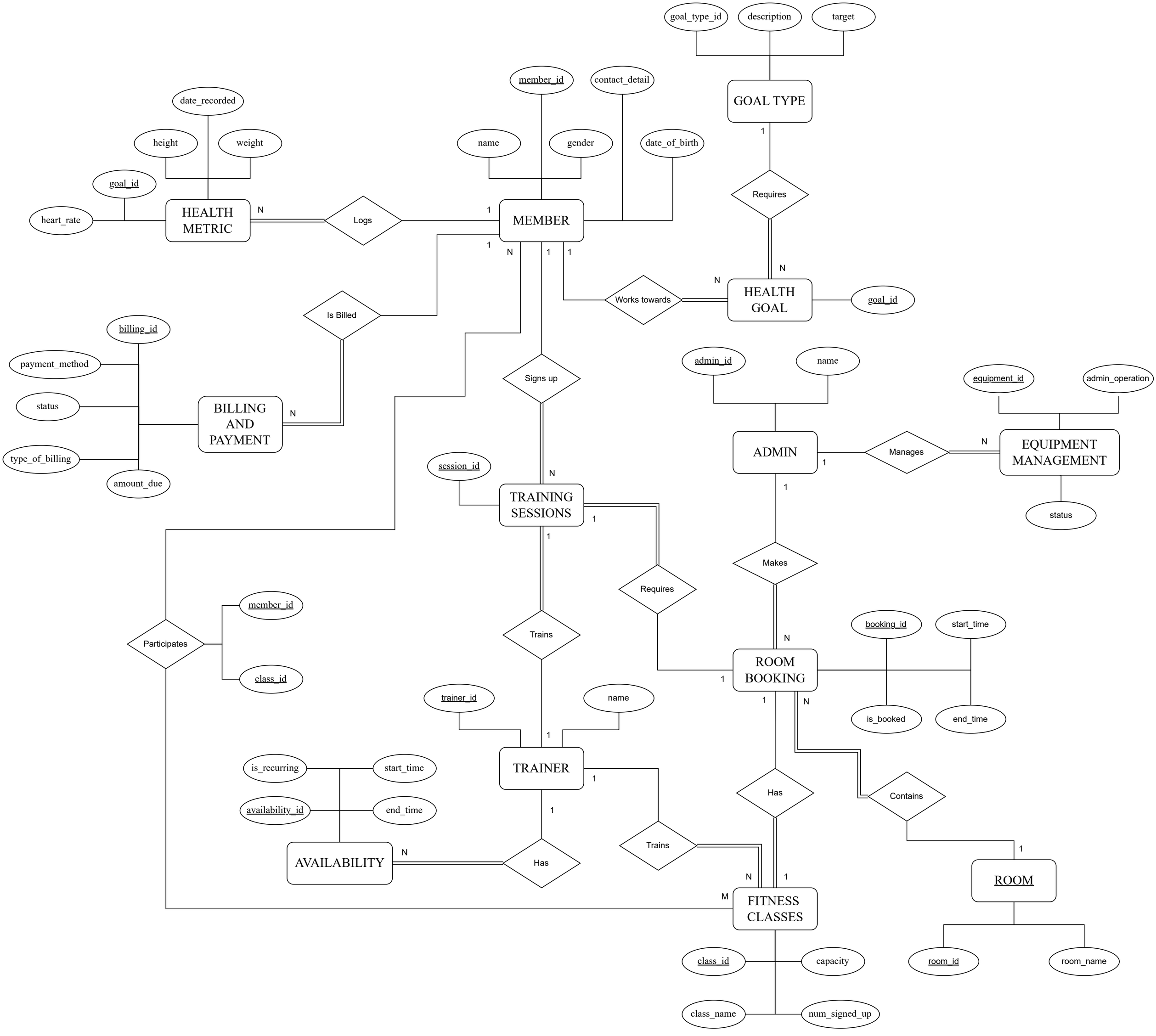
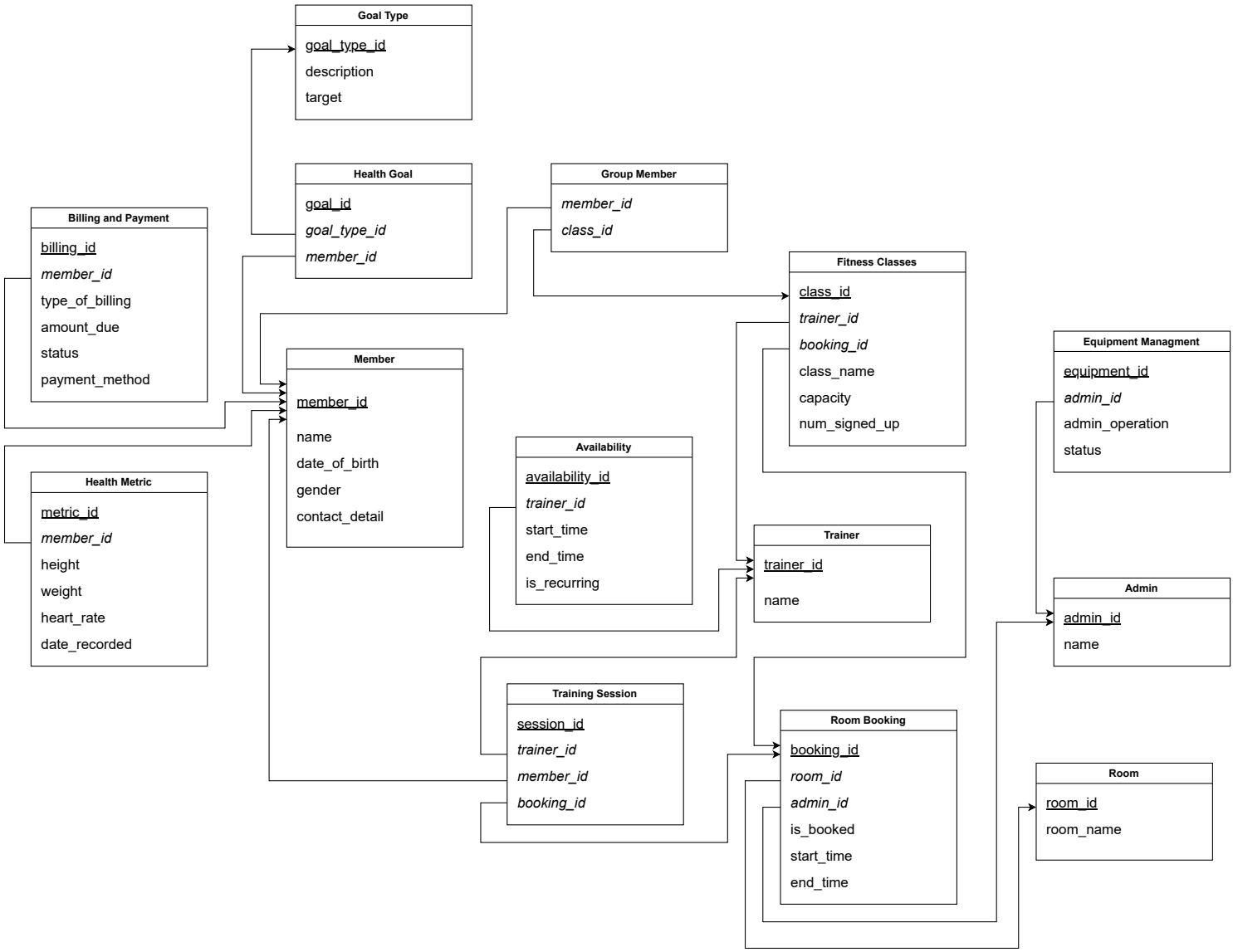
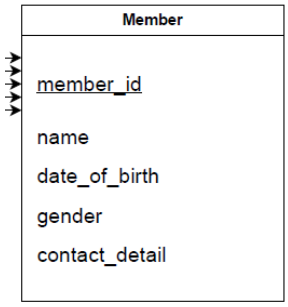

goal_type_id
description
target
GOAL TYPE
member_id
contact_detail
date_recorded
height
weight
name
gender
date_of_birth
goal_id
heart_rate
HEALTH METRIC
N
Logs
1
MEMBER
Requires
1
N
1
1
1
N
N
Works towards
HEALTH GOAL
goal_id
Is Billed
billing_id
payment_method
status
type_of_billing
amount_due
BILLING AND PAYMENT
N
Signs up
admin_id
name
equipment_id
admin_operation
ADMIN
1
Manages
N
EQUIPMENT MANAGEMENT
status
session_id
N
TRAINING SESSIONS
1
1
Requires
1
Makes
N
Participates
member_id
class_id
Trains
booking_id
start_time
ROOM BOOKING
1
1
N
is_booked
end_time
trainer_id
name
1
TRAINER
is_recurring
start_time
availability_id
end_time
1
1
Has
Contains
AVAILABILITY
N
Has
Trains
1
N
1
M
FITNESS CLASSES
ROOM
class_id
capacity
room_id
room_name
class_name
num_signed_up


Goal Type
goal_type_id
description
target
Health Goal
goal_id
goal_type_id
member_id
Group Member
member_id
class_id
Billing and Payment
billing_id
member_id
type_of_billing
amount_due
status
payment_method
Fitness Classes
class_id
trainer_id
booking_id
class_name
capacity
num_signed_up
Equipment Managment
equipment_id
admin_id
admin_operation
status
Member
member_id
name
date_of_birth
gender
contact_detail
Availability
availability_id
trainer_id
start_time
end_time
is_recurring
Health Metric
metric_id
member_id
height
weight
heart_rate
date_recorded
Trainer
trainer_id
name
Admin
admin_id
name
Training Session
session_id
trainer_id
member_id
booking_id
Room Booking
booking_id
room_id
admin_id
is_booked
start_time
end_time
Room
room_id
room_name

Normalization Tests

Insertion of duplicates into the database will be handled by function code (i.e. through the 'EXIST' keyword in sql).

Relation: Member (**member_id**, name, date_of_birth, gender, contact_detail)

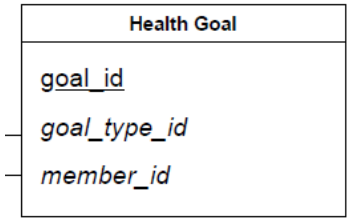


Functional Dependencies:

- member_id -> name
- member_id -> date_of_borth
- member_id -> gender
- member_id -> contact_detail

Passes second normal form since all non-prime attributes are fully functionally dependent on the primary key member_id. Also passes third normal form as there are no transitive dependencies.

Relation: Health Goal (**goal_id**, member_id, goal_type_id)

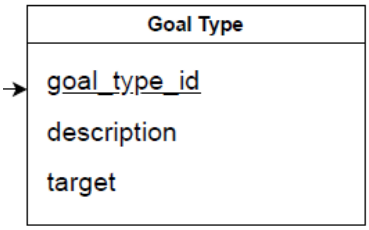


Function Dependencies:

- goal_id -> member_id
- goal_id -> goal_type_id

Passes second normal form test since non-prime attributes fully depend on the primary key goal_id. No transitive dependencies present, so it also passes the third normal form test.

Relation: Goal Type (**goal_type_id**, description, target)

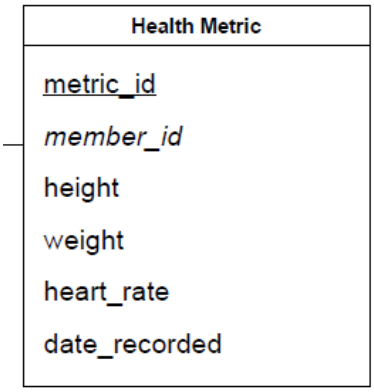


Functional Dependencies:

- goal_type_id -> description
- goal_type_id -> target

Passes second normal form test since all non-prime attributes depend on the goal_type_id. Even if two goals have the same description, they can each be identified by a goal_type_id. No transitive dependencies, so it also passes the third normal form test.

Relation: Health Metric (**metric_id**, member_id, height, weight, heart_rate, date_recorded)

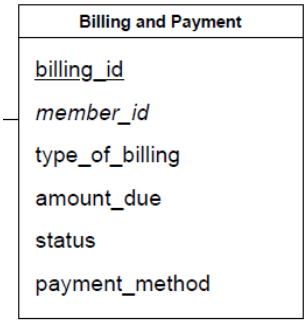


Functional Dependencies:

- metric_id -> member_id
- metric_id -> height
- metric_id -> weight
- metric_id -> heart_rate
- metric_id -> date_recorded

All non-prime attributes are functionally dependent on the metric_id. Members creating duplicate health metrics will be handled in the code. It will be handled using code like ‘EXIST’ in sql. There are no transitive dependencies, so it also passes third normal form.

Relation: Billing and Payment (**billing_id**, member_id, type_of_billing, amount_due, status, payment_method)

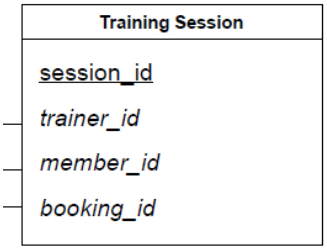


Functional Dependencies:

- billing_id -> member_id
- billing_id -> type_of_billing
- billing_id -> amount_due
- billing_id -> status
- billing_id -> payment_method

Passes second normal form test as all dependencies depend on one specific key (no partial dependencies possible). Passes third normal form test since there are no transitive dependencies.

Relation: Training Session (**session_id**, trainer_id, booking_id, member_id)

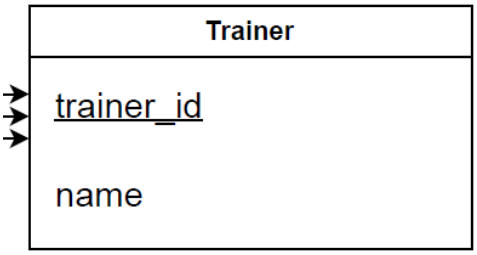


Functional Dependencies:

- session_id -> trainer_id
- session_id -> booking_id
- session_id -> member_id

All non-prime attributes are functionally dependent on the session_id key. As such, the relation is of the second normal form. None of the attributes have transitive dependencies so the relation also passes third normal form.

Relation: Trainer (**trainer_id**, name)

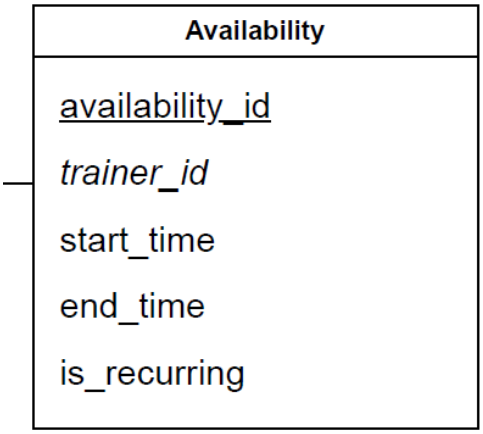


Functional Dependencies:

- trainer_id -> name

Only two attributes with trainer_id being the primary key. Passes second and third normal form tests (no transitive dependencies).

Relation: Availability (**availability_id**, trainer_id, start_time, end_time, is_recurring)

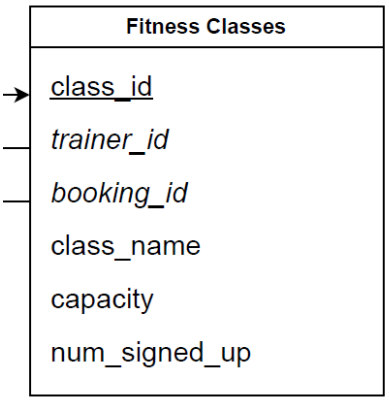


Functional Dependencies:

- availability_id -> trainer_id
- availability_id -> start_time
- availability_id -> end_time
- availability_id -> is_recurring

All non-prime attributes depend on a single availability_id attribute. Therefore, passes second normal form. No transitive dependencies so also pass third normal form.

Relation: Fitness Classes (**class_id**, trainer_id, booking_id, class_name, capacity, num_signed_up)

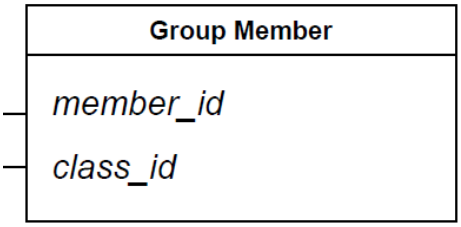


Functional Dependencies:

- class_id -> trainer_id
- class_id -> booking_id
- class_id -> class_name
- class_id -> capacity
- class_id -> num_signed_up

Non-prime attributes depend on a single class_id attribute. Thus, the relation passes the second normal form. There are no transitive dependencies, so it also passes the third normal form test.

Relation: Group Member (class_id, member_id)

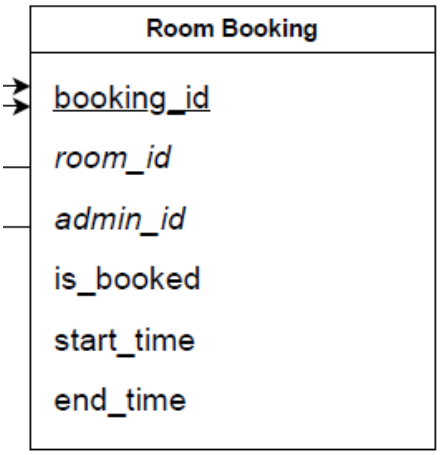


There are no functional dependencies since this is simply a mapping relation which maps the member id to a specific class id. Each row in the relation is uniquely identified by the class and member_id attribute pair.

Passes second normal form (there are no dependencies).

Passes third normal form (there are no dependencies).

Relation: Room Booking (**booking_id**, admin_id, room_id, is_booked, start_time, end_time)

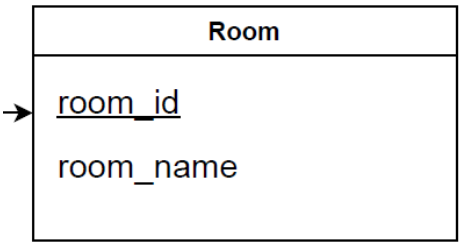


Functional Dependencies:

- booking_id -> admin_id
- booking_id -> room_id
- booking_id -> is_booked
- booking_id -> start_time
- booking_id -> end_time

Non-prime attributes depend only on the single booking_id key attribute. This relation passes the second normal form test. Passes third normal form: no transitive dependencies present.

Relation: Room (**room_id**, room_name)



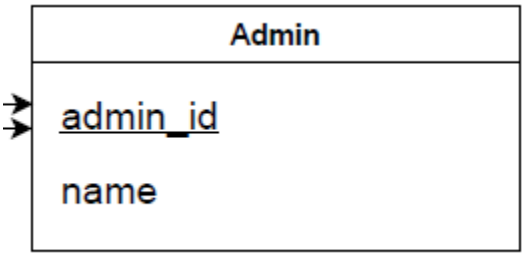
Functional Dependencies:

- Room_id -> room_name

Passes second normal form test: room_name is functionally dependent on room_id.

Passes third normal form test: no transitive dependencies in this relation.

Relation: Admin (**admin_id**, name)



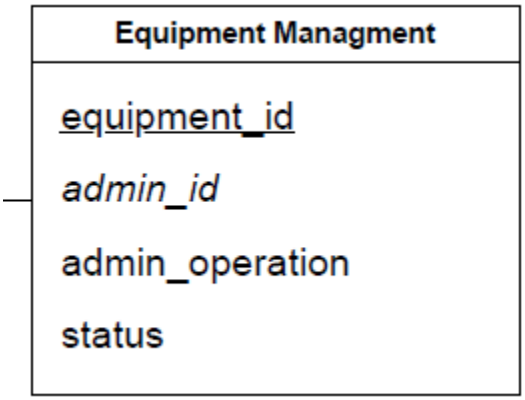
Functional Dependencies:

- admin_id -> name

Passes second normal form test: name is functionally dependent on admin_id.

Passes third normal form test: no transitive dependencies present in the relation.

Relation: Equipment Management (**equipment_id**, admin_id, admin_operation, status)



Functional Dependencies:

- equipment_id -> admin_id
- equipment_id -> admin_operation
- equipment_id -> status

Passes second normal form: all non-prime attributes are functionally dependent on the equipment primary key.
Passes third normal form: no transitive dependencies in this relation.