

# GYM'S MANAGEMENT SYSTEM

**Course: Data Base and Information Systems**

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## Specification

FitActive's Gym is a state-of-the-art fitness facility that caters to a wide range of fitness enthusiasts. Each member receives personalized attention from a dedicated trainer who customizes exercise routines to fit individual needs. The gym boasts modern equipment and offers a variety of subscription packages that include different exercise combinations to meet diverse fitness goals. Within these packages, customized exercise routines, identified by a RoutineID, are tailored to fit individual member needs and include specific exercises, sets, and repetitions. Trainers are responsible for customizing these routines for each member. Members can subscribe to these packages based on their fitness needs and goals.

MemberID uniquely identifies each member. They can enroll through the official website and enjoy comprehensive support and guidance throughout their fitness journey. The gym maintains meticulous records of each member's progress and payments to ensure a personalized and effective fitness program.

In addition to fitness services, FitActive's Gym provides an opportunity for members to participate in team sports. Each team comprises members and is led by a trainer who must possess a federation license to participate in championships. Team trainers can coach a maximum of 3 teams to ensure a diverse training environment.

FitActive's Gym prides itself on offering a seamless member experience. This includes easy enrollment, and comprehensive fitness regimens combining strength training, cardio, flexibility exercises, and more, all under the guidance of experienced professionals. FitActive's Gym also provides an opportunity for members to purchase official gym merchandise, ensuring they have the gear to enhance their workout experience.

By integrating top-tier fitness facilities, professional trainers, diverse subscription packages, and a customer-centric approach, FitActive's Gym aims to provide an unparalleled fitness experience.

## **Requirements:**

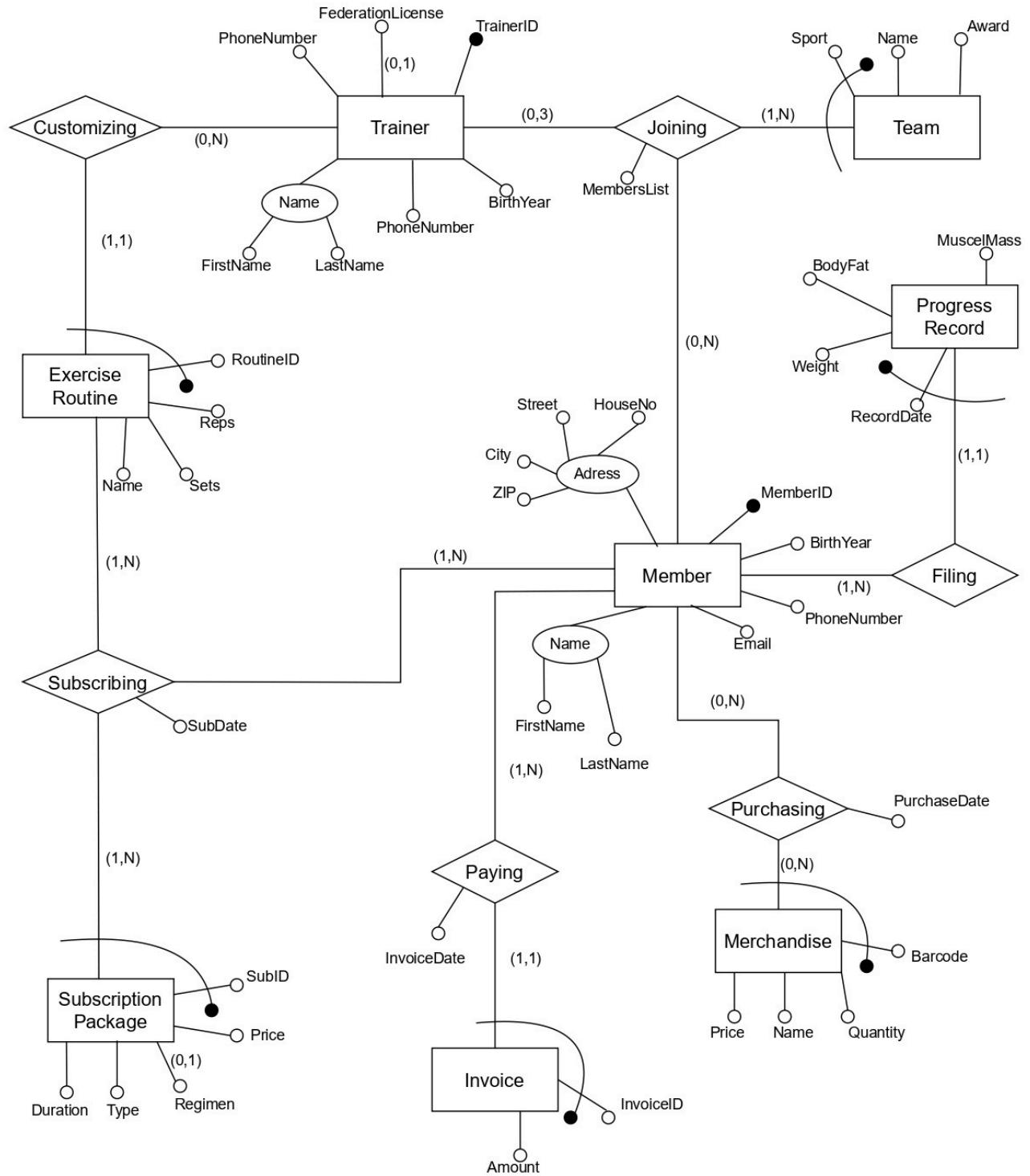
1. Model the database using the Entity-Relationship (E/R) conceptual methodology.
2. Translate the result of the conceptual design into a relational logical model.
3. Write SQL queries that allow:
  - a. Listing all the members assigned to a specific trainer.
  - b. Finding all members participating in a specific team.
  - c. Counting the number of teams each trainer is coaching
  - d. Listing all invoices of the payments made by a specific member.

## **Glossary of Terms**

Term	Description	synonyms	links
Member	A person who has joined FitActive's Gym and uses its services.	Individual	Team, Subscription Package, Exercise Routine, Trainer, Invoice, Merchandise, Progress Record
Trainer	A fitness professional who helps members with their workouts and leads teams.		Team, Exercise Routine, Member
SubscriptionPackage	A membership plan that includes a selection of exercise routines and other gym services, available for a specific duration at a certain price.		Member, Exercise Routine
ExerciseRoutine	A set of exercises tailored to meet specific fitness goals, often customized by trainers.		Trainer, Member, Subscription Package
Team	A group of members who play sports together, led by a trainer.		Trainer, Member
Merchandise	Gym products that members can buy, like clothes and accessories.		Member

Progress Record	A log maintained by members to track their fitness progress, including metrics like body fat, weight, and muscle mass.	Member
Invoice	A financial transaction made by a member for subscribing to packages or purchasing merchandise.	Member

## Entity-Relationship Schema



# Data Dictionary

Entity	Description	Attributes	Identifier
<b>Member</b>	An individual who subscribes to the gym's services and participates in exercise routines and teams.	MemberID, BirthYear, FirstName, LastName, Email, PhoneNumber, City, Street, House NO,Zip	<u>MemberID</u>
<b>Trainer</b>	A fitness professional responsible for customizing exercise routines and leading fitness teams.	TrainerID, FederationLicense , PhoneNumber, FirstName, LastName, BirthYear	<u>TrainerID</u>
<b>subscription package</b>	A membership plan that includes a selection of exercise routines and other gym services, available for a specific duration at a certain price.	SubID, Type, Duration, Price, Regimen	<u>SubID</u> _, <u>RoutineID</u> , <u>MemberID</u> , <u>TrainerID</u>
<b>ExerciseRoutine</b>	A set of exercises tailored to meet specific fitness goals, often customized by trainers.	RoutineID, Name, Sets, Reps	<u>RoutineID</u> _, <u>TrainerID</u>
<b>Team</b>	A group of members led by a trainer, often participating in collective fitness activities and competitions	Sport, Name, Award	<u>Sport</u> _, <u>TrainerID</u> _, <u>MemberID</u>
<b>Merchandise</b>	Items sold at the gym, such as fitness apparel and equipment.	Barcode, Name, Price, Quantity	<u>Barcode</u> _, <u>MemberID</u>

<b>Invoice</b>	A financial transaction made by a member for subscribing to packages or purchasing merchandise.	InvoiceID, InvoiceDate, Amount	<u>InvoiceID</u> , <u>MemberID</u> , <u>InvoiceDate</u>
<b>ProgressRecord</b>	A log maintained by members to track their fitness progress, including metrics like body fat, weight, and muscle mass.	RecordDate, BodyFat, Weight, MuscleMass	<u>RecordDate</u> , <u>MemberID</u>

Relation	Description	Entities involved	Attributes
Customizing	Associate a Trainer with an exercise routine for customization	Trainer (0,N) Exercise Routine(1,1)	
Joining	Associate Team with trainer and member	Team (1,N) Trainer(0,3) Member(0,N)	Sport,TrainerID,MemberID, MemberList
Subscribing	Associate Member with subscription package and Exercise Routine.	Subscription package(1,N) Member(1,N) Exercise Routine(1,N)	SubDate, SubID, MemberID, RoutineID, TrainerID
Paying	Associate Member with Invoice.	Invoice(1,1) Member(1,N)	InvoiceDate
Purchasing	Associate Member with merchandise.	Merchandise(0,N) Member(0,N)	PurchaseDate, MemberID, Barcode,
Filing	Associate progress record with the member.	ProgressRecord(1,1) Member(1,N)	

## Business Rules

FitActive's Gym aims to provide a comprehensive and personalized fitness experience for its members. The following business rules are designed to ensure operational integrity, member satisfaction, and a high standard of service:

### 1. Team Registration Requirement

- Purpose: To ensure organized and professionally managed team sports activities.
- Rule: Members interested in participating in team sports must register for a specific team led by a certified trainer with a federation license.

- Reasoning: This rule guarantees adherence to competitive standards and promotes safety during athletic pursuits.

## 2. **Comprehensive Member Support**

- Purpose: To provide consistent guidance and assistance throughout each member's fitness journey.
- Rule: FitActive's Gym guarantees comprehensive support accessible via the official website and in-person at the facility.
- Reasoning: This commitment ensures members receive timely assistance, advice, and motivation to achieve their fitness goals effectively.

## 3. **Progress Record Maintenance**

- Purpose: To support personalized training programs and track member progress effectively.
- Rule: FitActive's Gym is required to maintain detailed progress records for each member. This includes documenting weight measurements, body fat percentages, and weight.
- Reasoning: These records facilitate customized fitness plans and help trainers adjust routines to meet individual goals.

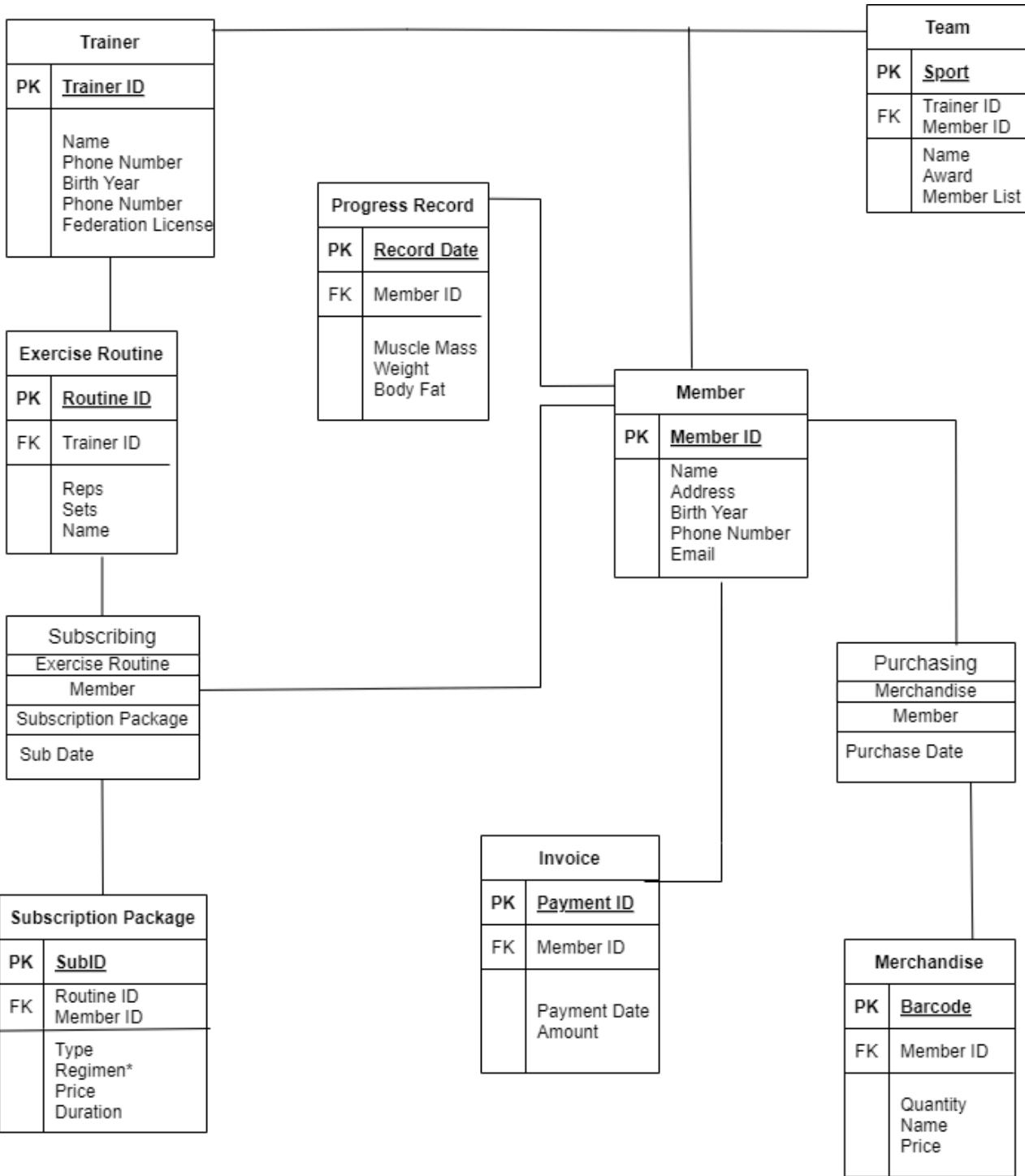
## 4. **Trainer Coaching Diversity**

- Purpose: To maintain a diverse training environment and maximize member benefit.
- Rule: A trainer at FitActive's Gym may coach a maximum of 3 teams.
- Reasoning: This promotes exposure to varied coaching styles and expertise among members.

## 5. **Facility Maintenance**

- Purpose: To maintain a high-quality and safe fitness environment.
- Rule: FitActive's Gym commits to maintaining state-of-the-art fitness equipment and facilities.
- Reasoning: This ensures a safe, hygienic, and comfortable environment for all members, supporting their fitness endeavors and enhancing overall satisfaction.

# **Relational Model**



## SQL Queries

1. Listing all the members assigned to a specific trainer.

```
SELECT m.MemberID, m.Name AS MemberName,
```

```
    t.Name AS TrainerName
```

```
FROM Member m
```

```
INNER JOIN SubscriptionPackage sp ON sp.MemberID = m.MemberID
```

```
INNER JOIN ExerciseRoutine er ON er.RoutineID = sp.RoutineID
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INNER JOIN Trainer t ON t.TrainerID = er.TrainerID;

2.Finding all members participating in a specific team.

SELECT

t.MemberID,  
m.Name AS MemberName

FROM

Team t

INNER JOIN

Member m ON t.MemberID = m.MemberID

WHERE

t.TrainerID = 'KM1323'  
AND t.Sport = 'Basketball';

3.Counting the number of teams each trainer is coaching

SELECT t.TrainerID,

t.Name AS TrainerName,  
COUNT(tm.Sport) AS NumberOfTeams

FROM

Trainer t

LEFT JOIN

Team tm ON t.TrainerID = tm.TrainerID

GROUP BY

t.TrainerID, t.Name

HAVING

COUNT(tm.TeamID) <= 3;

4.Listing all invoices of the payments made by a specific member

SELECT py.PaymentID, py.MemberID, py.PaymentDate, py.Amount

FROM Invoice py

WHERE py.MemberID = 'BA1212';