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Project Title: CinePictures

Group Number: Team 52

PROJECT URL

Frontend URL: <http://classwork.engr.oregonstate.edu:32829/>

A) Executive Summary:

The idea behind CinePictures was to modernize a local movie company to replace its old-fashioned manual tracking system with a newer, robust database management system (DBMS). CinePictures DBMS consists of 6 entities, with the Tickets entity following a many-to-many relationship between Screenings and Customers.

This project was developed through an iterative process where changes were made based on peer and TA feedback. Feedback included: using Crow's Foot notation for the Entity Relationship Diagram, using camelCase for standardization of properties, and removing a redundant relationship between Movies and Tickets. After removing the redundant relationship, two more entities (Employee and Employee Roles) had to be added to meet the project's minimum number of relationships.

The database's CUD operations also went through many changes. These operations were initially implemented with plain SQL, but were later swapped with stored procedures for security reasons. For a better user experience, the FKs for the Create and Update forms were developed to include a dynamic drop-down menu. The dropdown values were created to include meaningful labels following this format: FK ID followed by the value it represented. All of this is displayed through a clean, modern user interface that resembles the appearance of a professional database management system.

This project was developed using Node.js for the backend and React for the frontend. The base UI mockup for the database was developed using Figma. In addition, AI tools were used to generate SQL files, specifically for the Stored Procedures based on the plain SQL scripts. While AI was extremely helpful with debugging and generating React components, oftentimes bugs would be introduced because the AI lacked a full understanding of the backend and frontend. Ultimately, AI did help speed the development process, but it still needed the supervision and tweaking of someone who better understood the requirements.

b) Project and Database Outlines:

Overview:

A local movie theater called CinePictures is looking to update its day-to-day operations. They plan to replace their old manual record-keeping ways for movie scheduling, screen management, and customer information with a more reliable and robust database. As of now, the theater operates 5 screens, selling an average of 10,000 tickets a month while currently employing 20 staff members with various roles. With the old system, not only was it difficult to keep track of ticket sales and scheduling movie screenings, but it also became difficult to track which employee was in charge of which screening, disrupting the workflow. Even though CinePictures generates approximately \$100,000 a month, its old system caused many angry customers from operational errors like inefficient daily movie scheduling and inaccurate ticket information, which caused a loss of 5% of the annual revenue (around \$60,000).

A movie theater database system will not only prevent these errors but will also improve its operational workflow. CinePictures will now be able to schedule movies efficiently on each screen by properly managing start and end times throughout the day. They can maintain accurate ticket sale records that include customer information, seat numbers, screening details, pricing, and purchase dates. The database will also allow them to track employee assignments for every screening, better allowing them to manage staffing needs. In addition, the movie theater database system will also allow them to analyze their customer preferences and viewing history through customer records. With this database, they can accurately track performance metrics to determine which movies generated the most ticket sales and which showtimes had the highest attendance. The data from the database will then be able to help the owners make the proper business decisions to run the business successfully, in order to maximize profits and improve efficiency.

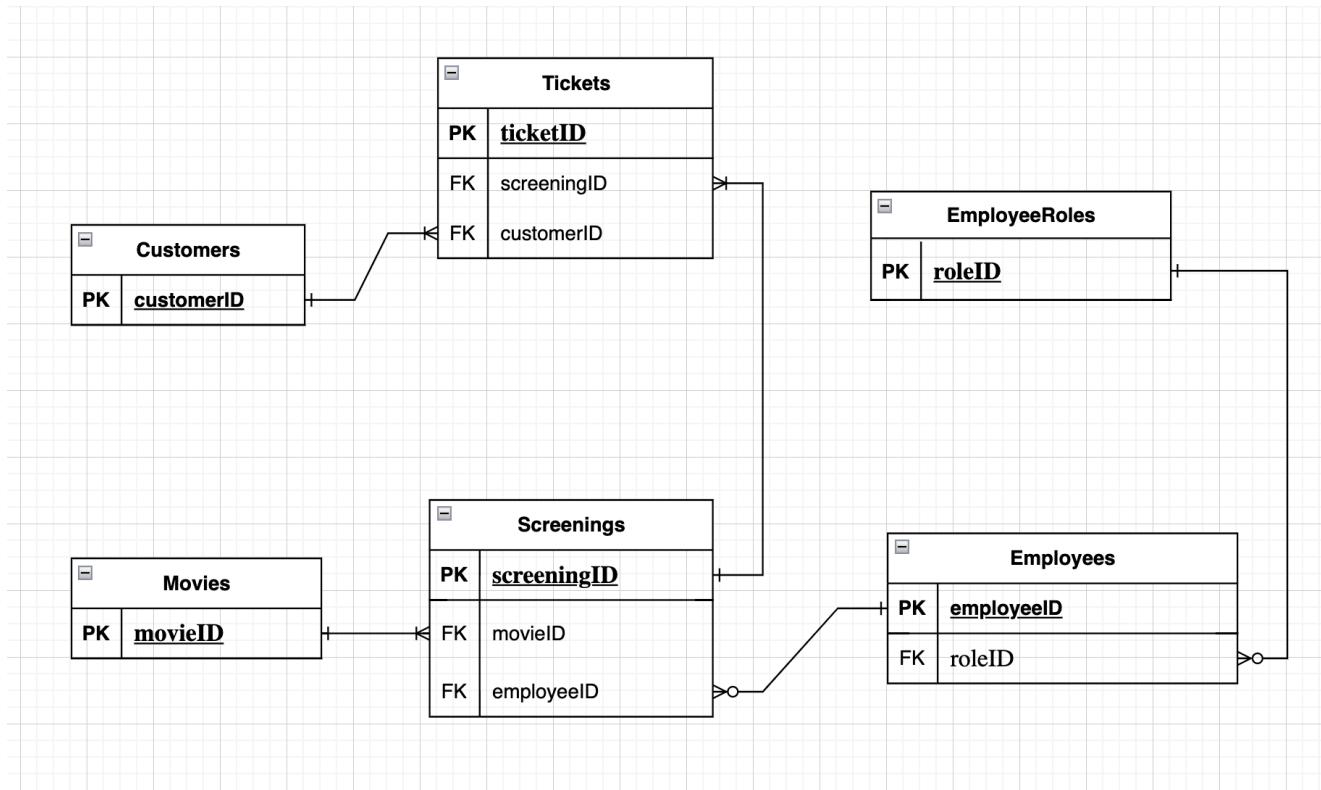
Database Outline, in Words:

- **Movies:** keeps track of the information relating to the movies showed in the theater (title, rating, genre etc...)
 - movieID: int, auto_increment, not NULL, unique, PK
 - title: varchar(255), not NULL
 - director:varchar(100), NULL

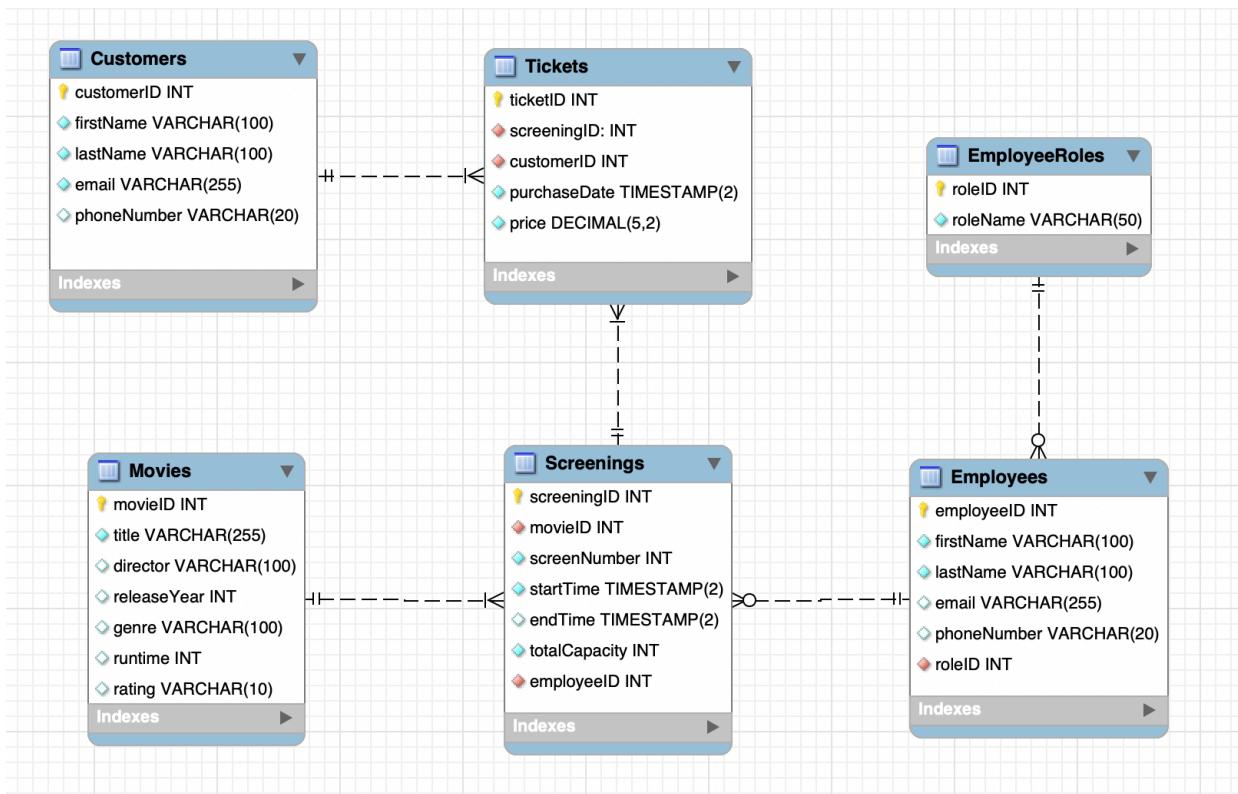
- releaseYear: int, NULL
 - genre: varchar(100), NULL
 - runtime: int, NULL
 - rating: varchar(10), NULL - (like PG, G, R)
 - **Relationship:** 1:M relationship with Screening, implemented with movieID as FK
- **Screenings:** keeps track of all the scheduled showings of a movie, including start time, end time, and screen number
 - screeningID: int, auto_increment, not NULL, unique, PK
 - movieID: int, not NULL, FK referencing Movies(movieID)
 - screenNumber: int, not NULL
 - startTime: timestamp, not NULL
 - endTime: timestamp, NULL
 - totalCapacity: int, not NULL
 - employeeID: int, not NULL, FK referencing Employees(employeeID)
 - **Relationship:**
 - M:1 with Movies
 - M:1 with Employees
 - 1:M with Tickets, implemented with screeningID as FK in Tickets
- **Tickets:** keeps track of every purchase made by customers for specific screenings/movies, including price and seat number.
 - ticketID: int, auto_increment, not NULL, unique, PK
 - screeningID: int, not NULL, FK referencing Screenings(screeningID)
 - customerID: int, not NULL, FK referencing Customers(customerID)
 - purchaseDate: timestamp, not NULL
 - price: decimal(5,2), not NULL
 - **Relationship:** Join table for Customers and Screenings.
 - M:1 with Customer and Screening
 - Customers and Screenings have a **Many-to-Many (M:N)** relationship, implemented through the Tickets table.
- **Customers:** keeps track of all the personal information of customers who have purchased tickets
 - customerID: int, auto_increment, not NULL, unique, PK
 - firstName: varchar(100), not NULL
 - lastName: varchar(100), not NULL
 - email: varchar(255), not NULL, unique
 - phoneNumber: varchar(20), NULL

- **Relationship:** 1:M with Tickets, implemented with customerID as FK in Tickets.
- **Employees:** keeps track of employee information like first name, role, and phone number.
 - employeeID: int, auto_increment, not NULL, unique, PK
 - firstName: varchar(100), not NULL
 - lastName: varchar(100), not NULL
 - email: varchar(255), NULL, unique
 - phoneNumber: varchar(20), NULL
 - roleID: int, not NULL, FK referencing EmployeeRoles(roleID)
 - **Relationship:**
 - 1:M with Screenings, implemented with employeeID as FK in Screenings. 1 employee can manage multiple screenings
 - M:1 with EmployeeRoles, implemented with roleID as FK in EmployeeRoles. Multiple employees can work under the same role.
- **EmployeeRoles:** keeps track of employee role types through a Category table
 - roleID: int, auto_increment, not NULL, unique, PK
 - roleName: varchar(50), not NULL, unique
 - **Relationship:** 1:M with Employees, implemented with roleID as FK in Employees. One role can be possessed by multiple employees

c) Entity-Relationship Diagram:



d) Schema:



e) Sample Data:

Customers Dummy Data

customerID	firstName	lastName	email	phoneNumber
1	David	Johnson	david.johnson@gmail.com	555-5001-0001
2	Gabriella	Hernandez	gabriella.h@gmail.com	555-5002-0002
3	Peter	Parker	peter.parker@gmail.com	555-5003-0003
4	Juan	Santos	juan.santos@gmail.com	555-5004-0004
5	Adam	Sandler	adam.s@gmail.com	555-5005-0005

Movies Dummy Data

movieID	title	director	releaseYear	genre	runtime	rating
1	The Avengers: Doomsday	A. Director	2025	Action	120	PG-13
2	Dune Messiah	D. Villeneuve	2025	Mystery	110	PG-13
3	Sinners	R. Coogler	2025	Thriller	135	R
4	The Odyssey	C. Nolan	2025	Drama	195	PG-13
5	The Batman	M. Reeves	2022	Thriller	205	PG-13

EmployeeRoles Dummy Data

roleID	roleName
1	Manager
4	Projectionist
3	Ticket Agent
2	Usher

Employees Dummy Data

employeeID	firstName	lastName	email	phoneNumber	roleID
201	Eveyln	Garcia	eveyln.garcia@cinepic.com	555-0101-0001	1
202	Isabella	Johnson	isabella.johnson@cinepic.com	555-0102-0002	2
203	Charlie	Goldberg	charlie.goldberg@cinepic.com	555-0103-0003	3
204	Danny	Prince	danny.p@cinepic.com	555-0104-0004	2
205	Mateo	Huminsky	mateo.huminsky@cinepic.com	555-0105-0004	4

Screenings Dummy Data

screeningID	movieID	screenNumber	startTime	endTime	totalCapacity	employeeID
11001	1	1	2025-04-29 14:00:00.00	2025-04-29 16:00:00.00	150	202
11002	5	5	2025-04-29 17:00:00.00	2025-04-29 19:25:00.00	50	205
11003	2	2	2025-04-29 15:30:00.00	2025-04-29 17:30:00.00	75	202
11004	3	3	2025-04-29 19:00:00.00	2025-04-29 21:15:00.00	75	204
11005	4	2	2025-04-29 18:00:00.00	2025-04-29 21:15:00.00	75	205

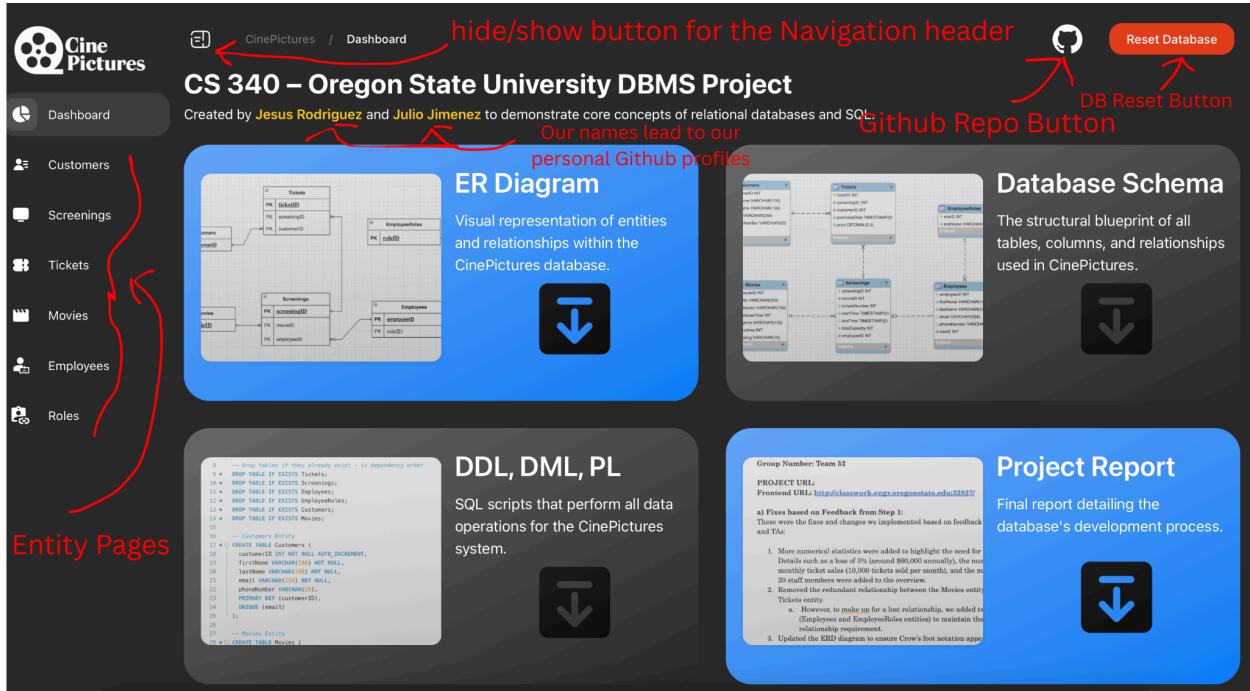
Tickets Dummy Data

ticketID	screeningID	customerID	purchaseDate	price
1	11001	4	2025-04-28 10:00:00.00	15.00
2	11001	4	2025-04-28 10:00:00.00	15.00
3	11003	1	2025-04-28 11:30:00.00	12.50
4	11004	2	2025-04-28 14:00:00.00	12.50
5	11001	3	2025-04-28 16:00:00.00	15.00
6	11005	3	2025-04-28 17:00:00.00	12.50
7	11002	5	2025-04-28 15:00:00.00	10.00

f) UI Screen Shots with Informative Titles

Dashboard Page

- Allows the user to download our ERD Diagram, Database Schema, DDL, DML, PL, and Project Report. By clicking the button for the files you want.
- Our names allow the user to access our personal Github profiles. They can see our other public projects
- The user can hide/show the navigation header by clicking the sidebar button
- The user can access the pages to the entities by clicking on the button for that page
- The user can access the Github repo for the project by clicking the Github Button.
- The user can reset the database by clicking the “Reset Database button”. Also, shown in all pages. An alert will be displayed when clicked.



Customers Page (M:M with Screenings using Tickets as junction table)

- The user can view the entire entity table that follows our DB schema (Read Operation)
- The user to create a new customer by hitting the button (Create Operation)
- The user can edit the users first name, last name, email, and phone number (Update Operation)
- The user can delete any customer (Delete Operation). Warning, deleting a customer will also delete their tickets.

- Reset Database button available on the top right.

Customers

Here you'll see your customers.
You can add, edit, and delete the information of customers.

Add a new customer button

Create New Entry

Customer ID	First Name	Last Name	Email	Phone Number	Edit/Delete
1	David	Johnson	david.johnson@gmail.com	555-5001-0001	
2	Gabriella	Hernandez	gabriella.h@gmail.com	555-5002-0002	
3	Peter	Parker	peter.parker@gmail.com	555-5003-0003	
4	Juan	Santos	juan.santos@gmail.com	555-5004-0004	
5	Adam	Sandler	adam.s@gmail.com	555-5005-0005	

Customers

Here you'll see your customers.
You can add, edit, and delete the information of customers.

Create New Entry

First Name:

Last Name:

Email:

Phone Number:

Save **Cancel**

Customer ID	First Name	Last Name	Email	Phone Number	Edit/Delete
1 - David Johnson	David	Johnson	david.johnson@gmail.com	555-5001-0001	
2	Gabriella	Hernandez	gabriella.h@gmail.com	555-5002-0002	
3	Peter	Parker	peter.parker@gmail.com	555-5003-0003	
4	Juan	Santos	juan.santos@gmail.com	555-5004-0004	
5	Adam	Sandler	adam.s@gmail.com	555-5005-0005	

Screenings Page (M:M with Customers using Tickets as junction table)

- The user can view the entire entity table (Read Operation)
- The user can add a new screening by hitting the button (Create Operation)
- The user can edit the screenings start times, end time, screen number, total capacity, employee ID and movie ID. FK ID's can only be edited using a dropdown feature (Update Operation)
- The user can delete any screening. Deleting a screening will also delete any tickets associated with the screening. (Delete Operation)
- Reset Database button available on the top right

The screenshot shows a dark-themed web application interface. At the top left is the navigation bar "CinePictures / Screenings". On the top right are two buttons: a "Reset Database" button and a "Logout" icon. Below the header, the title "Screenings" is displayed. A sub-instruction "Here you'll see all scheduled screenings. You can add, edit, delete a screening." is present. A prominent blue button labeled "Create New Screening" with a plus sign is located on the left. To its right, a red arrow points to the text "Create a new screening button". The main content area is titled "Screenings" and contains a table with the following data:

Screening ID	Start Time	End Time	Screen Number	Total Capacity	Employee ID	Movie ID	Edit/Delete
11001	4/29/2025, 9:00 AM	4/29/2025, 11:00 AM	1	150	202 - Isabella Johnson	1 - The Avengers: Doomsday	
11005	4/29/2025, 1:00 PM	4/29/2025, 4:15 PM	2	75	205 - Mateo Huminsky	4 - The Odyssey	
11002	4/29/2025, 2:00 PM	4/29/2025, 5:15 PM	5	50	205 - Mateo Huminsky	4 - The Odyssey	
11003	4/29/2025, 2:30 PM	4/29/2025, 6:30 PM	2	75	202 - Isabella Johnson	2 - Dune Messiah	
11004	4/29/2025, 10:00 PM	4/30/2025, 1:15 AM	3	75	204 - Danny Prince	4 - The Odyssey	

The screenshot shows a "Create New Entry" form for a screening. The form includes the following fields:

- Start Time: 06/08/2025, 08:46 PM
- End Time: (Auto-calculated based on start time and movie runtime - No need to fill) 06/09/2025, 12:46 AM
- Screen Number: 7
- Total Capacity: 150
- Employee ID: 201 - Evelyn Garcia
- Movie ID: 2 - Dune Messiah
- Note: Selected movie runtime: 4h 0m
- Buttons: Save, Cancel

A red arrow points to the "Start Time" field with the text "Datetime Picker feature for Start Time and End Time". Another red arrow points to the "Employee ID" and "Movie ID" dropdowns with the text "Dropdown feature for FK ID's".

Screenings							
Screening ID	Start Time	End Time	Screen Number	Total Capacity	Employee ID	Movie ID	Edit/Delete
11001 - The Avengers: Doomsday	04/29/2025, 09:00 AM	04/29/2025, 11:00 AM	1	150	202	1 - The A	Save Cancel Runtime: 2h 0m
11005	4/29/2025, 1:00 PM	4/29/2025, 4:15 PM	2	75	205 - Mateo Huminsky	4 - The Odyssey	Edit Delete
11002	4/29/2025, 2:00 PM	4/29/2025, 5:15 PM	5	50	205 - Mateo Huminsky	4 - The Odyssey	Edit Delete
11003	4/29/2025, 2:30 PM	4/29/2025, 6:30 PM	2	75	202 - Isabella Johnson	2 - Dune Messiah	Edit Delete
11004	4/29/2025, 10:00 PM	4/30/2025, 1:15 AM	3	75	204 - Danny Prince	4 - The Odyssey	Edit Delete

Tickets Page (Junction table to create M:M for Customers and Screenings)

- The user can view the entity table information (Read Operations)
- The user can add a new ticket by hitting the button. (Create Operation)
- The user can edit the ticket price, purchase date, customer ID, and movie ID. FK ID's can only be edited using the drop down feature (Update Operation)
- The user can delete any ticket. This won't delete any screening or customer. (Delete Operations)
- The Reset Database button is available on the top right.

CinePictures / Tickets Reset Database

Tickets

Here you'll see all purchased tickets.
You can add, edit, delete a ticket.

Create New Ticket		Edit and Delete Buttons					
+		← Create a new ticket button Edit/Delete					
Tickets							
Ticket ID	Price	Purchase Date	Customer ID	Screening ID			
1	15.00	4/28/2025	4 - Juan Santos	11001 - The Avengers: Doomsday @ 2025-04-29 07:00	Edit Delete		
2	15.00	4/28/2025	4 - Juan Santos	11001 - The Avengers: Doomsday @ 2025-04-29 07:00	Edit Delete		
3	12.50	4/28/2025	1 - David Johnson	11003 - Dune Messiah @ 2025-04-29 08:30	Edit Delete		
4	12.50	4/28/2025	2 - Gabriella Hernandez	11004 - Sinners @ 2025-04-29 12:00	Edit Delete		
5	15.00	4/28/2025	3 - Peter Parker	11001 - The Avengers: Doomsday @ 2025-04-29 07:00	Edit Delete		
6	12.50	4/28/2025	3 - Peter Parker	11005 - The Odyssey @ 2025-04-29 11:00	Edit Delete		
7	10.00	4/28/2025	5 - Adam Sandler	11002 - The Batman @ 2025-04-29 10:00	Edit Delete		

Tickets

Here you'll see all purchased tickets.
You can add, edit, delete a ticket.

Create New Entry

Price:

Purchase Date: (Defaults to current time)
06/08/2025, 09:30 PM

Customer ID: Select Customer ID

Screening ID: Select Screening ID

Save **Cancel**

Datepicker
defaults to
current time

Dropdown
feature for FK
ID's

Tickets					
Ticket ID	Price	Purchase Date	Customer ID	Screening ID	Edit/Delete
1	15.00	04/28/2025, 05:00 AM	4 - Juan Santos	11001 - The Avengers: Doomsday @ 2025-04-29 07:00	Save Cancel
2	15.00	4/28/2025	4 - Juan Santos	11001 - The Avengers: Doomsday @ 2025-04-29 07:00	
3	12.50	4/28/2025	1 - David Johnson	11003 - Dune Messiah @ 2025-04-29 08:30	
4	12.50	4/28/2025	2 - Gabriella Hernandez	11004 - Sinners @ 2025-04-29 12:00	
5	15.00	4/28/2025	3 - Peter Parker	11001 - The Avengers: Doomsday @ 2025-04-29 07:00	
6	12.50	4/28/2025	3 - Peter Parker	11005 - The Odyssey @ 2025-04-29 11:00	
7	10.00	4/28/2025	5 - Adam Sandler	11002 - The Batman @ 2025-04-29 10:00	

Movies Page

- The user can view the entire entity table (Read Operation)
- The user can add a new movie by clicking on the button (Create Operation)
- The user can edit a movie's title, director, release year, genre, runtime, and rating (Update Operation)
- The user can delete any movie. This will delete any screening and ticket associated with the movie. (Delete Operation)
- The Reset Button is available on the top right

Movies

Here you'll see a list of all movies from the database.
You can add a new movie or edit an existing one.

Create
New
Movie



Add a new movie button

Edit and Delete button

Movies

Movie ID	Title	Director	Release Year	Genre	Runtime	Rating	Edit/Delete
1	The Avengers: Doomsday	A. Director	2025	Action	3h 0m	PG-13	
2	Dune Messiah	D. Villeneuve	2025	Mystery	1h 50m	PG-13	
3	Sinners	R. Coogler	2025	Thriller	2h 15m	R	
4	The Odyssey	C. Nolan	2025	Drama	3h 15m	PG-13	
5	The Batman	M. Reeves	2022	Thriller	3h 25m	PG-13	

Movies

Here you'll see a list of all movies from the database.
You can add a new movie or edit an existing one.

Create New Entry

Title:

Director:

Release Year:

Genre:

Runtime:

Duration
picker for
runtime

Rating:

Movies

Movie ID	Title	Director	Release Year	Genre	Runtime	Rating	Edit/Delete
1 - The Avenger	The Avengers: D	A. Director	2025	Action	3 h 0 m (180 minutes total)	PG-13	
2	Dune Messiah	D. Villeneuve	2025	Mystery	1h 50m	PG-13	
3	Sinners	R. Coogler	2025	Thriller	2h 15m	R	
4	The Odyssey	C. Nolan	2025	Drama	3h 15m	PG-13	
5	The Batman	M. Reeves	2022	Thriller	3h 25m	PG-13	

Employees Page

- The users can view the entire entity table (Read Operation)
- The user can add a new employee by clicking on the button (Create Operation)
- The user can edit an employee's first name, last name, email, and role ID. Role ID can only be edited using a drop down feature (Update Operation)
- The user can delete any employee. This could cause screenings and tickets to be deleted if the screening is associated with the deleted employee. (Delete Operation)
- The Reset Database button is available on the top right

The screenshot shows a dark-themed web application interface. At the top left is a navigation bar with a logo, the text "CinePictures / Employees", and a GitHub icon. On the far right is a red "Reset Database" button. Below the navigation is a section titled "Employees" with the sub-instruction: "Here you'll see all employees and their roles. You can add, edit, delete an employee." A blue callout box highlights the "Create New Employee" button, which features a white plus sign. To the right of the table, a red arrow points to the "Edit and Delete" button, which includes icons for edit and delete.

Employee ID	First Name	Last Name	Email	Role ID	Edit/Delete
201	Eveyln	Garcia	eveyln.garcia@cinepic.com	1 - Manager	
203	Charlie	Goldberg	charlie.goldberg@cinepic.com	3 - Ticket Agent	
205	Mateo	Huminsky	mateo.huminsky@cinepic.com	4 - Projectionist	
202	Isabella	Johnson	isabella.johnson@cinepic.com	2 - Usher	
204	Danny	Prince	danny.p@cinepic.com	2 - Usher	

This screenshot shows a modal window titled "Create New Entry". It contains four input fields: "First Name", "Last Name", "Email", and "Role ID". The "Role ID" field is a dropdown menu labeled "Select Role ID". A red callout box highlights this dropdown menu. At the bottom of the modal are two buttons: "Save" and "Cancel".

This screenshot shows the same Employees page as above, but with a different focus. A specific row for "Eveyln Garcia" has been selected, highlighted by a light gray background. The "Edit/Delete" button for this row is also highlighted with a light gray background. The "Save" and "Cancel" buttons at the bottom right of the page are also highlighted.

Employee ID	First Name	Last Name	Email	Role ID	Edit/Delete
201 - Eveyln Garcia	Eveyln	Garcia	eveyln.garcia@cinepic.com	1 - Manager	
203	Charlie	Goldberg	charlie.goldberg@cinepic.com	3 - Ticket Agent	
205	Mateo	Huminsky	mateo.huminsky@cinepic.com	4 - Projectionist	
202	Isabella	Johnson	isabella.johnson@cinepic.com	2 - Usher	
204	Danny	Prince	danny.p@cinepic.com	2 - Usher	

Employees Page

- The user can view the entire entity table (Read Operation)
- The user can add a new employee by clicking on the button (Create Operation)
- The user can edit an employees role name (Update Operation)
- The user can delete any role. This will also delete any employee associated with that role (Delete Operation)
- The Reset Database Button is available on the top right

Employee Roles
Here you'll see all available employee roles.
You can add, edit, delete an employee role.

Add a new employee role button

Edit and Delete button

Role ID	Role Name	Edit/Delete
1	Manager	 
2	Usher	 
3	Ticket Agent	 
4	Projectionist	 

Employee Roles

Here you'll see all available employee roles.
You can add, edit, delete an employee role.

Create New Entry

Role Name:

Save **Cancel**

Employee Roles

Role ID	Role Name	Edit/Delete
1 - Manager	Manager	 
2	Usher	 
3	Ticket Agent	 
4	Projectionist	 