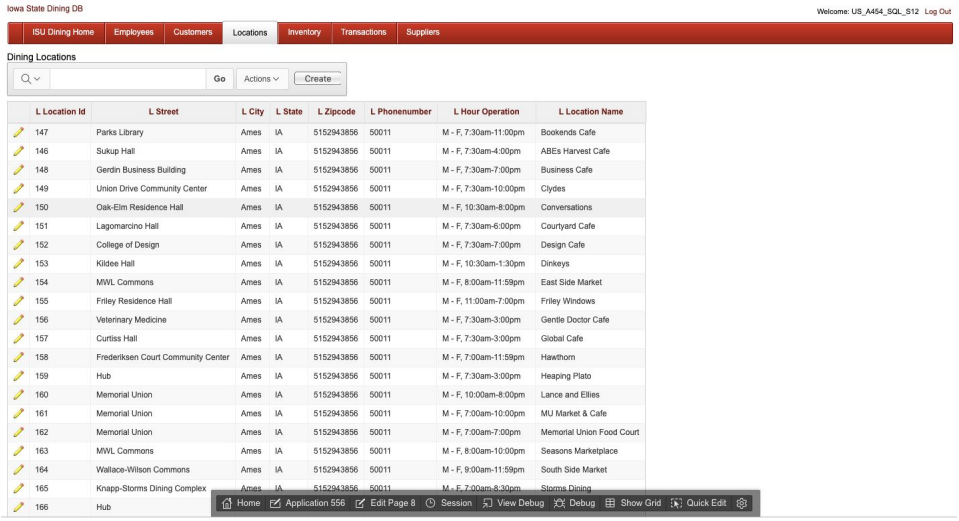


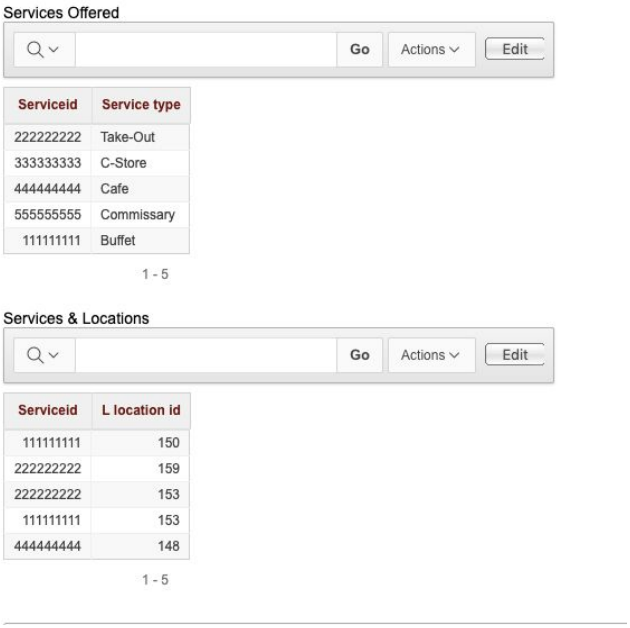
In the first image you are able to edit current customer information in the Customer table. In the second image you can add new customers to the Customer table.



In the first image you are able to edit current non-meal plan data in the Non-Meal Plan table by selecting the pencil icon. In the second image you are allowed to enter new non-meal plan data into the Non-Meal Plan table.

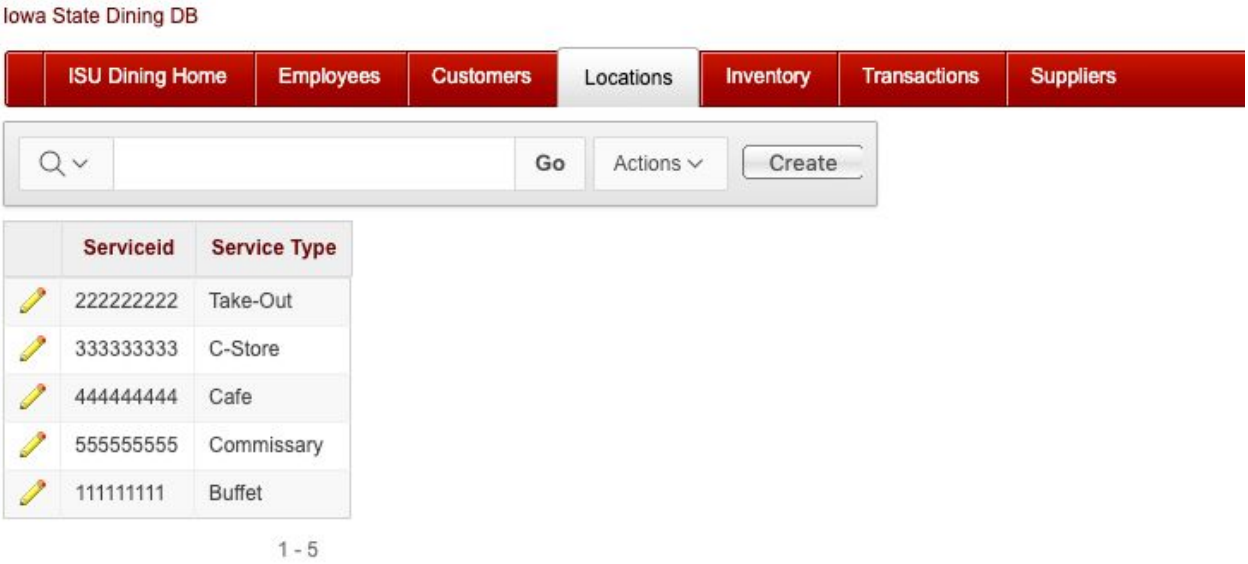
In the first image you can edit current meal plan data in the Meal Plan table by selecting the pencil icon. In the second image you are able to enter in new meal plan data into the Meal Plan table.

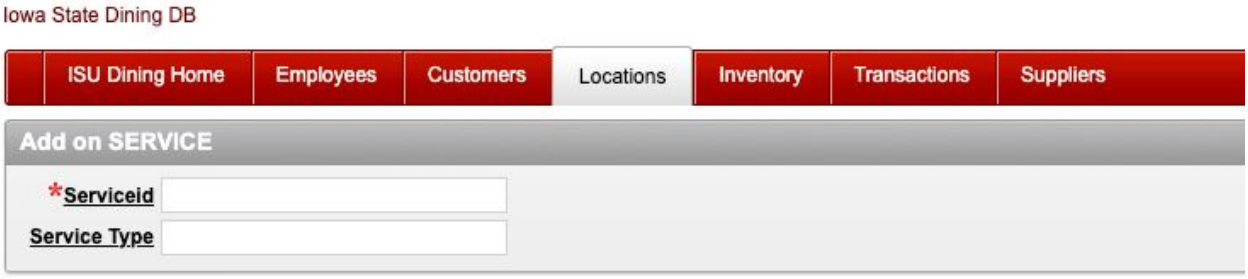




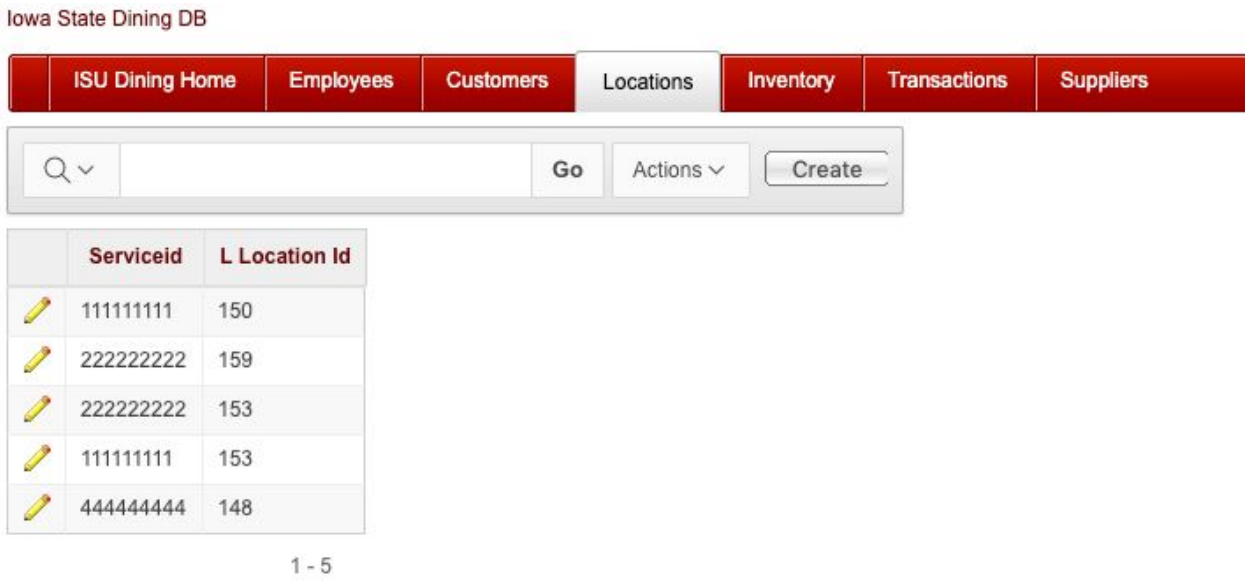
These two images display the view from the Locations page. It displays the Location, Service, and Service Offered tables.

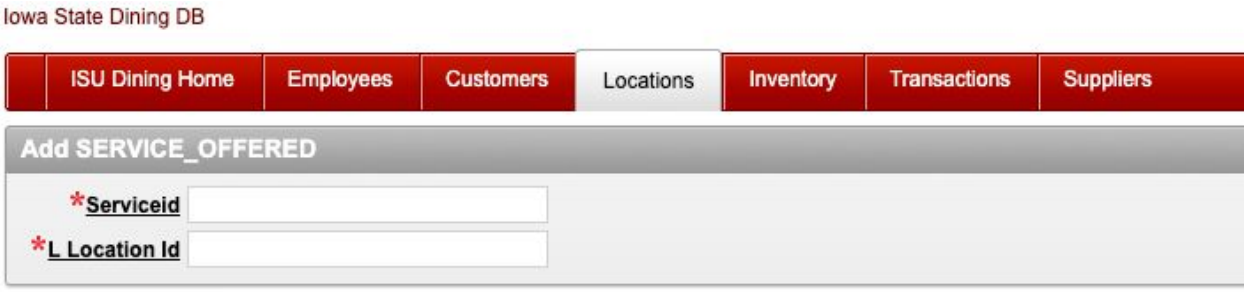
In the first image you are able to edit current location data in the Location table. In the second image you are able to add new location data into the Location table.



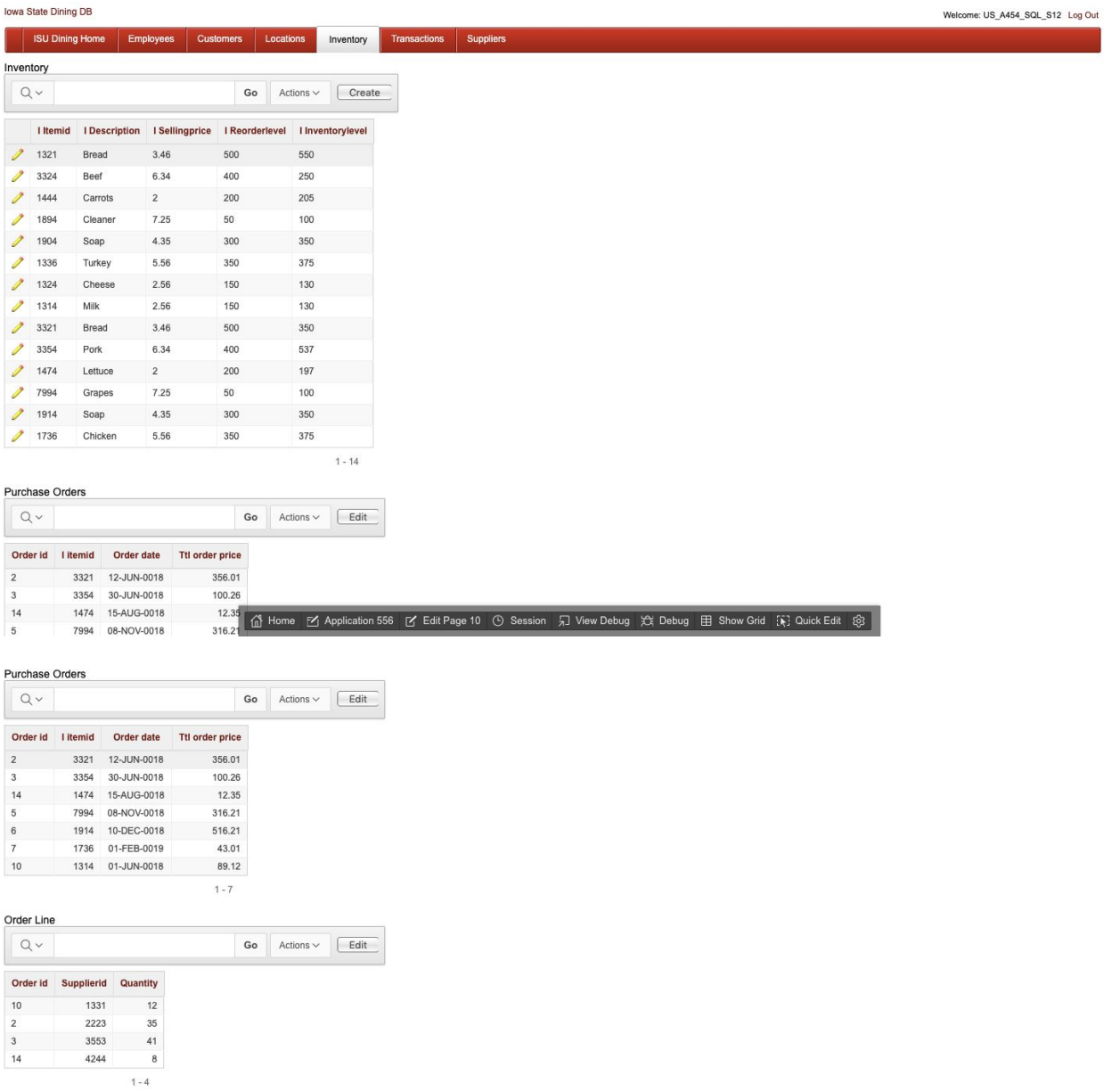


The first image shows that a user can modify current service data in the Service table by selecting the pencil icon. The second image shows that you can add new data into the Service table.

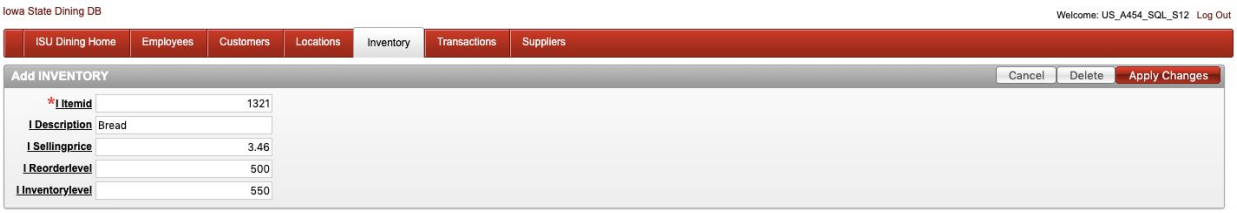




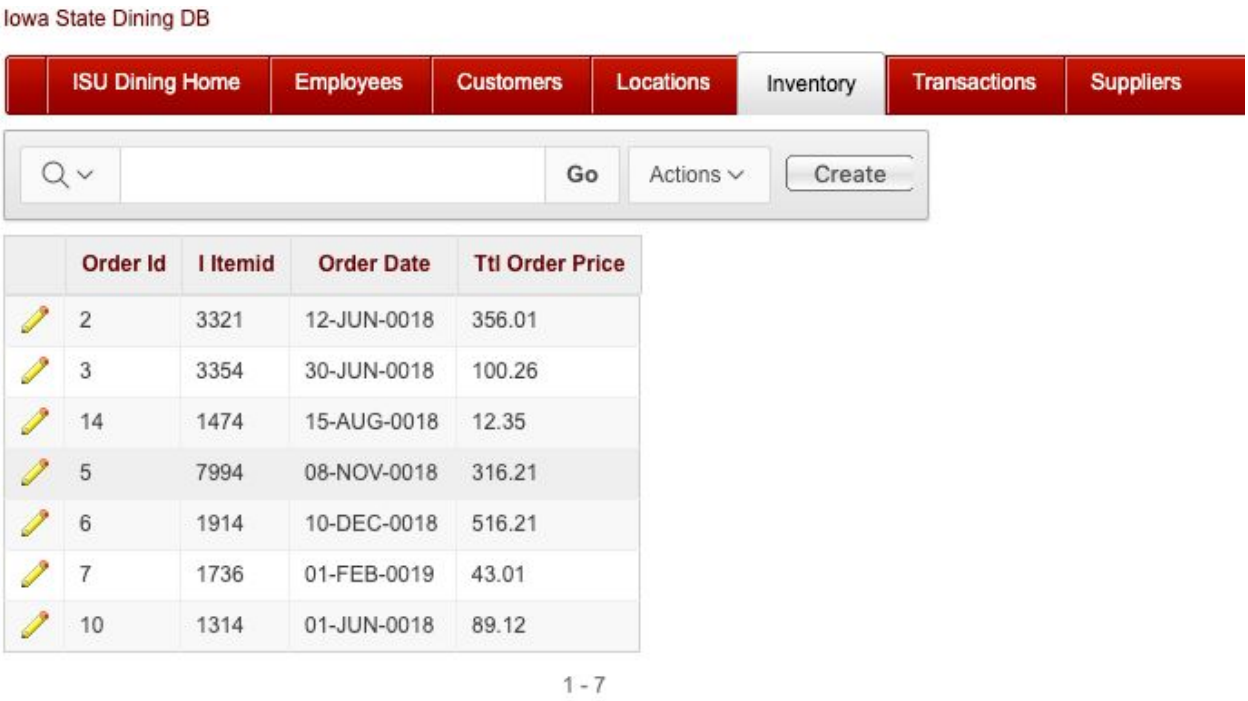
In the first image you are able to edit current data in the Service Offered table by selecting the pencil icon. In the second image you are able to add new data into the Service Offered table.

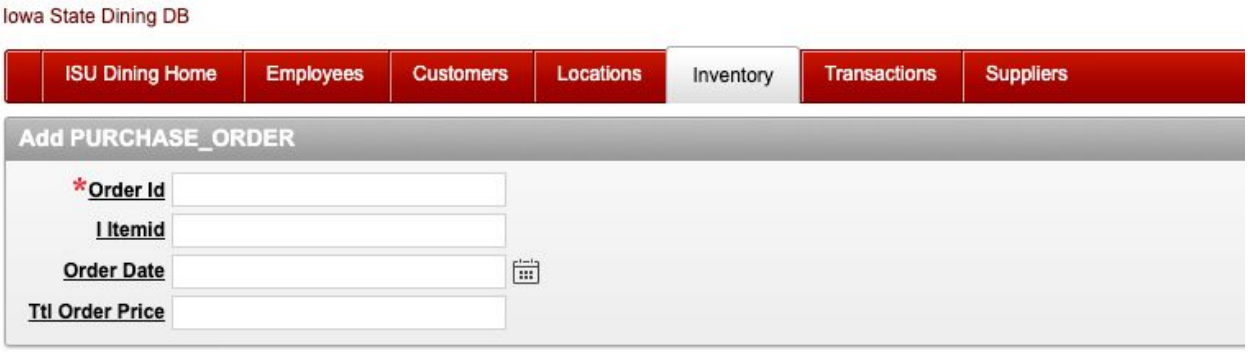


These two images display the view of the Inventory page. Displayed on this page is Transaction, Purchase Orders, and Order Line tables.

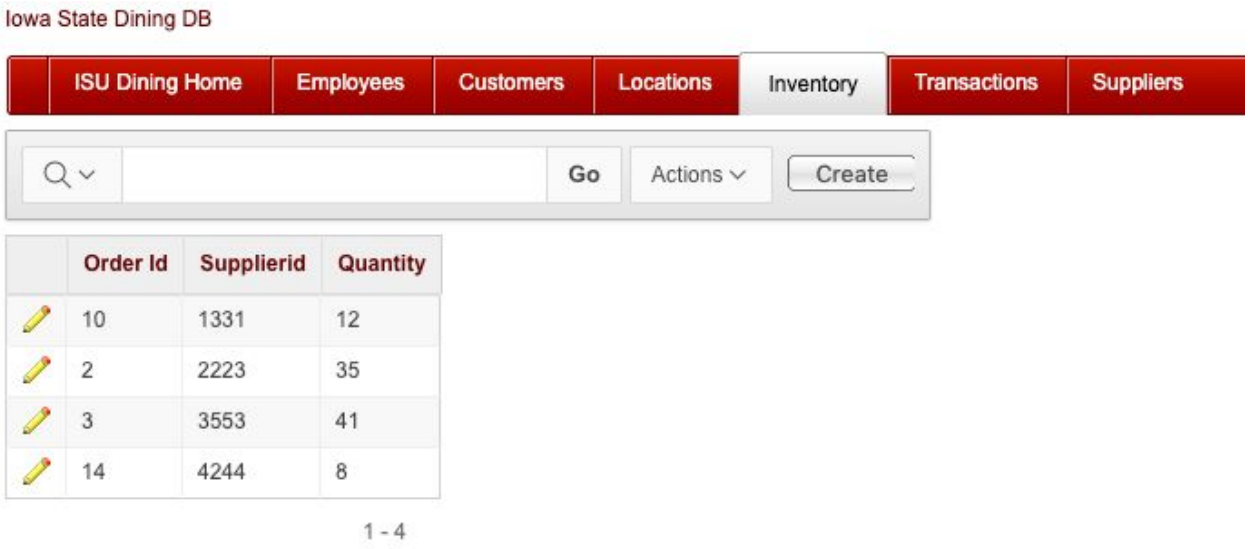


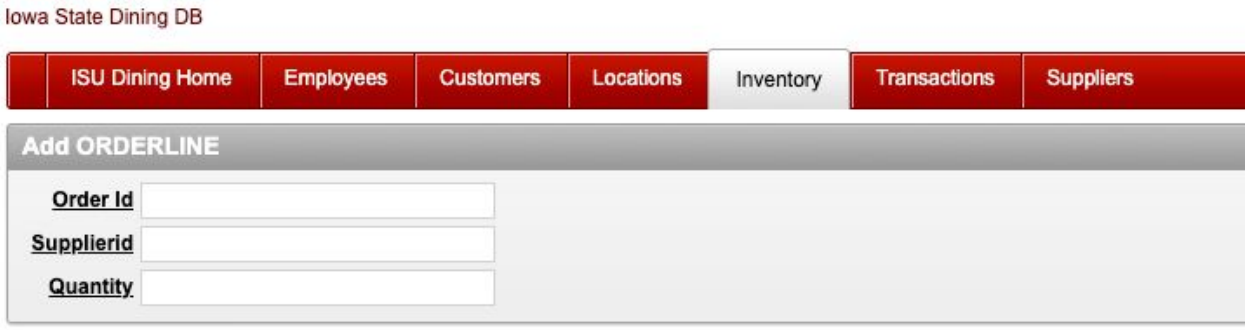
In the first image you are able to modify current inventory data in the Inventory table. In the second image you are able to add new data into the Inventory table.



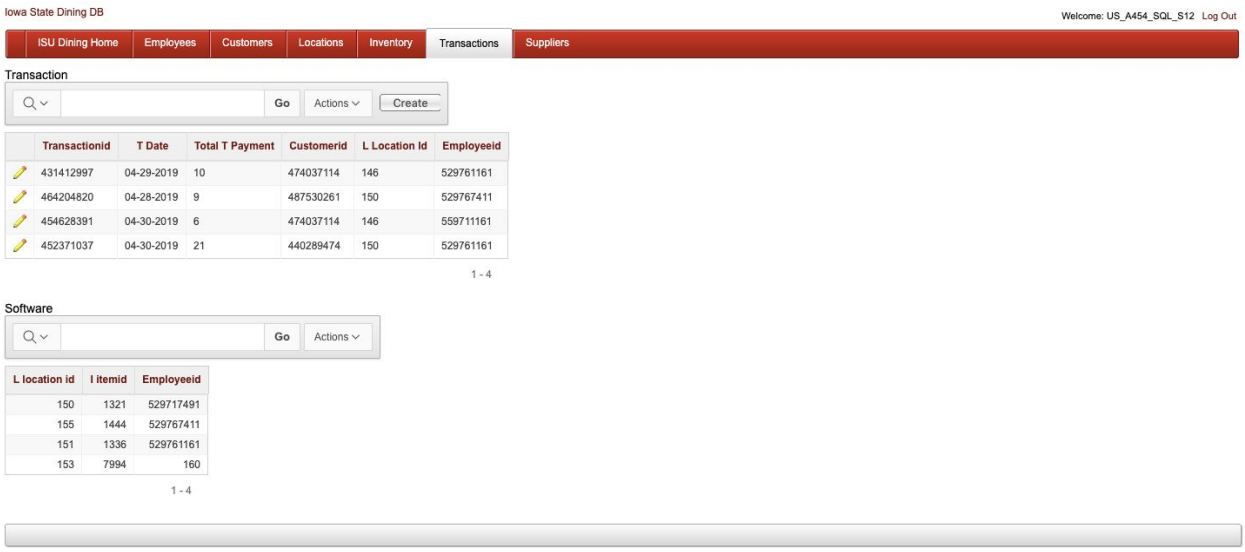


In the first image you are able to edit current purchase order data in the Purchase Order table by selecting the pencil icon located on the far left row. The second image shows that you are able to add new purchase orders into the Purchase Order table.



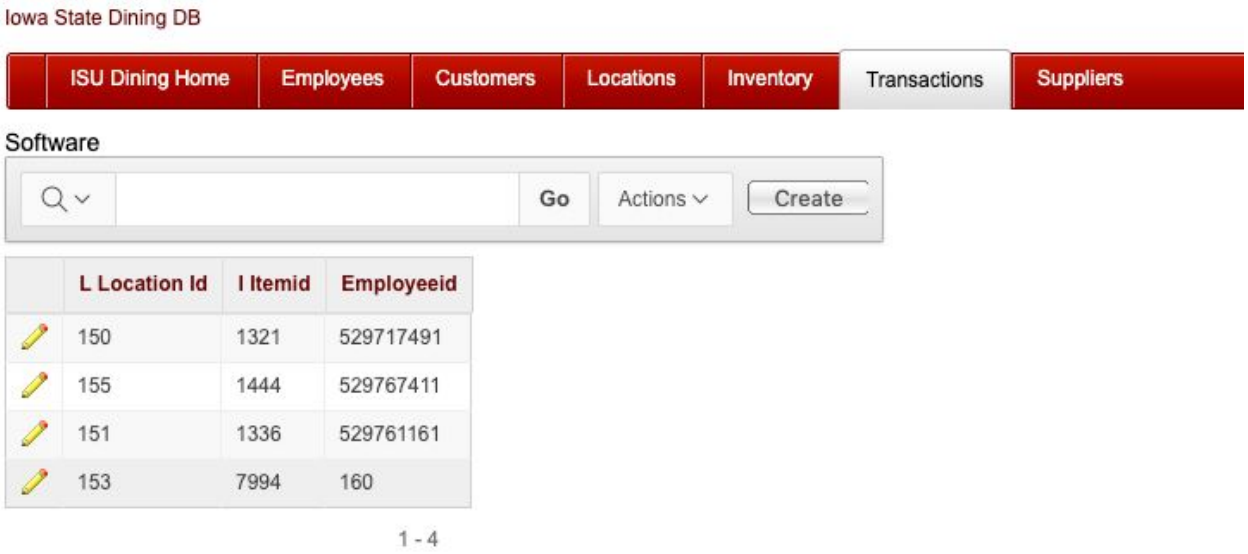


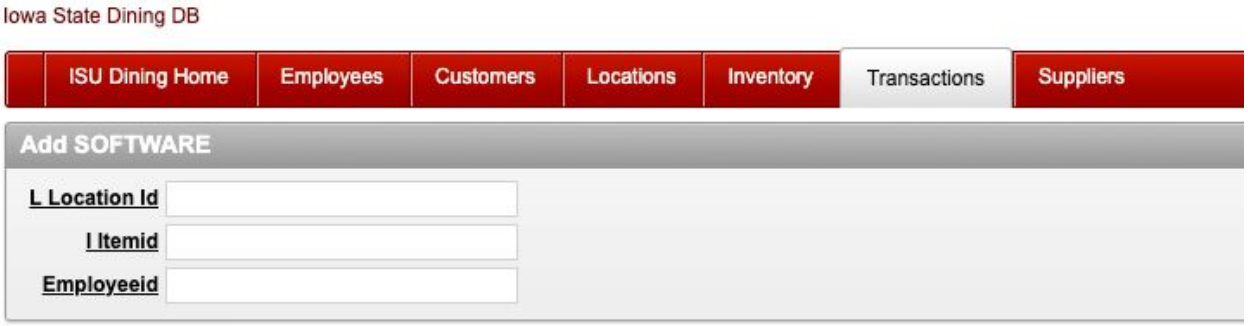
In the first image you are able to edit current order line data in the Order Line table by selecting the pencil icon located on the far left row. The second image shows that you are able to add new order line data into the Order Line table.



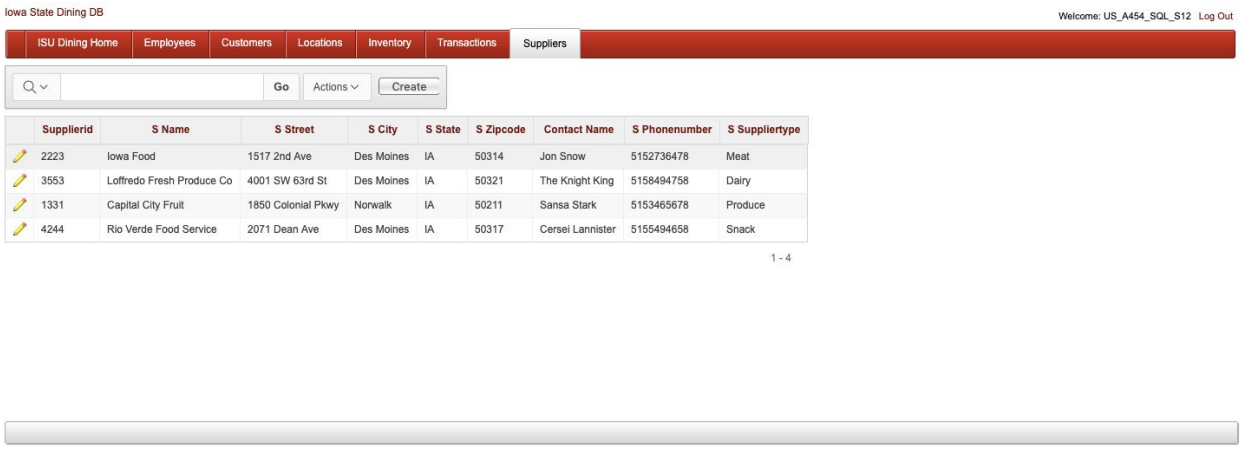
This image is a display of the Transactions page. Listed on this page are the Transaction and Software tables.

The first image shows that you are able to edit current data in the Transaction table. The second image shows that you are able to add new transaction data into the Transaction table.





In the first image you are able edit current software data in the Software table by selecting the pencil icon on the far left row. In the second image you are able to add new data into the Software table.



This image show the display of the Suppliers page. On this page is the Supplier table.

In the first image you are able to edit current supplier data in the Supplier table. In the second image you are able to insert new supplier data into the Supplier table.

Conclusion

During the course of this project, our group learned the importance of always staying on the same page with each other. This aspect of teamwork is so important when designing a database because many aspects of the database rely on one another. For example, when making attributes primary keys and foreign keys, it is important to be within the same understanding or different tables could use the same primary keys, which ultimately does not work. This is just one example, but it illustrates the problems that may be caused if team members do not keep attribute names uniform, input the wrong data types into tables, input incorrect constraints, etc.

Our group learned that communicating frequently with one another and asking questions greatly contributed to the success of this project. The content and style of this project required our group to meet regularly and message each other often because as stated before, it was critical to have the same understanding of how the database would be designed. This meant if we had problems with the sections we were responsible for completing, it was our duty to reach out and ask the group for their insight. Overall, our group worked well together and learned a great deal of knowledge from getting the chance to design and implement our own database.

Contributions

Team Member Name	Contribution Description	Contribution Percentage
Charles Donaldson	SQL Code, review/edit, Application Builder Design	20%
Chardonnae Fayemi	SQL Code, review/edit final report, coordination of team activities	20%
Zach Le	SQL Code, review/edit, ERR Design	20%
Cody Loftin	SQL Code, Functions, SQL and Application Builder Testing	20%
Marissa Sankey	SQL Code, Introduction, Relational Schema Design, Conclusion	20%