CSC-4710 - Database Systems

Georgia States University

Fall 2020

Group Information

```
  ___   _   _______
 / _ \ | | / /_   _|
/ /_\ \| |/ /  | |
|  _  ||    \  | |
| | | || |\  \_| |_
\_| |_/\_| \_/\___/



      _____ _____  ___  ___  ___
     |_   _|  ___|/ _ \ |  \/  |
       | | | |__ / /_\ \| .  . |
       | | |  __||  _  || |\/| |
       | | | |___| | | || |  | |
       \_/ \____/\_| |_/\_|  |_/


    A K I
    | | |
    | | |
    | | +---------- Iffatun Nessa Mahi (imahi1@student.gsu.edu)
    | +------------ Kirby Liu (kirby.liu@Student.gsu.edu)
    +-------------- Alexandre Geraldo (ageraldo1@student.gsu.edu)
```

Project Information

- **Topic:** Online Food Ordering Platform for Small Restaurants.

- **Inspiration:** The year 2020 has been a remarkable year that has brought about many changes to the restaurant industry. Through the lockdown, many restaurants have had to become dependent on food delivery service to survive while indoor dining has either been forced to close or become a much less popular dining option. Before the pandemic, food delivery might have compromised 10%-15% of revenue however as Covid-19 hotspots are popping up throughout the country, many restaurants are reporting 90% plus delivery-based sales. Several business owners have had to reinvent their businesses to survive the changes caused by COVID-19. Small restaurant owners are particularly hit hard and are still struggling to survive in this environment. To keep businesses open, many small restaurants are forced to move to an online ordering platform such as UberEats or GrubHub. These online platforms provide all the tools necessary to put a local restaurant into the online ordering food business. That sounds fantastic but there is an issue here: These platforms charge the restaurant a fee for each transaction. These fees are incredibly unpopular, but many restaurant owners feel they have no other options as a Washington Post article, "Restaurants are barely surviving. Delivery apps will kill them ," recently highlighted the high delivery fees of popular delivery apps like Grubhub, DoorDash, and Uber eats charges both restaurant owners for each transaction. Many restaurant owners voiced concerns as these fees barely allow restaurant owners to survive an already difficult conditions brought about by the pandemic. Our aim for this project is to provide an alternative/sustainable platform for restaurants to participate in the food delivery/gig worker economy that benefits restaurant owners, drivers, and customers. For customers the application will offer feature-rich functionalities that tracks previous order preferences, recommends new restaurants/menu, offer promotions, and provide reviews of nearby restaurants. For restaurants the application will offer simple commonly used features that include employee management, menu management, app sales notification, and promotion offerings. Our goal is to keep fees low, so that the money collected will be majority for the gig-workers that deliver the food. Our metric for success is to -1) create a working prototype that 2) once presented to restaurant owners, potential customers, and from gig-workers receives positive feedback, and 3) lastly the payment model is sustainable from an operational/business standpoint for all stakeholders including application developers, restaurant owners, gig-workers, and customers alike.

Required Analysis

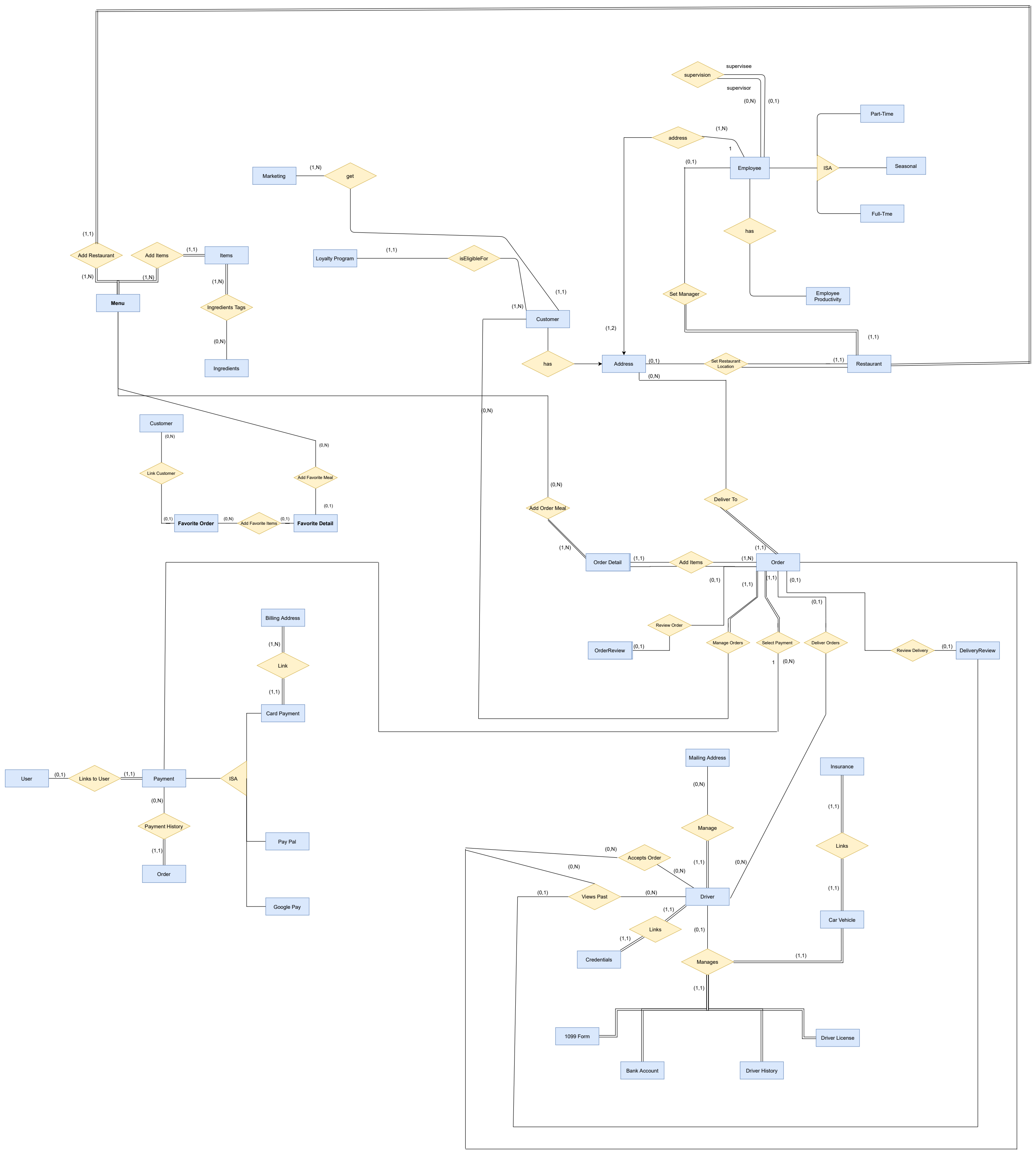
- **User Requirements**

- The system will allow customers to add orders, verify orders status, cancel orders.
- The system will allow drivers to pick orders from a queue and delivering to customers.
- The system will allow customers to create favorite orders.
- The system will provide a global address catalog to avoid duplicate records added to the system. The address catalog will also provide latitude and longitude coordinates to be used in data visualizations.
- The system will allow the restaurants to specify the operation hours of the business, select a local manager, and implement the use of the global address catalog. A restaurant must also have a feature to enable or disable the ordering system as a whole.
- The system will track total sales for reporting and tax purposes for restaurants.
- The system will allow customers to evaluate orders and deliveries.
- This system will allow to store customer information such as name, deliver address, contact information.
- This system will allow to store employee information such as their name, address, working hours, productivity.
- This system is for promoting limited-time-only discounts for customers.
- This system will identify potential customers to give them discounts based on their bill amount.
- The system will allow restaurants will be able to build their menu offering while listing calories, prices, size, promotions, and food category of their food and drink offering.
- The system will allow restaurants will have the ability to list the ingredients of each food and tag with special dietary and/or common food allergens.
- The system will allow customers to be able to save preferred payment options of credit/debit cards (with billing address), paypal, and/or google pay.
- The system will allow drivers to input and store their vehicle, driver’s license, driver history, insurance, bank, and tax information upon enrollment.
- The system will allow customers/restaurants/drivers to input and store their contact information including email, phone number, and mailing address.
- The system will allow customers/restaurants/drivers to view their past orders and transaction receipts.

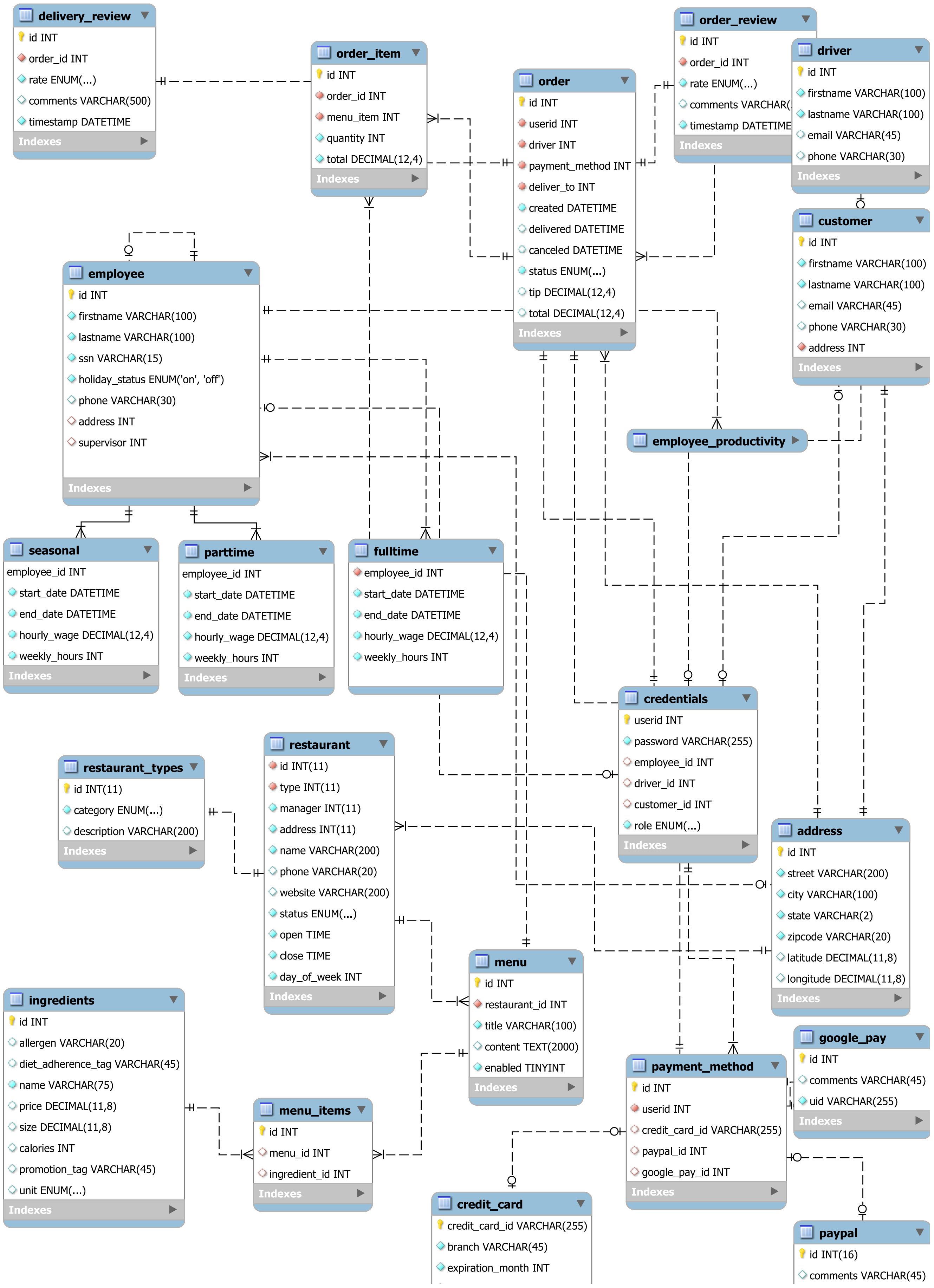
Architecture Design

- **Backend**
  - **Database**
    - MYSQL 8.0.22
  - **Test Data Generator**
    - Python 3.8
  - **Container**
    - Docker 19.03.13
- **Frontend**
  - Visualization
    - Grafana v7.3.4

Entity Relation Diagram



Physical Diagram


delivery_review
id INT
order_id INT
rate ENUM(...)
comments VARCHAR(500)
timestamp DATETIME
Indexes
order_item
id INT
order_id INT
menu_item INT
quantity INT
total DECIMAL(12,4)
Indexes
order
id INT
userid INT
driver INT
payment_method INT
deliver_to INT
created DATETIME
delivered DATETIME
canceled DATETIME
status ENUM(...)
tip DECIMAL(12,4)
total DECIMAL(12,4)
Indexes
order_review
id INT
order_id INT
rate ENUM(...)
comments VARCHAR(
timestamp DATETIME
Indexes
driver
id INT
firstname VARCHAR(100)
lastname VARCHAR(100)
email VARCHAR(45)
phone VARCHAR(30)
Indexes
customer
id INT
firstname VARCHAR(100)
lastname VARCHAR(100)
email VARCHAR(45)
phone VARCHAR(30)
address INT
Indexes
employee
id INT
firstname VARCHAR(100)
lastname VARCHAR(100)
ssn VARCHAR(15)
holiday_status ENUM('on', 'off')
phone VARCHAR(30)
address INT
supervisor INT
Indexes
employee_productivity
seasonal
employee_id INT
start_date DATETIME
end_date DATETIME
hourly_wage DECIMAL(12,4)
weekly_hours INT
Indexes
parttime
employee_id INT
start_date DATETIME
end_date DATETIME
hourly_wage DECIMAL(12,4)
weekly_hours INT
Indexes
fulltime
employee_id INT
start_date DATETIME
end_date DATETIME
hourly_wage DECIMAL(12,4)
weekly_hours INT
credentials
userid INT
password VARCHAR(255)
employee_id INT
driver_id INT
customer_id INT
role ENUM(...)
Indexes
restaurant_types
id INT(11)
category ENUM(...)
description VARCHAR(200)
Indexes
restaurant
id INT(11)
type INT(11)
manager INT(11)
address INT(11)
name VARCHAR(200)
phone VARCHAR(20)
website VARCHAR(200)
status ENUM(...)
open TIME
close TIME
day_of_week INT
Indexes
address
id INT
street VARCHAR(200)
city VARCHAR(100)
state VARCHAR(2)
zipcode VARCHAR(20)
latitude DECIMAL(11,8)
longitude DECIMAL(11,8)
Indexes
menu
id INT
restaurant_id INT
title VARCHAR(100)
content TEXT(2000)
enabled TINYINT
Indexes
ingredients
id INT
allergen VARCHAR(20)
diet_adherence_tag VARCHAR(45)
name VARCHAR(75)
price DECIMAL(11,8)
size DECIMAL(11,8)
calories INT
promotion_tag VARCHAR(45)
unit ENUM(...)
Indexes
menu_items
id INT
menu_id INT
ingredient_id INT
Indexes
payment_method
id INT
userid INT
credit_card_id VARCHAR(255)
paypal_id INT
google_pay_id INT
Indexes
google_pay
id INT
comments VARCHAR(45)
uid VARCHAR(255)
Indexes
credit_card
credit_card_id VARCHAR(255)
branch VARCHAR(45)
expiration_month INT
paypal
id INT(16)
comments VARCHAR(45)

Environment Build Process

1. **Download and install Docker & MySQL Workbench**
   - **Docker:** https://www.docker.com/products/docker-desktop
   - **MySQL Workbench:** https://www.mysql.com/products/workbench/
2. **Pull the following images from DockerHub.**
   - MySQL
     ```
     docker pull mysql:8.0.22
     ```
   - Grafana
     ```
     docker pull grafana/grafana:7.3.4
     ```
3. **Create a dedicated docker network for the containers.**
   ```
   docker network create gsu
   ```
4. **Construct the custom images for each container.**
   - MySQL
     ```
     docker build -t mysql-csc-4710-template -f docker/mysql/Dockerfile SQL/
     ```
     ```
     Sending build context to Docker daemon   7.31MB
     Step 1/7 : FROM mysql:8.0.22
     8.0.22: Pulling from library/mysql
     852e50cd189d: Pull complete
     29969ddb0ffb: Pull complete
     a43f41a44c48: Pull complete
     5cdd802543a3: Pull complete
     ```

```
b79b040de953: Pull complete
938c64119969: Pull complete
7689ec51a0d9: Pull complete
a880ba7c411f: Pull complete
984f656ec6ca: Pull complete
9f497bce458a: Pull complete
b9940f97694b: Pull complete
2f069358dc96: Pull complete
Digest:
sha256:4bb2e81a40e9d0d59bd8e3dc2ba5e1f2197696f6de39a91e90798dd27299b093
Status: Downloaded newer image for mysql:8.0.22
---> dd7265748b5d
Step 2/7 : ARG MYSQL_DATABASE=CSC4710
---> Running in 878a006e0951
Removing intermediate container 878a006e0951
---> 1f92e5091c6b
Step 3/7 : ARG MYSQL_USER=csc4710
---> Running in e8cffd0bb2d2
Removing intermediate container e8cffd0bb2d2
---> a96d4473bd74
Step 4/7 : ARG MYSQL_PASSWORD=password
---> Running in 848c7e703347
Removing intermediate container 848c7e703347
---> 695d77603bbf
Step 5/7 : ENV MYSQL_DATABASE=${MYSQL_DATABASE}
---> Running in 68f5880feb45
Removing intermediate container 68f5880feb45
---> 157fd62f7e27
Step 6/7 : ENV MYSQL_USER=${MYSQL_USER}
---> Running in b70c8962b469
Removing intermediate container b70c8962b469
---> da86a22281a0
Step 7/7 : ENV MYSQL_PASSWORD=${MYSQL_PASSWORD}
---> Running in a5f2de2ee262
Removing intermediate container a5f2de2ee262
---> 6f450553082a
Successfully built 6f450553082a
Successfully tagged mysql-csc-4710-template:latest
```

- Grafana

```
docker build -f docker/grafana/Dockerfile -t app-grafana-loader
docker/grafana
```

5. **Start the containers**

- MYSQL

  ```
  docker run --name mysql-csc-4710 --network gsu -p 3306:3306 -d mysql-csc-
  4710-template
  ```

  Note: this process can take several minutes to complete. Check the container logs for the following message:

  ```
  docker container logs mysql-csc-4710
  ```

  ```
  2020-11-24 23:08:05+00:00 [Note] [Entrypoint]: MySQL init process done. Ready
  for start up.

  2020-11-24T23:08:05.761154Z 0 [System] [MY-010116] [Server] /usr/sbin/mysqld
  (mysqld 8.0.22) starting as process 1
  2020-11-24T23:08:05.771092Z 1 [System] [MY-013576] [InnoDB] InnoDB
  initialization has started.
  2020-11-24T23:08:06.973433Z 1 [System] [MY-013577] [InnoDB] InnoDB
  initialization has ended.
  2020-11-24T23:08:07.315138Z 0 [System] [MY-011323] [Server] X Plugin ready
  for connections. Bind-address: '::' port: 33060, socket:
  /var/run/mysqld/mysqlx.sock
  2020-11-24T23:08:08.206152Z 0 [Warning] [MY-010068] [Server] CA certificate
  ca.pem is self signed.
  2020-11-24T23:08:08.206504Z 0 [System] [MY-013602] [Server] Channel
  mysql_main configured to support TLS. Encrypted connections are now supported
  for this channel.
  2020-11-24T23:08:08.388181Z 0 [Warning] [MY-011810] [Server] Insecure
  configuration for --pid-file: Location '/var/run/mysqld' in the path is
  accessible to all OS users. Consider choosing a different directory.
  2020-11-24T23:08:08.417446Z 0 [System] [MY-010931] [Server] /usr/sbin/mysqld:
  ready for connections. Version: '8.0.22'  socket:
  '/var/run/mysqld/mysqld.sock'  port: 3306  MySQL Community Server - GPL.
  ```

  This message indicated the instance is up and running.

- Grafana
  - Console

    ```
    docker run -d -p 3000:3000 --name grafana-csc-4710 --network gsu -e
    "GF_INSTALL_PLUGINS=grafana-piechart-panel,grafana-worldmap-panel"
    ```

```
grafana/grafana:7.3.4
```

- Customization

  ```
  docker run --rm --network gsu app-grafana-loader
  ```

6. **Perform a records count check**

```
# only execute this step when the container is fully operational.

docker exec -it mysql-csc-4710 mysql -u csc4710 -ppassword -e "SELECT table_name,
SUM(table_rows) FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_SCHEMA = 'CSC4710'
GROUP BY table_name ORDER BY TABLE_NAME;"
```

TABLE_NAME	SUM(table_rows)
address	100
credentials	140
credit_card	45
customer	100
delivery_review	513
driver	5
employee	35
employee_productivity	0
fulltime	5
google_pay	37
ingredients	7
menu	3
menu_items	6
order	1000

TABLE_NAME	SUM(table_rows)
order_item	1000
order_review	507
parttime	3
payment_method	140
paypal	59
restaurant	1
restaurant_types	6
seasonal	5

7. **Connect to MYSQL Workbench**

   - **Hostname:** 127.0.0.1
   - **Port:** 3306
   - **Username:** csc4710
   - **Password:** password
   - **Database:** CSC4710

8. **Additional Information**

   - Stop Container

     ```
     docker container stop mysql-csc-4710
     ```

   - Remove Container

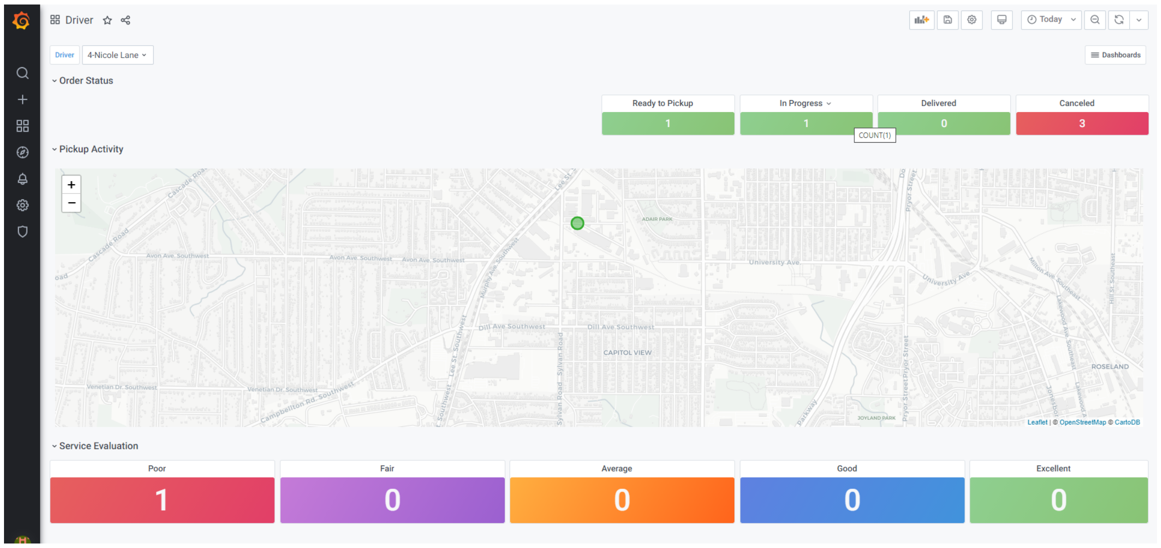
     ```
     docker container rm mysql-csc-4710
     ```

9. **Accessing Grafana**

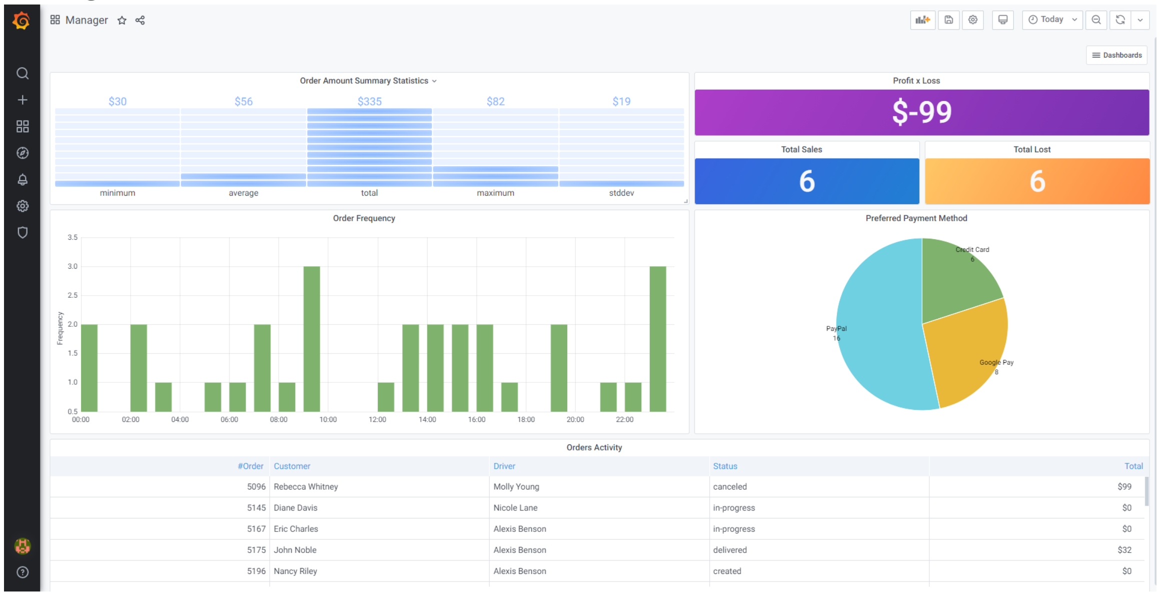
   - **URL:** http://localhost:3000

   - **Username:** admin

- **Password:** admin
- **Dashboards:**
  - Driver



  - Manager



Orders Activity

#Order	Customer	Driver	Status	Total
5096	Rebecca Whitney	Molly Young	canceled	$99
5145	Diane Davis	Nicole Lane	in-progress	$0
5167	Eric Charles	Alexis Benson	in-progress	$0
5175	John Noble	Alexis Benson	delivered	$32
5196	Nancy Riley	Alexis Benson	created	$0

Data Load Generators

- Address
  - 01-LoadAddressTable.ipynb

- Employee, Seasonal, Parttime, Fulltime
    - 02-LoadEmployee.ipynb
- Restaurant, Restaurant_Types
    - 03-LoadRestaurant.ipynb
- Customer
    - 04-LoadCustomer.ipynb
- Driver
    - 05-LoadDriver.ipynb
- Credentials
    - 06-LoadCredentials.ipynb
- Menu, Menu_Item, Ingredients
    - 07-LoadMenu.ipynb
- Payment Method
    - 08-LoadPaymentMethod.ipynb
- Orders and Reviews
    - 09-LoadOrders.ipynb

Links

- Entity-Relationshop Model:
    - https://drive.google.com/file/d/1a8tK_D-bycxRgjdm3OVcIxb5bUXvbMX_/view?usp=sharing
- Relational Model

- https://drive.google.com/file/d/12m3OyRWFgVFjw6_BgBYfnHkOkYJ6sllo/view?usp=sharing