Natura Cafe Sales and Operations Management System

Ethan Duke, *Team Leader / Database Designer*
Anna Kaza, *Lead Researcher / Project Manager*

URL: http://classwork.engr.oregonstate.edu:2037/

Executive Summary:

Since the beginning of our project, we've made significant additions to our project overview to address concerns regarding its specificity and detail. Additionally, we've chosen to allow certain attributes such as the customerID FK and employeeID FK in our Invoices entity table to be NULL to prevent cascade issues when deleting an entity from the table. In the early stages, we made sure to use appropriate data types for each of our attributes, specifically choosing the data type DATETIME for each of our attributes that would be tracking a date of sale.

The second step of our project saw the addition of a primary key for our intersection table (invoiceItemsID) and slight adjustments to our schema. We specifically removed the "unique" constraints from FK attributes to allow the repetition of the same FK among different entity rows. Additionally, we set ON DELETE actions for each of our foreign keys in our database as well.

In step 3, we implemented static HTML pages which represented the end product of our project and made steps to address typos which appeared to bring us closer to the end design. Based on our peer's feedback, we made the decision to change the displayed columns for our employeeID and customerID to the customer's name and the employee's name. This allowed for the information on our Invoices table to be significantly more readable for our end user. We implemented a similar change for our dropdown menus for update and add features on the pages that featured them. Additionally, our peers recommended more update features for each of the pages that didn't feature them. As such, we began incorporating them into our final design by updating our SQL queries in our DML.sql file.

Steps 4 and 5 saw our project begin to resemble the final version of our database. Our site faced several problems during the first implementation of our frontend and backend. For example, our Add function was inconsistent at best, and our Update and Delete functions largely didn't work. However, with the feedback from our peers, we were able to pinpoint the inconsistencies that led to these hiccups. Largely, typos and incorrect references were to blame for the problems that plagued our sample page in step 4. Additionally, one of our delete actions, ON DELETE NO ACTION, for the employeeID in our Invoices table prevented the items from deleting, so we modified our FK cascade method to ON DELETE SET NULL. Consequently, we updated our outline, ERD, schema, and example data to reflect this change. At the end of step 5, we added the last of our CRUD features for each of the other pages, effectively finishing the functioning version of our site.

Project Outline:

       Natura Cafe is a cozy coffee shop located in a vibrant Central Florida college town, offering artisanal coffee and a relaxing atmosphere. Natura has thrived at its campus adjacent location as the student body has grown, and with the uptick in business, they have hired more employees, delineated positions and responsibilities for said employees, and increased their number of menu items. The coffee shop processes around 150 customer transactions daily and offers a menu of 25 items, including 15 beverages and 10 food options, and they employ 7 workers altogether with the potential to hire more should their business continue to expand. Additionally, in any given year, Natura typically generates approximately $450,000 in gross earnings, with average monthly sales of $37,500.

       Given their recent growth, Natura has noticed that their existing system does not provide comprehensive tools to analyze sales trends, track customer spending habits, or efficiently manage employees. This lack of insight results in inefficiencies such as difficulties in identifying high- and low-performing menu items, missed opportunities to optimize offerings, and limited ability to manage employee roles and schedules as the shop plans to hire additional staff. The system also lacks the capability to track customer behavior effectively, which could be used to personalize services and increase customer satisfaction.

       To address these issues, the proposed database solution will enhance Natura's operations by incorporating invoice tracking, customer and employee information storage, and role assignment to facilitate the aforementioned tasks. By implementing this database, Natura will be better positioned to streamline operations, optimize its menu, and scale its business effectively while maintaining high levels of customer satisfaction.
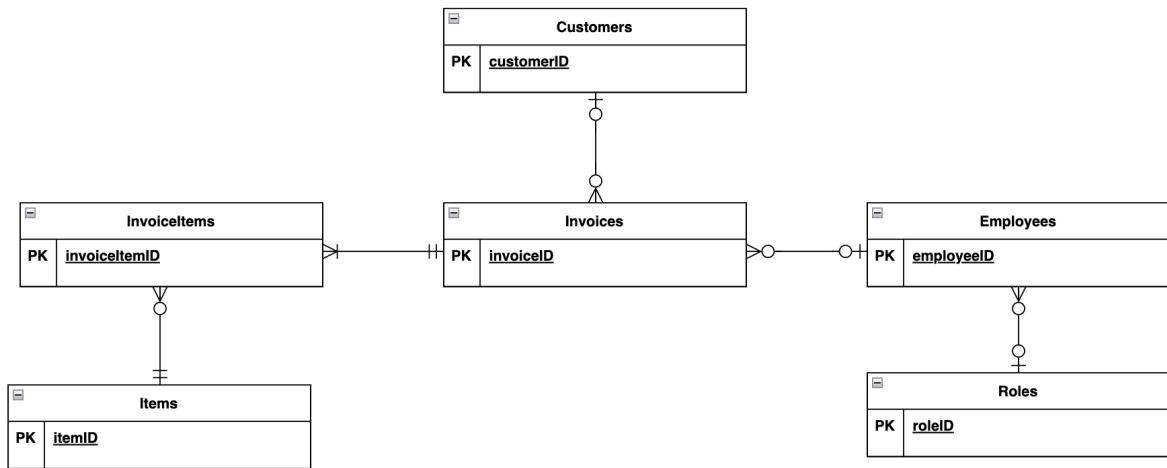
Database Outline:

- **Customers**: records basic details for customers who purchase products from Natura
    - customerID: int, auto_increment, unique, not NULL, PK
    - name: varchar(100), not NULL
    - email: varchar(100), unique, NULL
    - Relationships:
        - **1:M** relationship with **Invoices** is implemented with **customerID** as a **FK** in **Invoices**.

- **Employees**: records information for each employee hired at Natura
    - employeeID: int, auto_increment, unique, not NULL, PK
    - name: varchar(100), not NULL
    - address: varchar(100), not NULL
    - phone: varchar(100), unique, not NULL
    - email: varchar(100), unique, not NULL
    - dateOfBirth: DATE, not NULL
    - hireDate: DATE, not NULL
    - payRate: decimal(4,2), not NULL
    - roleID: int, NULL, FK

- Relationships:
  - **1:M** relationship with **Invoices** is implemented with **employeeID** as a **FK** in **Invoices.**
  - **M:1** relationship with **Roles** is implemented with **roleID** as a **FK** in **Employees.**

- **Roles**: stores the name of each role an employee at Natura can have
  - roleID: int, auto_increment, unique, not NULL, PK
  - name: varchar(100), unique, not NULL
  - Relationships:
    - **1:M** relationship with **Employees** is implemented with **roleID** as a **FK** in **Employees**

- **Items**: records the details for all menu items and various products sold by Natura
  - itemID: int, auto_increment, unique, not NULL, PK
  - name: varchar(100), unique, not NULL
  - price: decimal(5,2), not NULL
  - Relationships:
    - **M:N** relationship with **Invoices** facilitated by the intersection table **InvoiceItems** which uses **itemID** as a **FK** in **InvoiceItems**.

- **Invoices**: records the transaction information for all purchases made at Natura
  - invoiceID: int, auto_increment, unique, not NULL, PK
  - saleDate: DATETIME, not NULL
  - netTotal: decimal(6,2), not NULL
  - salesTax: decimal(6,2), not NULL
  - saleTotal: decimal(6,2), not NULL
  - employeeID: int, NULL, FK
  - customerID: int, NULL, FK
  - Relationships:
    - **M:1** relationship with **Employees** is implemented with **employeeID** as a **FK** in **Invoices**.
    - **M:1** relationship with **Customers** is implemented with **customerID** as a **FK** in **Invoices**.
    - **M:N** relationship with **Items** facilitated by the intersection table **InvoiceItems** which uses **invoiceID** as **FK** in **InvoiceItems**.
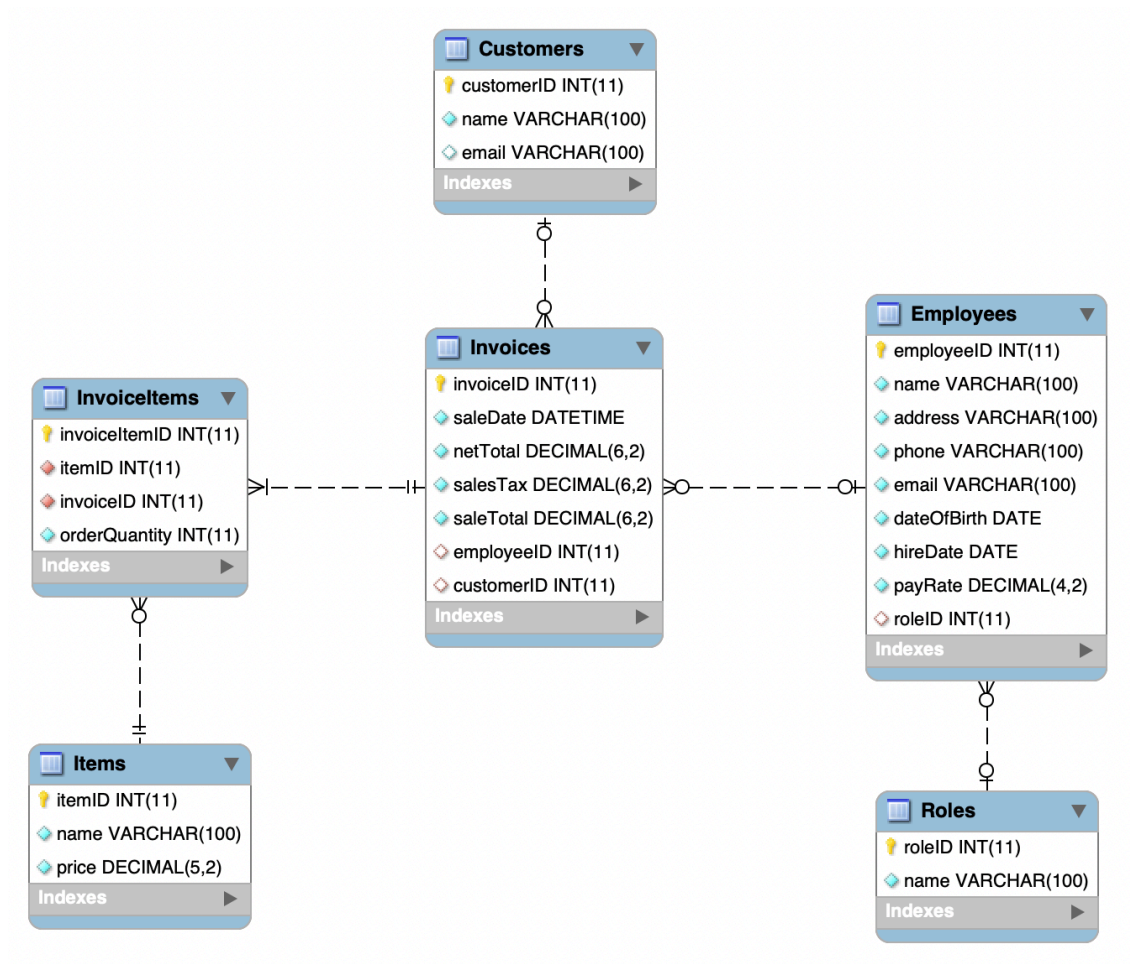
Intersection Table:
- **InvoiceItems**: represents an intersection table for the M:N relationship between Items and Invoices
  - invoiceItemID: int, auto_increment, unique, not NULL, PK
  - itemID: int, not NULL, FK
  - invoiceID: int, not NULL, FK
  - orderQuantity: int, not NULL

Entity-Relationship Diagram:

Customers
PK	customerID

InvoiceItems
PK	invoiceItemID

Invoices
PK	invoiceID

Employees
PK	employeeID

Items
PK	itemID

Roles
PK	roleID

Schema:

Customers
- 🔑 customerID INT(11)
- 🔹 name VARCHAR(100)
- 🔹 email VARCHAR(100)
- Indexes

InvoiceItems
- 🔑 invoiceItemID INT(11)
- 🔸 itemID INT(11)
- 🔸 invoiceID INT(11)
- 🔹 orderQuantity INT(11)
- Indexes

Invoices
- 🔑 invoiceID INT(11)
- 🔹 saleDate DATETIME
- 🔹 netTotal DECIMAL(6,2)
- 🔹 salesTax DECIMAL(6,2)
- 🔹 saleTotal DECIMAL(6,2)
- 🔸 employeeID INT(11)
- 🔹 customerID INT(11)
- Indexes

Employees
- 🔑 employeeID INT(11)
- 🔹 name VARCHAR(100)
- 🔹 address VARCHAR(100)
- 🔹 phone VARCHAR(100)
- 🔹 email VARCHAR(100)
- 🔹 dateOfBirth DATE
- 🔹 hireDate DATE
- 🔹 payRate DECIMAL(4,2)
- 🔹 roleID INT(11)
- Indexes

Items
- 🔑 itemID INT(11)
- 🔹 name VARCHAR(100)
- 🔹 price DECIMAL(5,2)
- Indexes

Roles
- 🔑 roleID INT(11)
- 🔹 name VARCHAR(100)
- Indexes

Sample Data:

Customers

customerID (PK)	name	email
1	Clair Hugo	c_hugo@gmail.com
2	Dylan Warren	warren47@hotmail.com
3	Zoya Rollins	zoyarollins@yahoo.com
4	Sebastian Pham	NULL
5	Darcey Savage	darsavage@gmail.com

Employees

employeeID (PK)	name	address	phone	email	dateOfBirth	hireDate	payRate	roleID (FK)
1	David Martinez	789 Oak St, Orlando, FL	321-555-9012	david.martinez@natura.com	1988-11-03	2021-05-20	25.00	1
2	Emily Carter	101 Maple St, Orlando, FL	321-555-3456	emily.carter@natura.com	1992-07-14	2022-10-30	24.00	1
3	James Rodriguez	22 Pine St, Orlando, FL	407-555-7890	james.rodriguez@natura.com	1998-03-18	2023-06-05	17.00	NULL
4	Sarah Johnson	456 Elm St, Orlando, FL	407-555-5678	sarah.johnson@natura.com	1995-09-25	2023-01-10	18.00	2
5	Michael Lee	123 Main St, Orlando, FL	407-555-1234	michael.lee@natura.com	1986-05-12	2022-08-15	16.00	3

Roles

roleID (PK)	name
1	'Manager'
2	'Barista'
3	'Custodian'

Items

itemID (PK)	name	price
1	'Parisian Blend'	2.00
2	'Cappuccino'	4.00
3	'Cafe Au Lait'	4.00
4	'Latte'	5.00
5	'Earl Grey Tea'	1.50

Invoices

invoiceID (PK)	saleDate	netTotal	salesTax	saleTotal	employeeID (FK)	customerID (FK)
1	2023-08-01 08:30:20	9.00	0.54	9.54	NULL	1
2	2023-08-01 10:45:07	6.50	0.39	6.89	4	3
3	2023-08-02 09:10:03	8.00	0.48	8.48	3	NULL
4	2023-08-02 14:45:57	3.50	0.21	3.71	2	2
5	2023-08-02 17:20:31	13.00	0.78	13.78	3	3

InvoiceItems (intersection table)

invoiceItemID (PK)	itemID (FK)	invoiceID (FK)	orderQuantity
1	2	1	1
2	4	1	1
3	4	2	1
4	5	2	1
5	2	3	1
6	3	3	1
7	5	4	1
8	1	4	1
9	5	5	2
10	4	5	2

Screen Captures:

Home page*:* Summarizes the CRUD steps that are available for each entity.

Customers page: Allows to <u>READ</u> all Customers entries, <u>CREATE</u> a new entry (via *Add a Customer* form), and <u>DELETE</u> an existing entry (via *Delete* buttons next to each entry). Additionally, allows to search for a customer by name (via *Search for a Customer* form).

Employees page: Allows to <u>READ</u> all Employees entries, <u>CREATE</u> a new entry (via *Add an Employee* form), <u>DELETE</u> an existing entry (via *Delete* buttons next to each entry), and <mark><u>UPDATE</u> an existing entry's <u>NULLable relationship</u></mark> (via *Update an Emloyee's Role* form). The *Update* form allows the user to select an employee's name from a dropdown menu. They can then update the role (foreign key) of a chosen employee by selecting a new role name from a dropdown menu. The *Update* form also allows setting the foreign key (roleID) value to NULL, which the user can do by selecting the "None" role. Additionally, the page allows to search for an employee by name (via *Search for an Employee* form).

Employees

Employee ID	Name	Address	Phone	Email	Date of Birth	Hire Date	Pay Rate ($)	Role	
1	David Martinez	789 Oak St, Orlando, FL	321-555-9012	david.martinez@natura.com	11/03/1988	05/20/2021	25	Manager	Delete
2	Emily Carter	101 Maple St, Orlando, FL	321-555-3456	emily.carter@natura.com	07/14/1992	10/30/2022	24	Manager	Delete
3	James Rodriguez	22 Pine St, Orlando, FL	407-555-7890	james.rodriguez@natura.com	03/18/1998	06/05/2023	17		Delete
4	Sarah Johnson	456 Elm St, Orlando, FL	407-555-5678	sarah.johnson@natura.com	09/25/1995	01/10/2023	18	Barista	Delete
5	Michael Lee	123 Main St, Orlando, FL	407-555-1234	michael.lee@natura.com	05/12/1986	08/15/2022	16	Custodian	Delete

Add an Employee

To add a new employee, please enter their information below and click Add.

Name: [ ] Address: [ ] Phone: [ ] Email: [ ]

Date of Birth: [mm/dd/yyyy 📅] Hire Date: [mm/dd/yyyy 📅] Pay Rate: [ ] Role (optional): [None ▾] [Add]

Search for an Employee

To search for an employee, enter their first (then last) name below and click Search. Partial names are allowed. Click Reset to clear the search.

Search by Name: [ ] [Search] [Reset]

Update an Employee's Role

To update an employee's role, select their name from the dropdown menu on the left and their new role from the right and click Update.

Name: [Select an Employee ▾] Role (optional): [None ▾] [Update]

Expanded dropdown menus:

Name [✓ Select an Employee / David Martinez / Emily Carter / ⌄]   Role (optional) [✓ None / Barista / Custodian / Manager]

Roles page: Allows to <u>READ</u> all Roles entries, <u>CREATE</u> a new entry (via *Add a Role* form), and <u>DELETE</u> an existing entry (via *Delete* buttons next to each entry).

Roles

Role ID	Name	
2	Barista	Delete
3	Custodian	Delete
1	Manager	Delete

Add a Role

To add a new role, please enter the following information and click Add.

Role Name: [   ] **Add**

Menu Items page: Allows to <u>READ</u> all Items entries, <u>CREATE</u> a new entry (via *Add a Menu Item* form), and <u>DELETE</u> an existing entry (via *Delete* buttons next to each entry). Additionally, allows to search for an item by name (via *Search for a Menu Item* form).

Menu Items

Item ID	Name	Price ($)	
1	Parisian Blend	2	Delete
2	Cappuccino	4	Delete
3	Cafe Au Lait	4	Delete
4	Latte	5	Delete
5	Earl Grey Tea	1.5	Delete

Add a Menu Item

To add a new item, please enter its information below and click Add.

Name: [   ] Price: [   ] **Add**

Search for a Menu Item

To search for an item, enter its name below and click Search. Partial names are allowed. Click Reset to clear the search.

Search by Name: [   ] **Search** **Reset**

Invoices page: Allows to <u>READ</u> all Invoices entries, <u>CREATE</u> a new entry (via *Add an Invoice* form), and <u>DELETE</u> an existing entry (via *Delete* buttons next to each entry).

Expanded dropdown menus:

Invoice Items page (intersection table for the M:N relationship of Items and Invoices): Allows to <u>READ</u> all Invoice Items entries, <u>CREATE</u> a new entry (via *Add an Invoice Item* form), <mark><u>DELETE</u> an existing entry from the <u>M:N relationship</u></mark> (via *Delete* buttons next to each entry), and <mark><u>UPDATE</u> an existing <u>M:N relationship</u></mark> (via *Update an Invoice Item's Order Quantity* form). The *Add* form allows the user to select an existing item's name and an existing invoice's date from dropdown menus to add a new entry to the intersection table. The *Update* form also allows the user to select an existing invoice item's name / date from a dropdown menu and update the order quantity of the chosen invoice item.

Invoice Items

Invoice Item ID	Item	Invoice	Order Quantity	
1	Cappuccino	2023-08-01 08:30:20	1	Delete
2	Latte	2023-08-01 08:30:20	1	Delete
3	Latte	2023-08-01 10:45:07	1	Delete
4	Earl Grey Tea	2023-08-01 10:45:07	1	Delete
5	Cappuccino	2023-08-02 09:10:03	1	Delete
6	Cafe Au Lait	2023-08-02 09:10:03	1	Delete
7	Earl Grey Tea	2023-08-02 14:45:57	1	Delete
8	Parisian Blend	2023-08-02 14:45:57	1	Delete
9	Earl Grey Tea	2023-08-02 17:20:31	2	Delete
10	Latte	2023-08-02 17:20:31	2	Delete

Add an Invoice Item

To add a new invoice item, please enter its information below and click Add.

Item: [Select an Item ▾] Invoice: [Select an Invoice ▾] Order Quantity: [_____] [Add]

Update an Invoice Items's Quantity

To update an invoice item's order quantity, select the item / invoice from the dropdown menu, enter the order quantity and click Update.

Invoice Item: [Select an Invoice Item ▾] Order Quantity: [_____] [Update]

Expanded dropdown menus:

Item [✓ Select an Item / Parisian Blend / Cappuccino / Cafe Au Lait / Latte / Earl Grey Tea]

Invoice [✓ Select an Invoice / 2023-08-01 08:30:20 / 2023-08-01 10:45:07 / 2023-08-02 09:10:03 / 2023-08-02 14:45:57 / 2023-08-02 17:20:31]

Invoice Item [✓ Select an Invoice Item / Cappuccino / 2023-08-01 08:30:20 / Latte / 2023-08-01 08:30:20 / ⌄]