

Fitness Technology Industry

FitConnect

CSC675 Database Systems Fall 2023

Yueling Liu 922272361

Github: [Yueling Liu](#)

Checkpoint #	Data Submitted
Checkpoint 1	9/18/2023
Checkpoint 2	10/4/2023
Checkpoint 3	10/25/2023

Table of Contents

Table of Contents	2
Product Description	4
Use Cases	6
Functional Database Requirements	11
Non-functional Database Requirements	15
Entity Description	17
Entity Relation Diagram	22
Description Table	26
EER Diagram	30

Product Description

FitConnect is a database booking system. It allows gym goers to book fitness classes easily. FitConnect also helps gym owners to manage their class schedule and facilities, they can easily add, edit, or update class and instructor information, ensuring that everything runs smoothly. FitConnect gathers and aggregates data which can be used for various analyses. This data is based on user activity, class attendance, and equipment usage, allowing the fitness industry to make data-driven decisions and improve their offerings.

Our motivation behind this platform is to offer a user-centric solution that simplifies the fitness class booking experience and grants access to activity data for gym-goers, contributing to a healthier and happier and more efficient lifestyle. Our motivation is driven by the desire to make it exceptionally easier for everyone who seeks for a healthier lifestyle to achieve it. We understand that in today's busy world, convenience is key. Therefore, we aim to eliminate redundant processes and make users and gym owners have a great experience in the workout journey and gym management.

Our platform enables gym-goers by facilitating full control over their fitness journey. They will have the flexibility to choose from a diverse range of classes, including options like Zumba, Yoga, or Pilates, etc. They can also select their preferred fitness levels, whether they're beginners, intermediate, or advanced participants. Additionally, users can choose their favorite instructors and class schedules, all of which can be easily booked or canceled at their convenience, while providing access to their entire workout history.

FitConnect does not only help gym goers but also aids in optimizing gym operation. Gym staff can easily add, edit or update class and instructor

information, and stay up to date with schedule adjustments. FitConnect offers gyms and fitness training service providers valuable insights into class popularity, attendance patterns, and member preferences. This data helps gyms in making decisions about class offerings and marketing strategies, ultimately improving profitability.

FitConnect provides an user-friendly interface whereby users can easily access their workout history data, and adjust their physical fitness training schedules. Whether you're a gym enthusiast, a fitness instructor, or a gym owner, FitConnect provides you with the tools to stay motivated and informed about your fitness journey.

Use Cases

Use Case 1:

Actor: Mark, Studio Owner

Scenario:

Mark is the owner of a small Pilates studio called Hot Pilates. His studio specializes exclusively in hot Pilates classes. It's designed for members who are passionate about Pilates and want to keep fit. Members who are registered can conveniently check the class schedule on the website or at the front desk and walk in to attend the class since it is a small studio.

However, due to the growing popularity of Pilates classes in summer, the studio occasionally experiences overcrowding problems. For example, the studio becomes so full at evening time that it cannot accommodate all members, and some are unable to use their Pilates machines, resulting in their disappointment. This situation has left Mark feeling overwhelmed and he strives to improve employee class availability and member satisfaction as a studio owner.

FitConnect's database booking system comes to Mark's rescue, it helps simplify class scheduling and available spots. It allows members to check Hot Pilates' class schedules online and book their spots. This ensures that every member can find an available slot and enjoy their Pilates practice.

Use Case 2:

Actor : Emily, Fitness staff

Scenario:

Emily works at a high-end fitness studio in the town, this studio provides a wide range of workout classes and attracts lots of people with registered membership. Emily, as a staff member who works here, is responsible for membership registration. The gym has provided some systems for tracking memberships, but they mainly relied on spreadsheets and without accurate records regarding expiration date and client personal information. She often missed tracking membership, and without informing clients to renew their membership.

With the introduction of the FitConnect booking system, the problems Emily faced are resolved. FitConnect database platform eliminates the need of relying on spreadsheets and automatically tracks membership expiration dates and sends clients notification. She can access all the memberships information, including the different type of membership (e.g., basic, premium, student, family), as well as name and contact details of an emergency contact person etc.

FitConnect gives her the availability of membership management, she can efficiently register new members on the FitConnect database platform, capturing their personal information and membership preferences accurately. Renewal emails are automatically sent, this has reduced inaccuracy of missing tracking of membership.

Use Case 3:

Actor: Daniel, a gym manager at a local fitness local

Scenario:

Daniel is a gym manager at a medium size gym in the town. He is mainly responsible for scheduling fitness classes, determining class times, assigning instructors according to their availability, and managing the class calendar.

However, Daniel frequently encounters scheduling conflicts where two or more classes are scheduled for the same time or overlapping times. This confuses both instructors and members. He was thinking of getting a better tool that could help make a better schedule for instructors, taking into account factors like class popularity, instructor availability, and resource allocation.

Daniel reported this situation to the gym management, and in response, they were introduced to FitConnect, a recommendation from the gym owner. In his role as the gym manager, Daniel created an account and logged in. He discovered FitConnect provides the feature that allows him to have access to a comprehensive view of all instructors' availability. This feature could simplify the task of aligning instructor schedules with class times, and reduces the risk of classes overlapping.

Use Case 4:

Actor: Jenny, a marketing executive

Jenny is a marketing executive and working on a project to highlight the top fitness providers in the industry. She wants a way to have visibility into which fitness-training service providers are most popular, and their expertise in order to design effective workout program marketing materials.

She needs a lot of data from fitness providers, including their names, contact information, location details, certification, specialization or areas of expertise, such as personal training, yoga, pilates, etc. She also needs client data that includes client attendance records, health and fitness goals, etc.

FitConnect's database platform collects a wide range of data that is related to fitness trainers and clients. Jenny can access data to understand how many clients each trainer has, how often do these clients book fitness sessions, and what types of exercises are highly booked in general.

She could analyze this data and determine which fitness providers are most effective at helping clients, and understand clients preference and highlight effective trainers and studios. This information can be invaluable for her project to showcase the industry's best fitness training professionals.

Use Case 5:

Actor: Gilbert is a governmental contractor

Gilbert is a governmental contractor who was assigned a project to gather data on organizations health and wellness fitness commitments. This is important because it can be used to determine what state and federal funding is available to each organization. Programs like this incentivize employees to maintain reasonable levels of physical fitness, which helps reduce government spending on emergency healthcare services.

Gilbert needs information on the number of employees within each organization participating in fitness programs. He needs data on the types of fitness programs offered by these organizations, such as yoga, Zumba, weight training, and others. He also wants the data on attendance at different fitness classes or activities that are helpful for his project.

The FitConnect booking system provides all the information he needs in an easily accessible format. To protect individuals' privacy, FitConnect informs both organizations and individuals about data collection before gathering

anonymous client fitness information. This platform offers Gilbert a user-friendly interface and reporting features, he can access data such as the frequency individuals go to workout. This helps the government make better decisions about funding based on health and wellness fitness commitments within organizations.

Functional Database Requirements

Admin:

1. An admin shall be able to create an account
2. An admin shall be able to login
3. An admin shall be able to logout
4. An admin shall be able to reset password
5. An admin shall be able to define different roles for gym staff and instructors
6. An admin shall be able to add a workout class
7. An admin shall be able to remove a workout class
8. An admin shall be able to edit a workout class name
9. An admin shall be able to edit a workout class description
10. An admin shall be able to edit a workout class type
11. An admin shall be able to edit a workout class level
12. An admin shall be able to edit a workout class duration
13. An admin shall be able to edit a workout class room/location
14. An admin shall be able to edit a workout class schedule
15. An admin shall be able to edit a workout class capacity
16. An admin shall be able to edit a workout class equipment
17. An admin shall be able to edit a workout class cost and pricing
18. An admin shall be able to edit a workout class booking information
19. An admin shall be able to edit a workout class cancellation policy
20. An admin shall be able to retrieve the schedule information of one employee
21. An admin shall be able to retrieve the number of members of the gym
22. An admin shall be able to retrieve the number of instructors of the gym
23. An admin shall be able to retrieve the booking history for fitness classes
24. An admin shall be able to check how many spots left for a class
25. An admin shall be able to add the new registered gym member
26. An admin shall be able to deactivate an inactive gym member

Manager:

27. A manager shall be able to register their account
28. A manager shall be able to login their account
29. A manager shall be able to reset password
30. A manager shall be able to update their personal information, contact details, and profile picture
31. A manager shall be able to log out their account
32. A manager shall be able to edit a workout class name
33. A manager shall be able to edit a workout class description
34. A manager shall be able to edit a workout class type
35. A manager shall be able to edit a workout class level
36. A manager shall be able to edit a workout class duration
37. A manager shall be able to edit a workout class room/location
38. A manager shall be able to edit a workout class capacity
39. A manager shall be able to edit a workout class equipment
40. A manager shall be able to edit a workout class cost and pricing
41. A manager shall be able to edit a workout class booking information
42. A manager shall be able to edit a workout class cancellation policy
43. A manager shall be able to check how many spots left for a class
44. A manager shall be able to retrieve the booking history for fitness classes
45. A manager shall be able to add the new registered gym member
46. A manager shall be able to deactivate an inactive gym member

Instructor:

47. An instructor shall be able to register their account
48. An instructor shall be able to login their account
49. An instructor shall be able to update their personal information, contact details, and profile picture
50. An instructor shall be able to reset password
51. An instructor shall be able to log out their account
52. An instructor shall be able to retrieve her/his class schedules
53. An instructor shall be able to set their availability on the schedule tool
54. An instructor shall be able to have the options to accept or decline class assignments based on their availability and preferences

- 55. An instructor shall be able to access the class materials/information such as lesson plans, exercise routines, or instructional videos to prepare for their classes
- 56. An instructor shall be able to submit attendance records after class
- 57. An instructor shall be able to provide feedback on class performance, member engagement, and any issues encountered
- 58. An instructor shall be able to view the list of members registered for their upcoming classes

User:

- 59. A user shall be able to create their account
- 60. A user shall be able to login
- 61. A user shall be able to reset password
- 62. A user shall be able to update their personal information, contact details, and profile picture
- 63. A user shall be able to log out
- 64. A user shall be able to book a fitness class
- 65. A user shall be able to cancel a fitness class
- 66. A user shall be able to review his/her booking history
- 67. A user shall be able to retrieve upcoming and past fitness classes
- 68. A user shall be able to see a review of an instructor
- 69. A user be able to leave a review for a workout class
- 70. A user shall be able to see details of a fitness class including instructor information, class duration, location, and a brief description etc
- 71. A user shall be able to delete their account if they are no longer going to the gym

Fitness class:

- 72. A fitness class can be booked by registered members
- 73. A fitness class schedule can be assigned to different instructors by admins and managers
- 74. A fitness class can be canceled by admins and managers
- 75. A fitness class can be added by admins and managers
- 76. A fitness class can be removed by admins

77. A fitness class can be updated by admins and managers

Account:

78. An account can be registered by many users

79. An account can be deleted/deactivated by many users

80. An account can be assigned different roles by admins

81. An account informations can be updated by many users

82. An account can be assigned one of several status options, such as
active, expired or pending renewal by admins

83. An account can be reactivated by admins

Non-functional Database Requirements

1. Performance:
 - a. The platform shall be able to handle a certain number of concurrent users without significant performance degradation
 - b. The platform shall be able to support reasonable and acceptable response times for operations within the platform
 - c. The platform shall be able to handle the number of login requests per unit of time
2. Security
 - a. The platform shall be able to protect sensitive data such as username and password
 - b. The platform shall be able to ensure this sensitive data is encrypted
 - c. The platform shall manage the sessions, including session timeout period, secure session token
 - d. The platform shall be able to support data backups are securely stored
3. Storage
 - a. The database system shall allocate a minimum of 10 MB of memory for each table
 - b. The database system shall support persistent storage
 - c. The database system shall support seamlessly scales as data volumes increase
 - d. The database system shall be able to provide real-time monitoring of storage usage
4. Availability
 - a. The database system shall support a minimum of 99% service uptime
 - b. The database system shall be available 24/7, with minimum downtime for maintenance or for upgrades
5. Usability
 - a. The database system shall support a user-friendly interface that designed with clarity and simplicity
 - b. The database system shall be responsive and adaptable to different devices

- c. The database system shall support consistent navigation menus and layouts
- d. The database system shall provide a clear and informative notification when errors happen

6. Scalability

- a. The database system shall be designed to easily scale as the instructors and gym members grow
- b. The database system shall be able to manage scalability by dividing large tables or dataset into smaller partitions

7. Privacy

- a. The database system shall be able to RESTRICT access to sensitive data based on roles and permissions
- b. The database system shall ensure that user consent for how their data is stored and shared
- c. The database system shall protect personal data from unauthorized access and ensures that even if data is accessed or intercepted that the user is notified

Entity Description

1. Workout Class (Strong)
 - a. class_id: key, numeric
 - b. level : key, numeric
 - c. instructor_id: key, numeric
 - d. schedule_id: key ,numeric
 - e. type: key, numeric
 - f. class_title: composite, alphanumeric
 - g. location: composite, alphanumeric

2. General Member (Strong)
 - a. tracking_id: key, numeric
 - b. class_id: key, numeric
 - c. date: multivalue, timestamp

3. Class Type (Strong)
 - a. type_id: key, numeric
 - b. type_name: alphanumeric
 - c. description: alphanumeric

4. Class level(Strong)
 - a. level_id: key, numeric
 - b. type_name: alphanumeric
 - c. description: alphanumeric

5. Instructor (Strong)
 - a. instructor_id : key, numeric
 - b. name : composite, alphanumeric
 - c. email : composite, alphanumeric

- d. phone: multivalue, alphanumeric

6. Membership (Strong)

- a. member_id: key, numeric
- b. account_id: key, numeric
- c. membership_type: alphanumeric
- d. pricing: single value, numeric
- e. start_date: multivalue, timestamp
- f. end_date: multivalue, timestamp
- g. auto_pay: boolean (true, or false)

7. Member Booking History (Strong)

- a. booking_id: key, numeric
- b. member_id: key, numeric
- c. class_id: key, numeric
- d. booking_date: multivalue, timestamp
- e. cancellation_date: multivalue, timestamp
- f. status: alphanumeric

8. Instructor Certification (Strong)

- a. certification_id: key, numeric
- b. instructor_id: key, numeric
- c. name: alphanumeric
- d. issuing_organization: alphanumeric
- e. expiration_date: multivalue, timestamp

9. Workout Equipment (Strong)

- a. equipment_id: key, numeric
- b. name: alphanumeric
- c. quantity : numeric

- d. serial_number: alphanumeric
- e. purchase_date: multivalue, timestamp
- f. price: numeric
- g. condition: alphanumeric
- h. last_maintenance_date: multivalue, timestamp
- i. facility_id: key, numeric

10. Purchase (Strong)

- a. transaction_id : key, numeric
- b. member_id : key
- c. price: numeric
- d. membership_type: key
- e. date: multivalue, timestamp
- f. payment_method: alphanumeric

11. Facility (Strong)

- a. facility_id : key, numeric
- b. facility_name : alphanumeric
- c. address : composite, alphanumeric
- d. city: alphanumeric
- e. state: alphanumeric
- f. postal_code: numeric
- g. operation_hours: alphanumeric
- h. occupancy: numeric

12. Admin (Strong)

- a. admin_id: key, strong, numeric
- b. account_id: key, numeric
- c. name: composite, alphanumeric
- d. title: composite, alphanumeric

- e. email: composite, alphanumeric

13. Manager (Strong)

- a. manager_id: key, numeric
- b. name: composite, alphanumeric
- c. account_id: key, numeric
- d. email: composite, alphanumeric
- e. phone : composite, alphanumeric
- f. hire_date: multivalue, timestamp

14. Review (Strong)

- a. review_id : key, numeric
- b. member_id : key, numeric
- c. class_id: key, numeric
- d. rating: singled value, numeric
- e. comment: alphanumeric
- f. review_date: multivalue, timestamp

15. Training goal (Strong)

- a. goal_id : key, numeric
- b. member_id : key, numeric
- c. goal_type: alphanumeric
- d. start_date: multivalue, timestamp
- e. target_date: multivalue, timestamp
- f. Status: alphanumeric

16. Member Metrics (Strong)

- a. record_id : key, numeric
- b. member_id : key,
- c. weight: numeric
- d. height: numeric

17.Account (Weak)

- a. account_id : key, numeric
- b. email: composite, alphanumeric
- c. password: alphanumeric
- d. role: alphanumeric
- e. date_registered: composite, alphanumeric

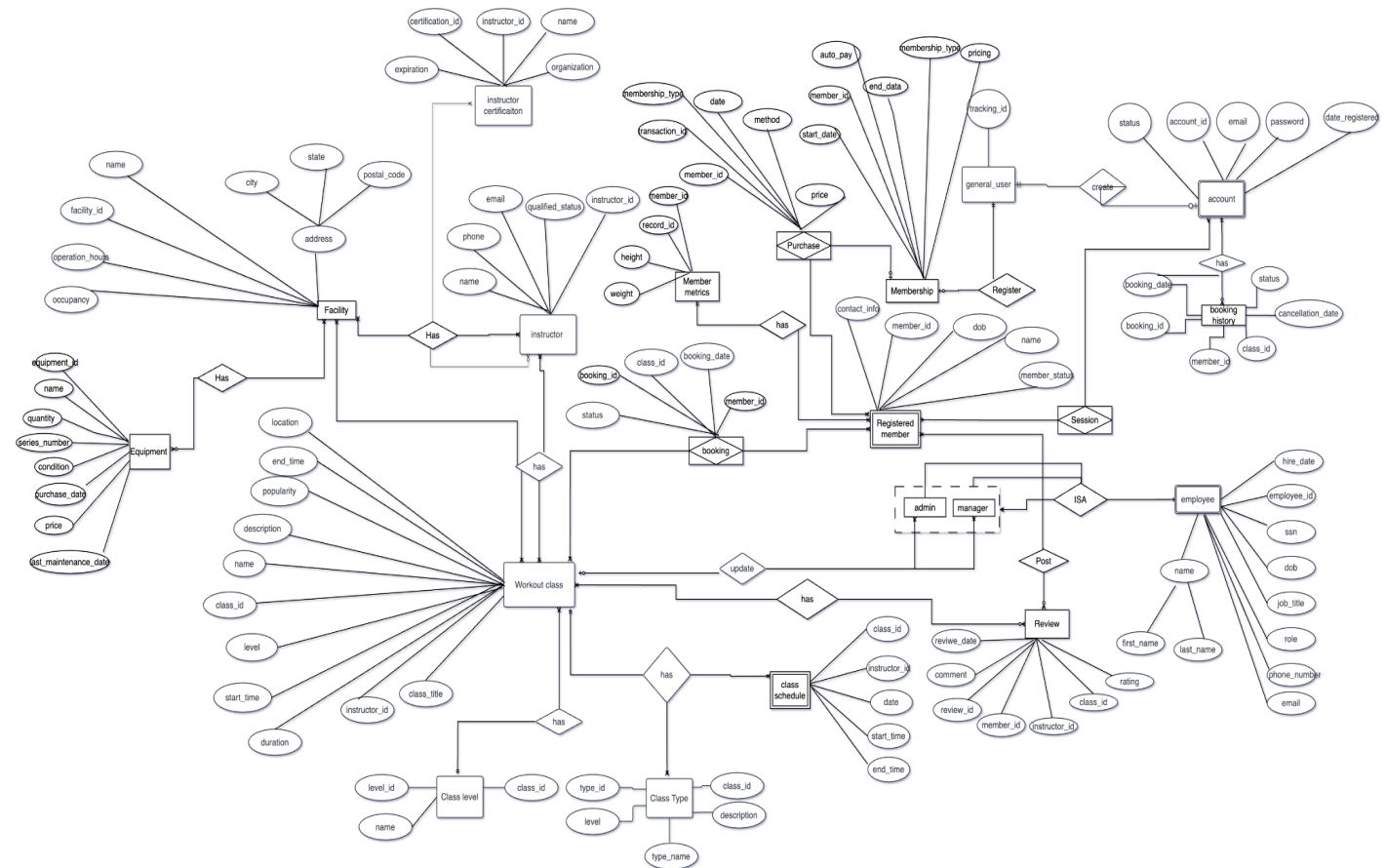
18.Class Schedule (Weak)

- a. schedule_id: key, numeric
- b. duration: numeric
- c. start_time : multivalue, timestamp
- d. end_time: multivalue, timestamp

19.Employee (Weak)

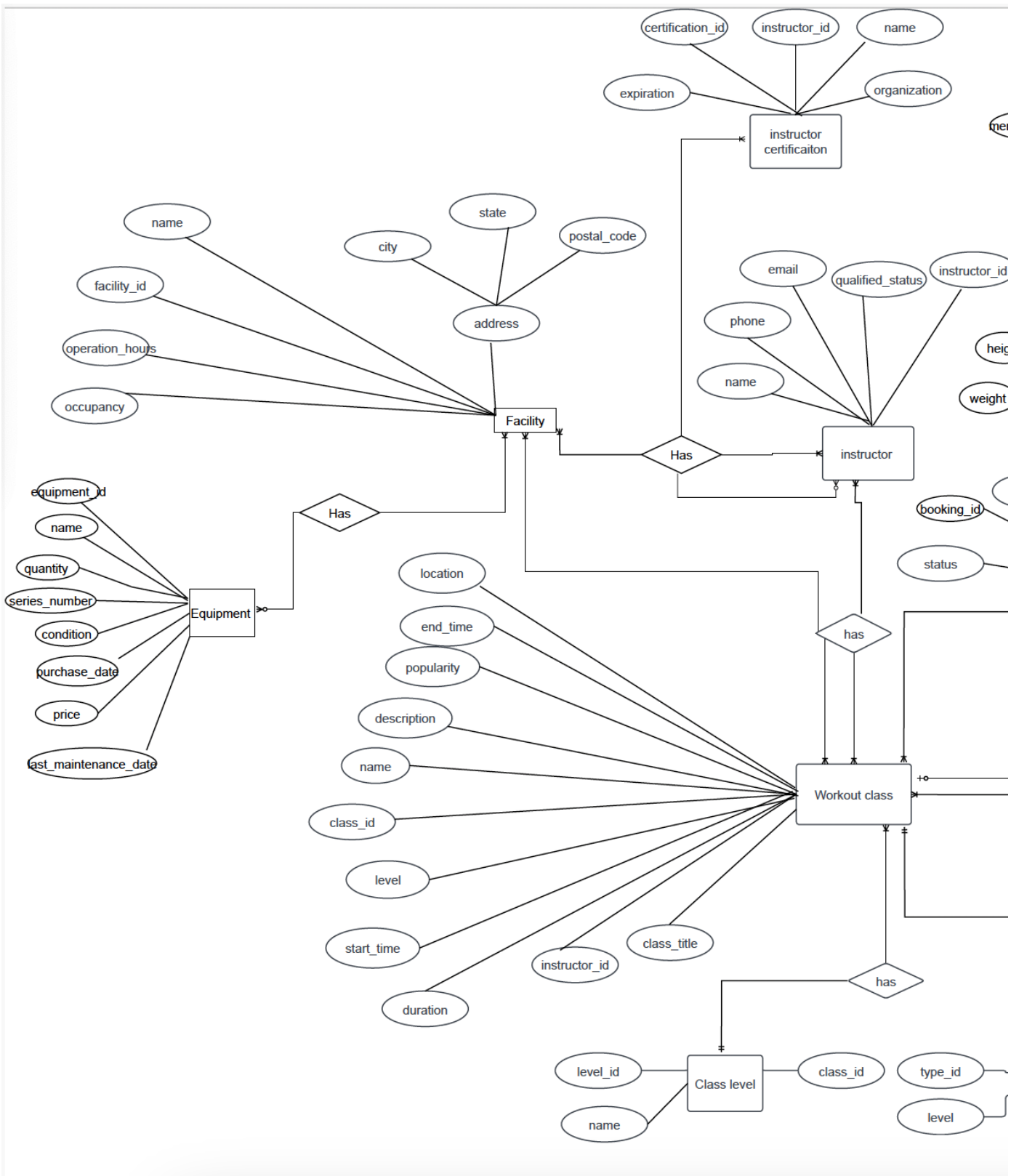
- a. employee_id: key, numeric
- b. ssn: key, numeric
- c. dob: composite, timestamp
- d. name: alphanumeric
- e. email: composite, alphanumeric
- f. phone: multivalue, alphanumeric
- g. hire_date: multivalue, timestamp

Entity Relation Diagram

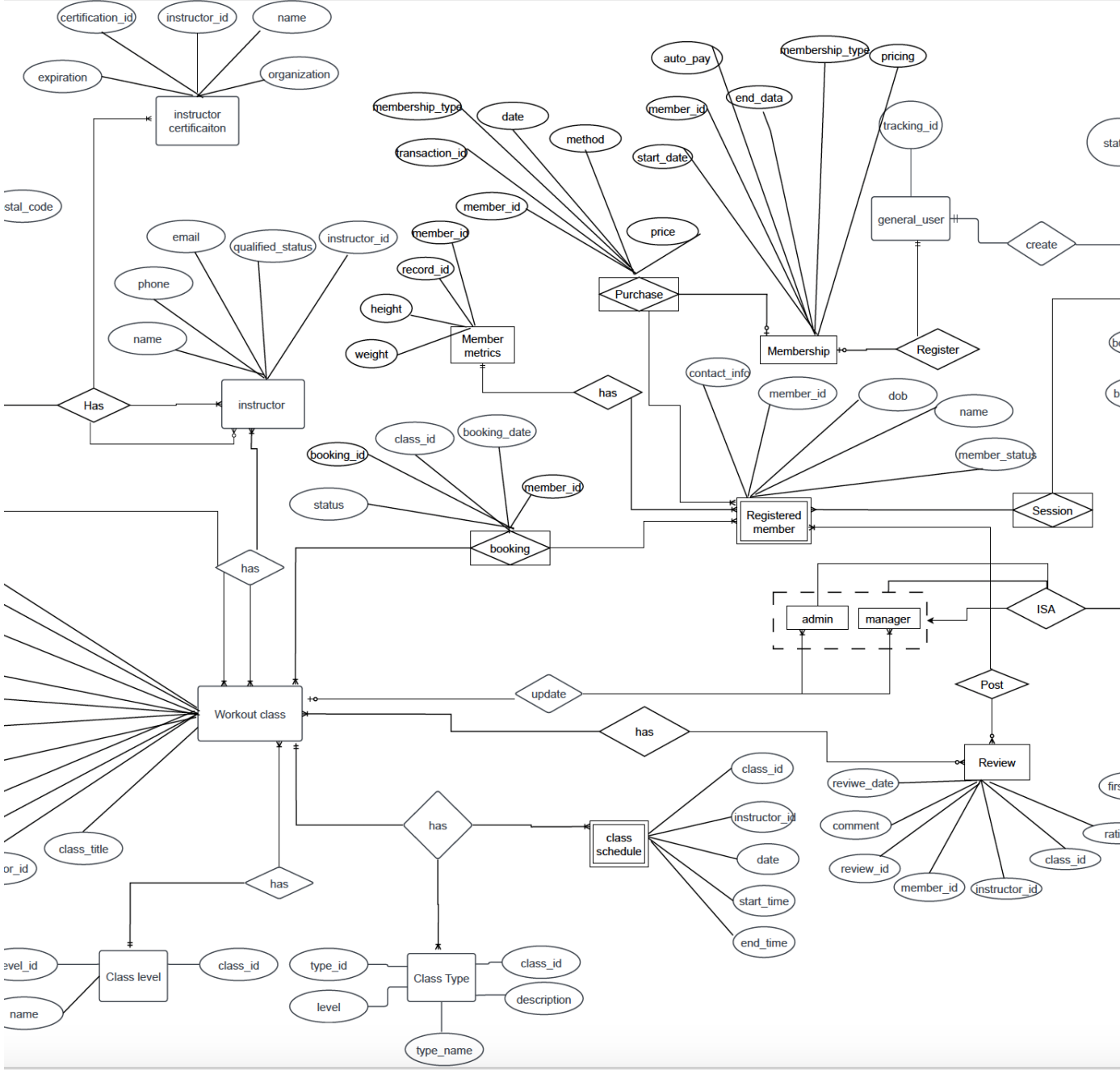


Please check the zoom in details in Quadrant A, B and C

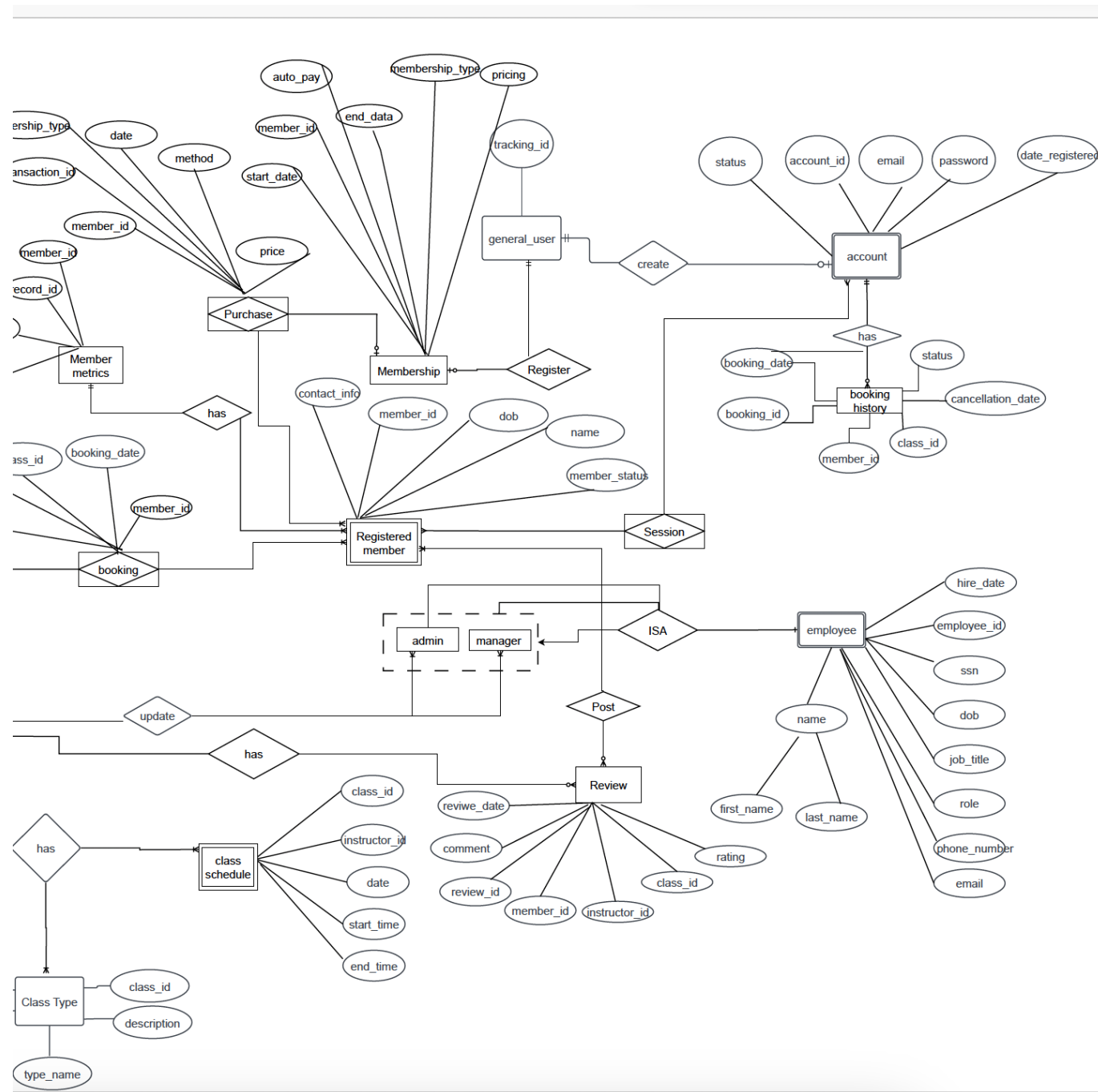
Quadrant A:



Quadrant B:



Quadrant C:



Description Table

Table	FK	ON DELETE	ON UPDATE	Comment
workout_class	type	NO ACTION	NO ACTION	This is a very static , and won't get change too much
workout_class	level	NO ACTION	NO ACTION	If a level is deleted , the workout class will remain.
workout_class	instructor	NO ACTION	On CASCADE	If an instructor is updated from the Instructor table, any WorkoutClass records that reference that instructor will also be automatically updated.'
workout_class	Schedule	SET Null	On CASCADE	If a schedule is deleted, still keep the workout_class, and reassign to different schedule
membership	account_id	RESTRICT	RESTRICT	If someone tries to delete an account with associated memberships, the system will raise an error if the membership status is not expired, this to prevent accidental deletions and date losses
Member booking history	member_id	NO ACTION	NO ACTION	The member_id is also associated with another entity called Training goal, NO ACTION is to preserve user activity and prevent

				<p>automatic deletion of related records.</p> <p>Even if a member is deleted, by keeping the booking history related to that class remains accurate and can be accessed and analyzed if needed.</p>
Member booking history	class_id	NO ACTION	NO ACTION	If a class is no longer active or being offered, by keeping it in the database, you ensure that any previous booking history related to that class remains accurate and can be accessed and analyzed if needed.
Instructor Certification	instructor_id	ON CASCADE	ON CASCADE	<p>If an instructor is deleted from the table(she or he quit the job) there's no reason to keep their certification record.</p> <p>If an admin updates the instructor_id of an instructor in the Instructor table, the corresponding instructor_id in all related Instructor Certification records will also be updated.</p>
Purchase	member_id	NO ACTION	NO ACTION	If a member_id is deleted, still to retain transaction history for auditing or reporting purposes
Equipment	facility_id	SET NULL	SET NULL	If a facility is

				invalid, we still don't want to lose the equipment record but want to indicate it's no longer associated with a valid facility
metrics	member_id	NO ACTION	NO ACTION	If a member is deleted, retaining metrics even if a member's record is deleted can be beneficial for historical analysis or reporting purposes
review	member_id	ON CASCADE	NO ACTION	<p>If a member is deleted, their reviews are also deleted to maintain data integrity.</p> <p>For update, since member_id should be the primary key in the membership table, and they are typically stable and don't get changed.</p>
review	class_id	ON CASCADE	NO ACTION	<p>If a WorkoutClass is deleted, all associated review records would also be automatically deleted.</p> <p>For update, since class_id should be the primary key in the workout class table, and they are typically stable and don't really get changed.</p>
Purchase	member_id	On CASCADE	On CASCADE	If a member_id is deleted, we don't need to keep this purchase from this member

Purchase	membershi p_type	RESTRICT	RESTRICT	if membership_type is deleted but there are still purchase records referencing it, we don't want to end up with purchase records pointing to non-existent membership types. RESTRICT prevents this scenario.
Schedule	instructor	SET Null	NO ACTION	If an instructor is deleted, the instructor reference in their associated schedules is SET to NULL. This implies the schedule remains, but it's no longer associated with any instructor.
Training goal	member_id	ON CASCADE	ON CASCADE	If a member_id is deleted, their training goal will be deleted too
membership	account_id	ON CASCADE	ON CASCADE	When an account_id is deleted, the membership will be deleted too. When a user starts this process, they're usually aware of their membership status, either it gets expired or they don't want to come anymore.

EER Diagram

