



Class Attendance Forecasting System (CAFS)

Module 5 Assignment Submission

Data Requirements

by

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DISCLAIMER: This report is not affiliated in any way with ClassPass, nor does it intend to provide an accurate view of how ClassPass conducts its business activities. This is a learning exercise at the University of New Brunswick based on unfounded assumptions and “best guesses” made by the author. The author has no inside knowledge of how ClassPass’s software or business practices work. The objective is to simulate how requirements analysis might have been documented during the development of an information system similar to ClassPass’s.

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1. Introduction

This document provides the conceptual data requirements for ClassPass's Class Attendance Forecasting System (CAFS).

The primary objective of CAFS is to accurately predict class attendance to facilitate optimal scheduling and resource allocation, enhancing operational efficiency. This document defines the data entities, attributes, and relationships necessary for predicting class attendance.

The data requirements are presented as one data area, as follows:

Attendance Prediction Data concerns data related to capturing, analyzing, and using historical class attendance, bookings, and user profiles to forecast future class attendance trends.

The scope of this document includes the following functionalities:

- Collecting class attendance records to build a comprehensive dataset for analysis.
- Integrating user profiles, including demographic information, membership types, and preferred workout types and times, to enhance the accuracy of attendance predictions.

2. Research Description and Screenshots

Research Process

I conducted thorough research using various resources to understand what data is stored for entities such as Class, Business, and User. I was able to gather some useful information from the organization's website and supplementary sources, the restricted access led me to use a combination of direct information and educated guesses to define the data model.

Initially, I explored the organization's main website to gather information about its offerings and functionalities. However, I found that some detailed information, particularly those accessible only to members, was restricted due to the paid nature of the service. Hence, I turned to other sources like Reddit and YouTube, where I found user reviews, tutorials, and discussions about the platform's functionality. These resources provided valuable insights into the user experience and the kind of data that might be collected and utilized.

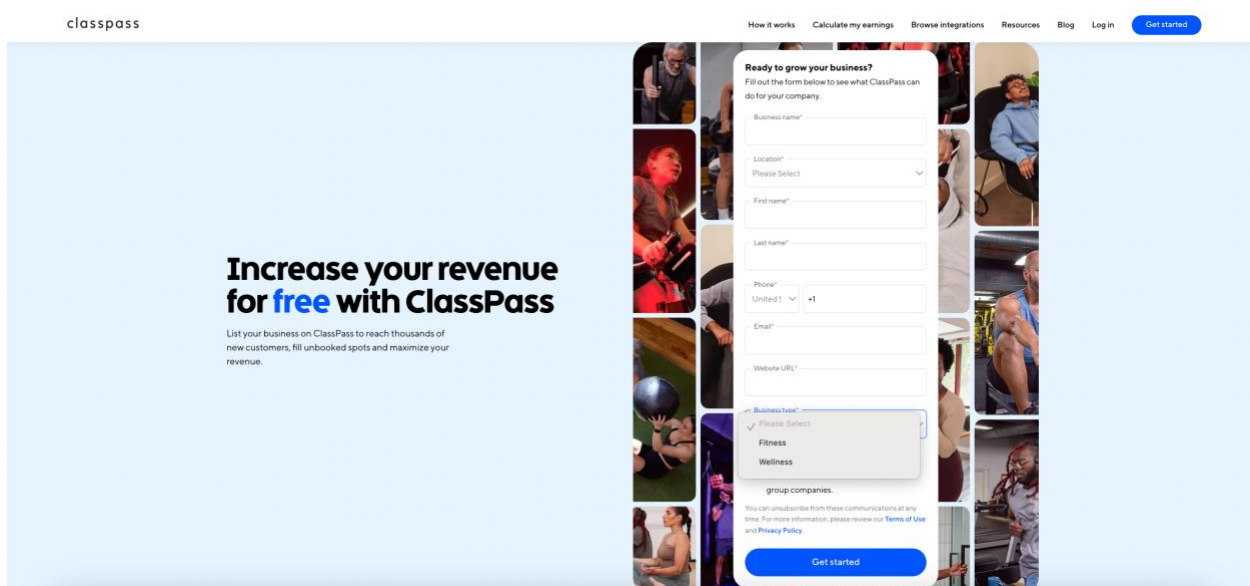
Due to the limitations in accessing certain specifics, I had to rely on my knowledge and make educated guesses to create the data models. This involved getting a list of the necessary attributes and relationships based on common practices in similar systems.

The Entity Relationship Diagram includes all identified entities and a new entity that needs to be created for CAFS.

The schedule revision process for optimization will be handled manually.

Screenshots of the ClassPass Website

New Studio Registration:



The screenshot displays the ClassPass website's new studio registration form. The form is titled "Ready to grow your business?" and includes fields for Business name, Location, First name, Last name, Phone, Email, and Website URL. A "Business type" dropdown menu is set to "Fitness". The form also features a "Get started" button and a "group companies" section with a link to "Terms of Use and Privacy Policy". The background of the form is a collage of images showing people in various fitness settings.

This screenshot shows the new studio registration form on ClassPass. The form includes fields for location, contact information, website URL, and business type (Fitness or Wellness).

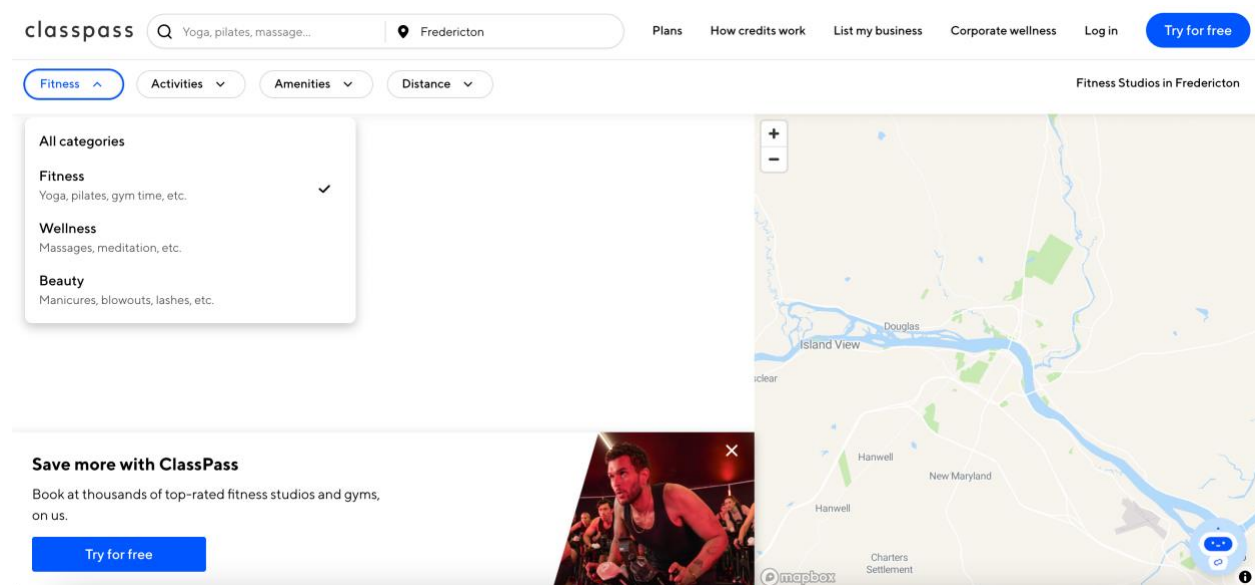
This helped in the identification of the following data:

- Entities Identified:
 - Business
 - City
- Attributes:
 - Business Name, Location, Owner First Name, Owner Last Name, Contact Number, Email ID, Website URL, Business Type. (Business)
 - City Name, Province Name, Country Name (City)
- Relationships:
 - Business and City: There can be multiple businesses in one city i.e. many-to-one relationship between Business and City.

The form from the screenshot shows that the business owner can only select one location per business, which is why Location is an attribute of Business. Businesses are named Barry's – Downtown Toronto, Barry's – McKay Drive, etc. This indicates that the same owner has multiple businesses (Studios) in different locations, but due to system limitations, the location is included in the names.

Find Classes & Appointments:

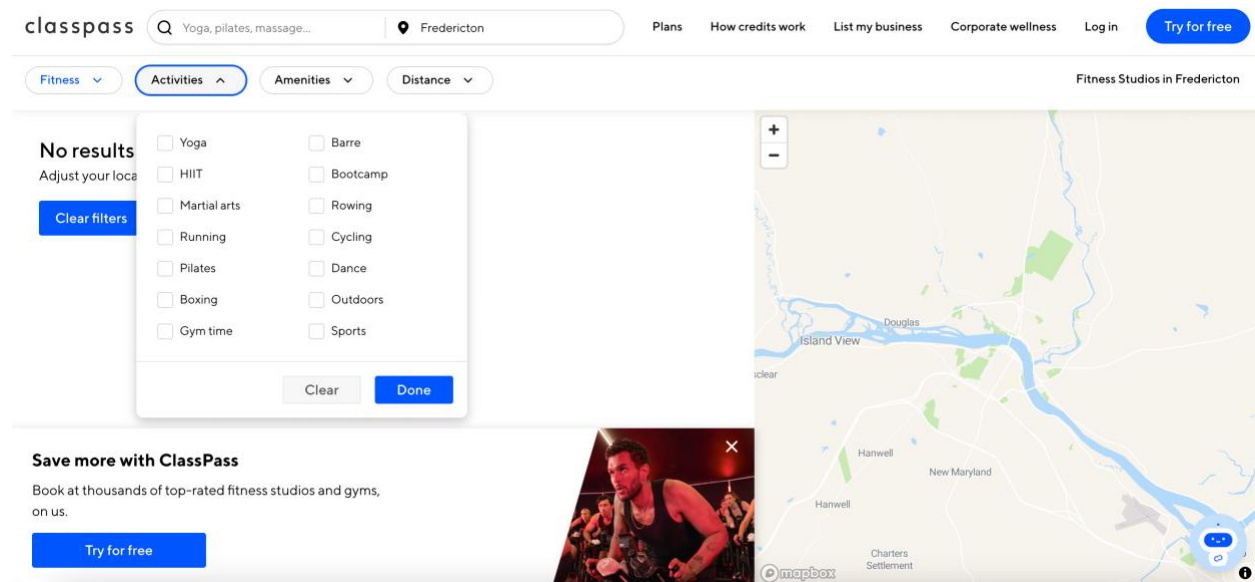
These screenshots show the search interface on the ClassPass website. Filters include Fitness categories, Activities, Amenities, and Distance.



The user can search for different types of classes (e.g., yoga, pilates, gym time) in a specific location (Fredericton). The categories include Fitness (Yoga, Pilates, Gym time), Wellness (Massage, Meditation), and Beauty (Manicures, Blowouts, Lashes).

This helped in the identification of the following data:

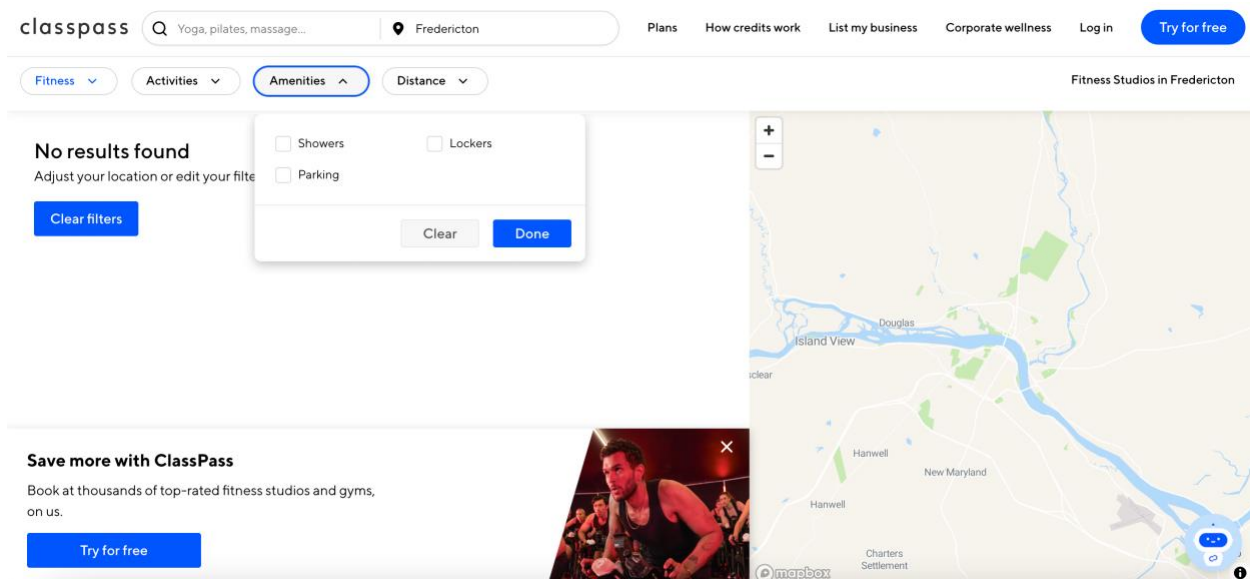
- Entities Identified: Category
- Attributes: Category Name, Description
- Relationships:
 - Category and Business: There is a one-to-many relationship between Category and Business.



The screenshot shows the Activities filter options, including Yoga, HIIT, Martial Arts, Running, Pilates, Boxing, Gym Time, Barre, Bootcamp, Rowing, Cycling, Dance, Outdoors, and Sports.

This helped in the identification of the following data:

- Entities Identified: Class
- Attributes: Class Name
- Relationship:
 - Business and Class: There is a one-to-many relationship between Business and Class.

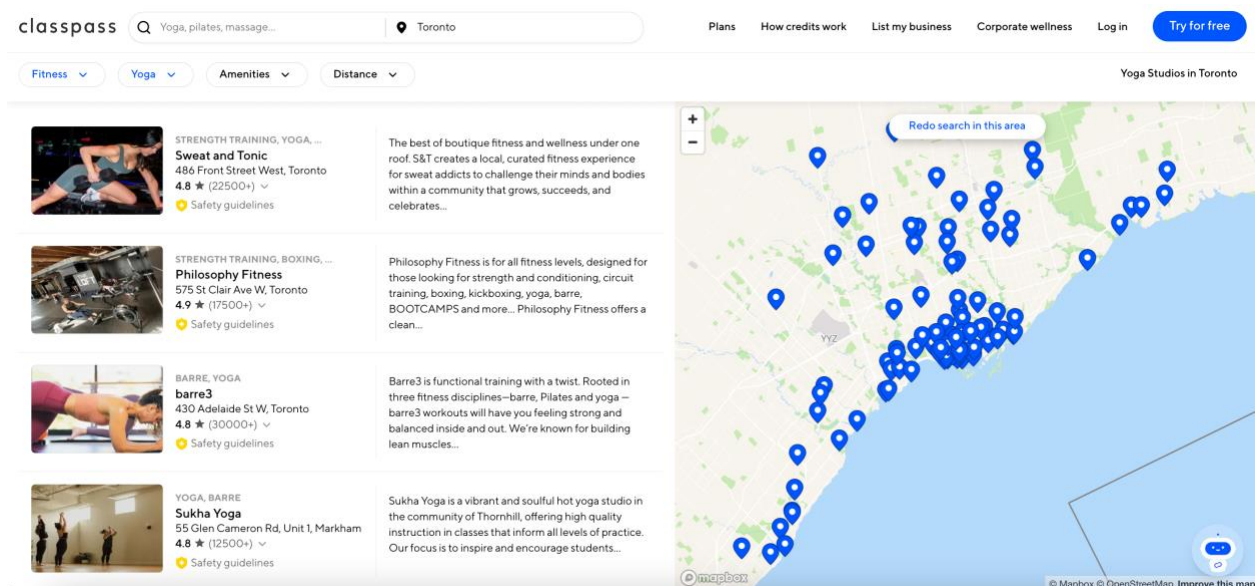


The screenshot shows the Amenities filter with options like Showers, Lockers, and Parking.

This helped in the identification of the following data:

- Entities Identified: Amenity
- Attributes: Amenity Name
- Relationship: There is a many-to-many relationship between Class and Amenity.

Available Classes:



This screenshot shows the ClassPass interface with results for different classes in Toronto with a filter category as Fitness and the class type as Yoga.

classpass Find classes & appointments Plans How credits work List my business Corporate wellness Log in [Try for free](#)

[Info](#)

Sweat and Tonic - The Well

4.8 ★★★★★ (22,500+)

This business is in a different timezone.

The best of boutique fitness and wellness under one roof. S&T creates a local, curated fitness experience for sweat addicts to challenge their minds and bodies within a community that grows, succeeds, and celebrates together.

Safety & cleanliness

Safety guidelines are provided by Sweat and Tonic and were last updated on 12/22/23.

Mask-wearing policies

Per the latest Toronto Public Health requirements, masks are no longer required indoors. Guests are still welcome to wear masks if they'd prefer.

Ventilation system

We've upgraded our air ventilation with hospital-grade MERV 13 filters, which capture airborne droplet nuclei & other particles that viruses & bacteria are attached to. Our facility is also equipped with Energy Recovery Ventilators which exchange stale air from inside with fresh air from outside.

486 Front Street West, Toronto, ON, M5V

+1 647 477 1446

sweatandtonic.com

@sweatandtonic

sweatandtonic

Book a spot at Sweat and Tonic - The Well today. [Try for free](#)

This screenshot provides detailed information about a specific fitness studio, "Sweat and Tonic - The Well," including its address, contact information, and safety guidelines.

This helped in the identification of the following data:

- Entities Identified:
 - Business
 - Images
- Attributes:
 - Business Name, Location, Description, Contact Number, Email ID, Website URL, Instagram Handle, Facebook Profile (Business)
 - Image Title, Description (Images)
- Relationships:
 - Business to Images: A new entity for images as multiple images are associated with one Business. There is a one-to-many relationship between Business and Images.

Class Schedule:

The screenshot shows the ClassPass website interface. At the top, there is a search bar with "Yoga, pilates, mas..." and a location filter set to "Fredericton". Navigation links include "Find classes & appointments", "Plans", "How credits work", "List my business", "Corporate wellness", "Log in", and a "Try for free" button. The main content area is titled "Info" and "Schedule". It shows a calendar view for "Tue, Jun 4". A list of classes is displayed with the following details:

Time	Class Name	Instructor	Duration	Action
6:30 AM EDT	FULL-BODY (KW)	Jeffery	50 min	See pricing
7:30 AM EDT	FULL-BODY (KW)	Jeffery	50 min	See pricing
7:30 AM EDT	Box-Fit	Fernando	45 min	See pricing
8:30 AM EDT	Box-Fit	Fernando	45 min	See pricing
8:50 AM	ARMS & ABS (KW)			

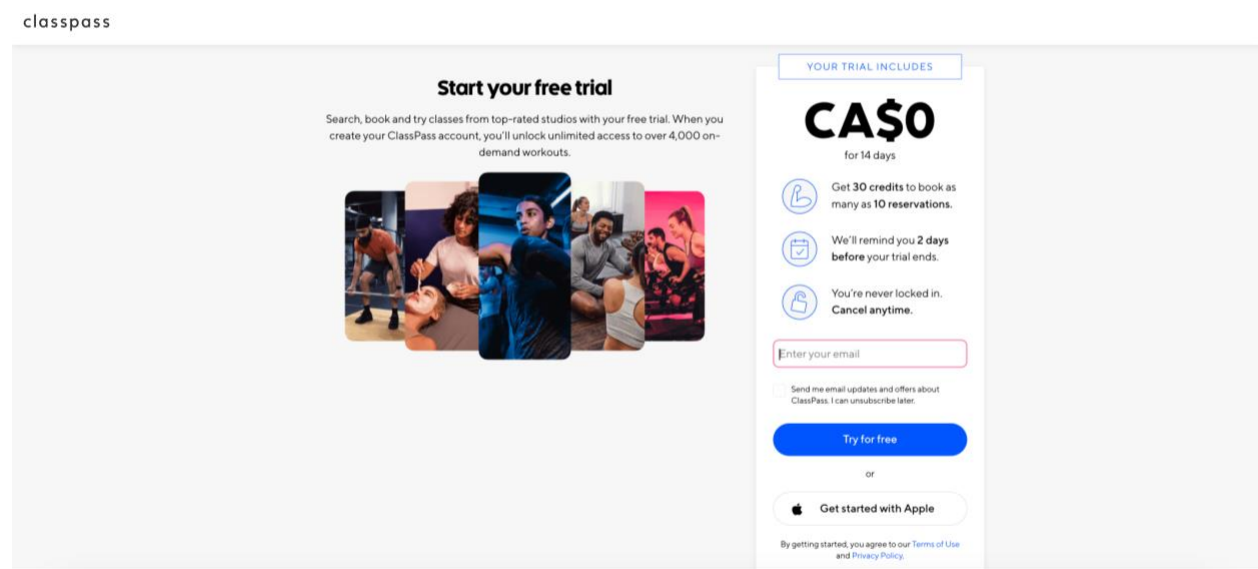
Below the class list, there is a button that says "Book a spot at Studio Lagree & KO - King Street West today." and another "Try for free" button. To the right of the class list, there is a map showing the location of Studio Lagree & KO - King Street West, along with contact information: 788 King St W, Toronto, ON, M5V 1N6; +1 416 901 4788; studiogagree.com; @studiogagree; and StudioLagree.

This screenshot shows the schedule of available classes at a specific studio, including class names, instructor names, and times.

This helped in the identification of the following data:

- Entities Identified:
 - Class
 - Class Schedule
 - Instructor
- Attributes:
 - Class Name, Instructor Name, Capacity, Cost (Class)
 - Start Date Time, End Date Time (Class Schedule)
 - Instructor Name (Instructor)
- Relationships:
 - Class to Class Schedule: One-to-many relationship where one class can have multiple schedule entries.
 - Class to Instructor: Many-to-one relationship where one instructor can teach multiple classes.

User Registration:



This screenshot shows the User Registration page. This page does not give much idea about what the user registration form looks like, so I used my knowledge of the system to make educated guesses.

This helped in the identification of the following data:

- Entities Identified: User
- Attributes: User Name, Email ID, Contact Number, Address
- Relationship: There is a many-to-many relationship between Class and User.

YouTube:

Source: [ClassPass 101: How to Use ClassPass and Book Your First Fitness Class](#)

This video shows how users can subscribe to ClassPass and book classes.

This helped in the identification of the following data:

- Entities Identified: User
- Attribute: Member Type

GPT Queries

Query: What attributes can a User entity have for ClassPass? URL: <https://classpass.com/>

Response:

To define attributes for a User entity for ClassPass, we can consider various aspects that are relevant for users of a fitness and wellness membership service. Based on the information from the ClassPass website and the typical needs for such a service, here are some potential attributes:

Basic Information:

1. **User ID:** Unique identifier for the user.
2. **Name:** Full name of the user.
3. **Email:** Email address of the user.
4. **Password:** Encrypted password for account access.
5. **Phone Number:** Contact number for the user.
6. **Profile Picture:** URL to the user's profile picture.

Personal Information:

7. **Date of Birth:** User's birthdate.
8. **Gender:** User's gender.
9. **Address:** User's residential address.
10. **City:** City of residence.
11. **Country:** Country of residence.

Account Information:

12. **Membership Type:** Type of membership (e.g., Basic, Premium, Student).
13. **Membership Status:** Active, Inactive, or Suspended status.
14. **Join Date:** Date when the user joined ClassPass.
15. **Last Login Date:** Date of the last login to the account.
16. **Preferred Language:** User's preferred language for communication.

Fitness Preferences:

- 17. **Favorite Activities:** List of favorite fitness activities (e.g., yoga, cycling, pilates).
- 18. **Preferred Studios:** List of preferred fitness studios.
- 19. **Workout Schedule:** User's preferred workout times and days.
- 20. **Goals:** Fitness goals (e.g., weight loss, muscle gain, flexibility).

Usage Data:

- 21. **Booking History:** History of class bookings.
- 22. **Attended Classes:** List of attended classes with dates.
- 23. **Reviews and Ratings:** Reviews and ratings given by the user for classes and studios.
- 24. **Credits Balance:** Available balance of credits for booking classes.

Payment Information:

- 25. **Payment Method:** Details of the payment method (e.g., credit card, PayPal).
- 26. **Billing History:** History of transactions and billing.
- 27. **Subscription Plan:** Details of the current subscription plan.
- 28. **Auto-Renewal Status:** Whether auto-renewal is enabled or disabled.

Communication Preferences:

- 29. **Notification Preferences:** Preferences for receiving notifications (e.g., email, SMS).
- 30. **Marketing Preferences:** Opt-in status for marketing emails and promotions.

These attributes cover a wide range of information necessary for managing a user's account and preferences within ClassPass.

Influence on Final Data Model:

Influenced by the attributes **Preferred Studios** and **Workout Schedule**, I added attributes **Preferred Workout Type** and **Preferred Workout Time** to the **User** entity, which will be helpful in tasks related to attendance prediction. By analyzing these preferences, the system can optimize schedules to better match user availability and preferences and enhance user satisfaction.

I added the **Password** attribute, which is essential for maintaining secure access to user accounts.

Note: Text in this section marked with yellow highlighting has been used to enhance ideas presented elsewhere in this document.

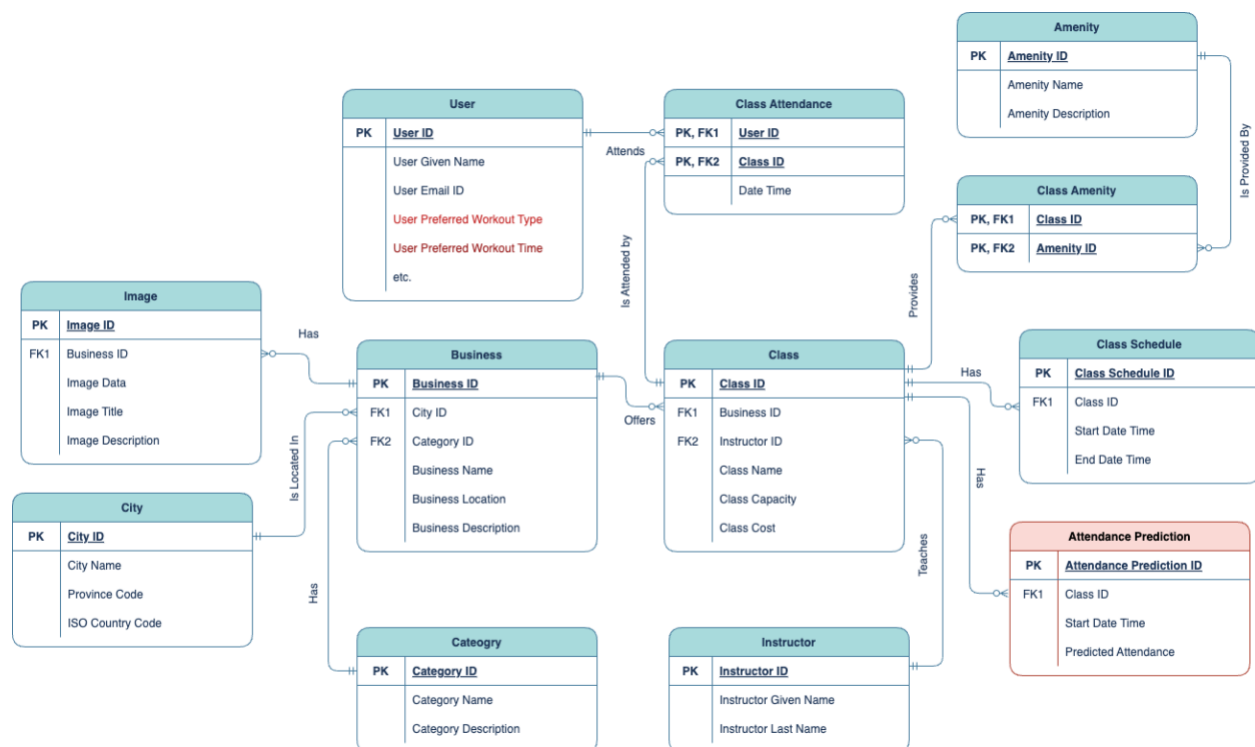
3. Data Area #1 – Attendance Prediction

Data Area Description

This data area focuses on capturing all the essential data needed to predict class attendance accurately. This data is crucial for building and training machine learning models to forecast future attendance trends.

The Entity Relationship Diagram includes all identified entities, a new entity, and two new attributes of the Entity User (highlighted in red) created for the attendance prediction task. The current data model supports the prediction of class attendance, but manual adjustments to class schedules will be necessary to optimize schedules based on these predictions.

Entity Relationship Model



Entity & Attribute Descriptions (including sample entity instances)

Class

The Class entity represents a specific fitness or wellness session offered by a business. This entity includes details about the class such as its name, type, capacity, and the business offering it. Each class is associated with an instructor and can belong to a specific category, ensuring that classes are well-organized and effectively managed.

NOTE: The attributes shown with **bold underline** represent a unique identifier for each entity.

Attributes for: **Class**

Attribute Name	Description (where the meaning is not obvious)
<u>Class ID</u>	A unique way to identify each class
Business ID	Foreign key referencing Business entity This represents the relationship: <i>Business Offers Class</i>
Instructor ID	Foreign key referencing Instructor entity This represents the relationship: <i>Instructor Teaches Class</i>
Category ID	Foreign key referencing Category entity This represents the relationship: <i>Category Classifies Class</i>
Class Name	Name of the class/ activity.
Class Capacity	The maximum number of participants allowed
Class Cost	The fee required to attend the class in local currency

List of entity instances for: **Class**

<u>Class ID</u>	Business ID	Instructor ID	Category ID	Class Name	Class Capacity	Class Cost
101	601	501	2	Yoga	20	15
102	601	502	2	HIIT Training	15	20
103	602	503	3	Pilates	25	18

Business

The Business entity represents the fitness or wellness centers offering classes. This entity includes details about the business such as its name, location, and contact information. Each business can offer multiple classes and belongs to a specific category, helping to organize and manage the class offerings effectively.

Attributes for: **Business**

Attribute Name	Description (where the meaning is not obvious)
<u>Business ID</u>	A unique way to identify each business
City ID	Foreign key referencing City entity This represents the relationship: <i>Business Is Located In City</i>
Category ID	Foreign key referencing Category entity This represents the relationship: <i>Business Has Category</i> (Choose from available Categories)
Business Name	
Business Location	The address or location of the business (Ex. 123 Main St)
Business Description	A brief description of the business

List of entity instances for: **Business**

<u>Business ID</u>	City ID	Category ID	Business Name	Location	Description
601	901	2	Gold Gym	123 Main St	A well-equipped gym
602	902	3	Wellness Centre	456 Elm St	A center for wellness
603	901	1	Yoga Studio	3 York St	A peaceful yoga studio

City

The City entity represents the location details for businesses. This entity includes information about the city's name, province, and country. It helps in categorizing businesses based on their geographic location, facilitating location-based searches and analyses.

Attributes for: **City**

Attribute Name	Description (where the meaning is not obvious)
<u>City ID</u>	A unique way to identify each city
City Name	
Province Code	The two-letter province code of the province/state the city is located in.
ISO Country Code	The two-letter country code of the country the city is located in.

List of entity instances for: **City**

<u>City ID</u>	City Name	Province Code	ISO Country Code
901	New York	NY	US
902	Toronto	ON	CA
903	Vancouver	BC	CA

Class Attendance

The Class Attendance entity is created each time a user attends a class. This entity tracks which users attended which classes and when, providing valuable data for predicting future attendance patterns. It captures the attendance date and time, linking users with the classes they attend.

Attributes for: **Class Attendance**

Attribute Name	Description (where the meaning is not obvious)
<u>User ID</u> (PK, FK)	Foreign key referencing User entity This represents the relationship: <i>User Attends Class</i>
<u>Class ID</u> (PK, FK)	Foreign key referencing Class entity This represents the relationship: <i>Class Is Attended By User</i>
Date Time	The date and time when the attendance was recorded

List of entity instances for: **Class Attendance**

<u>User ID</u>	<u>Class ID</u>	Date Time
1	101	2024-06-15 08:00:00
2	102	2024-06-15 09:00:00
3	103	2024-06-15 18:00:00

User

The User entity represents an individual who uses the ClassPass platform to book and attend classes. This entity includes personal details of the user, such as their name, email, and contact number. Users can enroll in multiple classes, and their attendance records are tracked for forecasting purposes. The attributes User Preferred Workout Type and User Preferred Workout Time were newly added for CAFS.

Attributes for: **User**

Attribute Name	Description (where the meaning is not obvious)
<u>User ID</u>	A unique way to identify each user
User Given Name	
User Last Name	
User Email ID	Format: xys@khg.fjl
User Contact Number	Optional Format: 405-245-5678
User Login Password*	Encrypted password for user account security
User Address	Ex. 123 Main St, NY
User Membership Type	Type of the membership selected by the user. One of the following: <ul style="list-style-type: none">• Standard• Premium• Basic
User Preferred Workout Type*	Preferred type of workout (Choose from a list of available classes)
User Preferred Workout Time*	Preferred time for workout One of the following: <ul style="list-style-type: none">• Morning• Afternoon• Evening

(*Inspired by CHATGPT-3.5)

List of entity instances for: **User**

User ID	User Given Name	User Last Name	User Email ID	User Contact Number	Password
1	Alice	Bob	alice.bob@gmail.com	123-456-7890	Encryptedpass1
2	Carol	Lee	carol.lee@gmail.com	098-765-4321	Encryptedpass2
3	David	Kor	David.kor@gmail.com	456-789-0123	Encryptedpass3

User Address	User Membership Type	User Preferred Workout Type	User Preferred Workout Time
123 Main St, NY	Premium	Yoga	Morning
456 Elm St, CA	Basic	Dance	Evening
6 York St, CA	Standard	HIIT Training	Evening

Class Schedule

The Class Schedule entity details the specific timings for each class offered. This includes the start and end times of the class, ensuring that users and instructors are aware of the exact schedule. It helps in organizing the timetable for various classes and managing the availability of resources and instructors.

Attributes for: **Class Schedule**

Attribute Name	Description (where the meaning is not obvious)
<u>Class Schedule ID</u>	A unique way to identify each class schedule
Class ID	Foreign key referencing Class entity This represents the relationship: Class <i>Has</i> Class Schedule
Start Date Time	The start date and time of the class
End Date Time	The end date and time of the class

List of entity instances for: **Class Schedule**

<u>Class Schedule ID</u>	Class ID	Start Date Time	End Date Time
201	101	2024-06-15 08:00:00	2024-06-15 09:00:00
202	102	2024-06-15 08:30:00	2024-06-15 09:30:00
203	103	2024-06-15 18:00:00	2024-06-15 19:00:00

Amenity

The Amenity entity represents a specific facility or feature available at a class, such as showers, lockers, or specialized equipment. This entity ensures that users are aware of the amenities provided, enhancing their experience and satisfaction with the class offerings.

Attributes for: **Amenity**

Attribute Name	Description (where the meaning is not obvious)
<u>Amenity ID</u>	A unique way to identify each amenity
Amenity Name	
Amenity Description	A brief description of the amenity

List of entity instances for: **Amenity**

<u>Amenity ID</u>	Amenity Name	Amenity Description
801	Showers	Clean and spacious showers
802	Lockers	Secure lockers for storage
803	Parking	Free parking available

Class Amenity

The Class Amenity entity links classes with the amenities they offer. This associative entity captures the many-to-many relationship between classes and amenities, ensuring that each class can be associated with multiple amenities and each amenity can be available for multiple classes.

Attributes for: **Class Amenity**

Attribute Name	Description (where the meaning is not obvious)
<u>Class ID</u> (PK, FK)	Foreign key referencing Class entity This represents the relationship: <i>Class Provides Amenity</i>
<u>Amenity ID</u> (PK, FK)	Foreign key referencing Amenity entity This represents the relationship: <i>Amenity Is Provided By Class</i>

List of entity instances for: **Class Amenity**

<u>Class ID</u>	<u>Amenity ID</u>
101	801
101	802
102	801
103	803

Attendance Prediction

The Attendance Prediction entity is created to forecast the expected number of attendees for a class at a specific date and time. This entity uses historical attendance data and other factors to provide predictions, aiding in resource planning and class scheduling to optimize attendance and resource utilization.

Attributes for: **Attendance Prediction**

Attribute Name	Description (where the meaning is not obvious)
<u>Attendance Prediction ID</u>	A unique way to identify each prediction record
Class ID	Foreign key referencing Class entity This represents the relationship: Class <i>Has</i> Attendance Prediction
Start Date Time	The start date and time for the predicted attendance
Predicted Attendance	The forecasted number of attendees

List of entity instances for: **Attendance Prediction**

<u>Attendance Prediction ID</u>	Class ID	Start Date Time	Predicted Attendance
301	101	2024-06-15 08:00:00	18
302	102	2024-06-15 18:00:00	14
303	103	2024-06-15 16:00:00	22

Category

The Category entity classifies the classes and businesses into specific types. This entity includes details about the category name and description, ensuring that classes and businesses are organized based on their type and nature of services provided.

Attributes for: **Category**

Attribute Name	Description (where the meaning is not obvious)
<u>Category ID</u>	A unique way to identify each category
Category Name	
Category Description	A brief description of the category

List of entity instances for: **Category**

<u>Category ID</u>	Category Name	Category Description
1	Wellness	Activities related to wellness, such as massages, meditation, etc.
2	Fitness	Activities related to fitness, such as yoga, pilates, gym, etc.
3	Beauty	Activities related to beauty, such as manicures, blowouts, lashes, etc.

Image

The Image entity represents the visual media associated with businesses. This entity includes information about the image, such as its name and description, helping to provide visual context and enhance the business listings.

Attributes for: **Image**

Attribute Name	Description (where the meaning is not obvious)
<u>Image ID</u>	A unique way to identify each image
Business ID	Foreign key referencing Business entity This represents the relationship: Business <i>Has</i> Image
Image Data	Image in BLOB format
Image Title	
Image Description	A brief description of the image

List of entity instances for: **Image**

<u>Image ID</u>	Business ID	Image Data	Image Title	Image Description
1	601	Binary data	Gym Exterior	Front view of the gym
2	601	Binary data	Gym Interior	Inside view of the gym
3	602	Binary data	Yoga Room	Spacious yoga room

Instructor

The Instructor entity represents the individuals who teach or conduct the classes. This entity includes details about the instructor such as their name and contact information, ensuring that each class is linked to an instructor who is responsible for conducting it.

Attributes for: **Instructor**

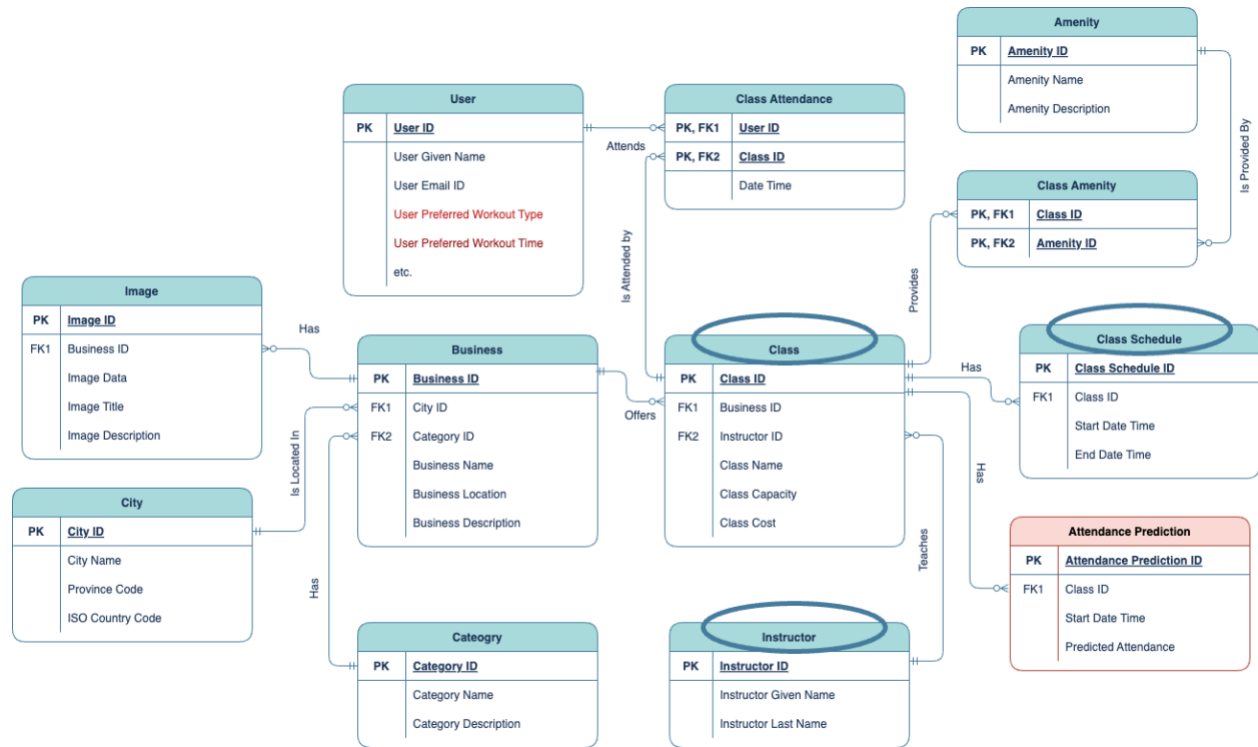
Attribute Name	Description (where the meaning is not obvious)
<u>Instructor ID</u>	A unique way to identify each instructor
Instructor Given Name	Instructor's First Name
Instructor Last Name	Instructor's Last Name

List of entity instances for: **Instructor**

<u>Instructor ID</u>	Instructor Given Name	Instructor Last Name
501	Bowen	Higgins
502	Kylan	Gentry
503	Franklin	Sierra

4. Ternary Relationship Analysis

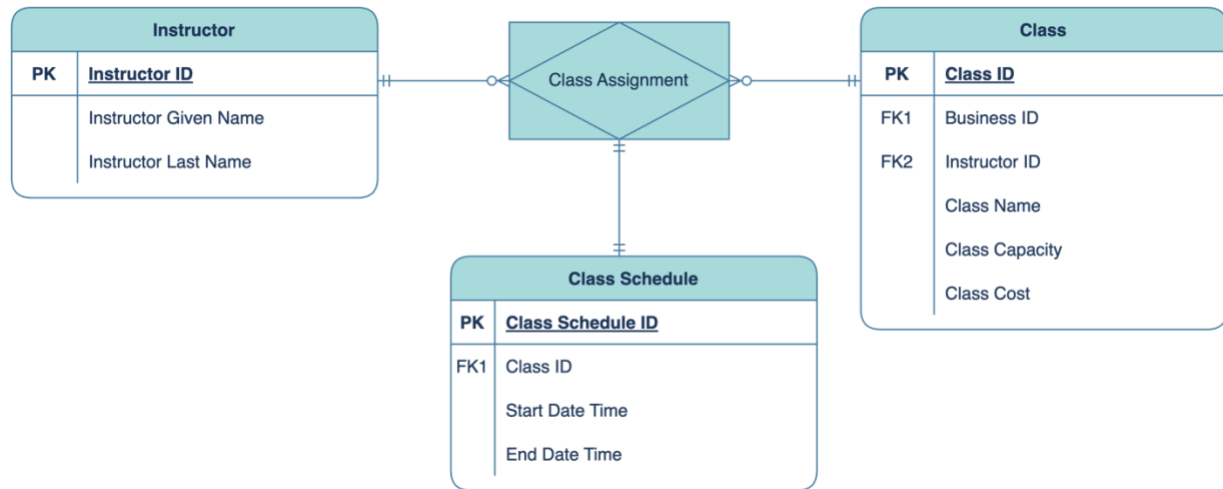
Selected ER Diagram and Three Entities



Selected Entities:

1. Class
2. Class Schedule
3. Instructor

Ternary Relationship ER Diagram



Sample List of Triples

Sample list of **Class Assignment** instances:

Instructor ID	Class Schedule ID	Class ID
501	203	101
502	204	102
503	205	103
502	206	104
502	207	102

Six Cardinalities

For a given instance of Instructor the maximum number of associated Class instances is: Many

For a given instance of Class, the maximum number of associated Instructor instances is: 1

For a given instance of Instructor, the maximum number of associated Class Schedule instances is: Many

For a given instance of Class Schedule, the maximum number of associated Instructor instances is: 1

For a given instance of Class, the maximum number of associated Class Schedule instances is: Many

For a given instance of Class Schedule, the maximum number of associated Class instances is: 1

Which is Appropriate: Ternary or Binary?

Decision: Binary Relationship

Binary relationships between Class and Instructor, Class and Class Schedule, and Instructor and Class Schedule effectively represent the connections and accurately capture the necessary constraints.

Rationale:

1. Cardinalities:

The cardinalities indicate that for three out of the six questions, the maximum number of associated instances is 1.

Specifically:

- For a given instance of Class, the maximum number of associated Instructor instances is 1.
- For a given instance of Class Schedule, the maximum number of associated Class instances is 1.
- For a given instance of Class Schedule, the maximum number of associated Instructor instances is 1.

These cardinalities suggest that each class is associated with only one instructor, and each class schedule is associated with only one class and one instructor.

2. Using Method #2:

- **Binary Cardinality:**
 - For a given Class, how many Instructors? Answer: One
 - For a given Instructor, how many Classes? Answer: Many
 - For a given Class, how many Class Schedules? Answer: Many
 - For a given Class Schedule, how many Classes? Answer: One
 - For a given Instructor, how many Class Schedules? Answer: Many
 - For a given Class Schedule, how many Instructors? Answer: One
- **Maximum of one:**
 - For a given Class, the maximum number of associated Instructor instances is 1.
 - For a given Class Schedule, the maximum number of associated Class instances is 1.
 - For a given Class Schedule, the maximum number of associated Instructor instances is 1.

Since three of the six cardinality questions have a maximum of one, binary relationships are appropriate.