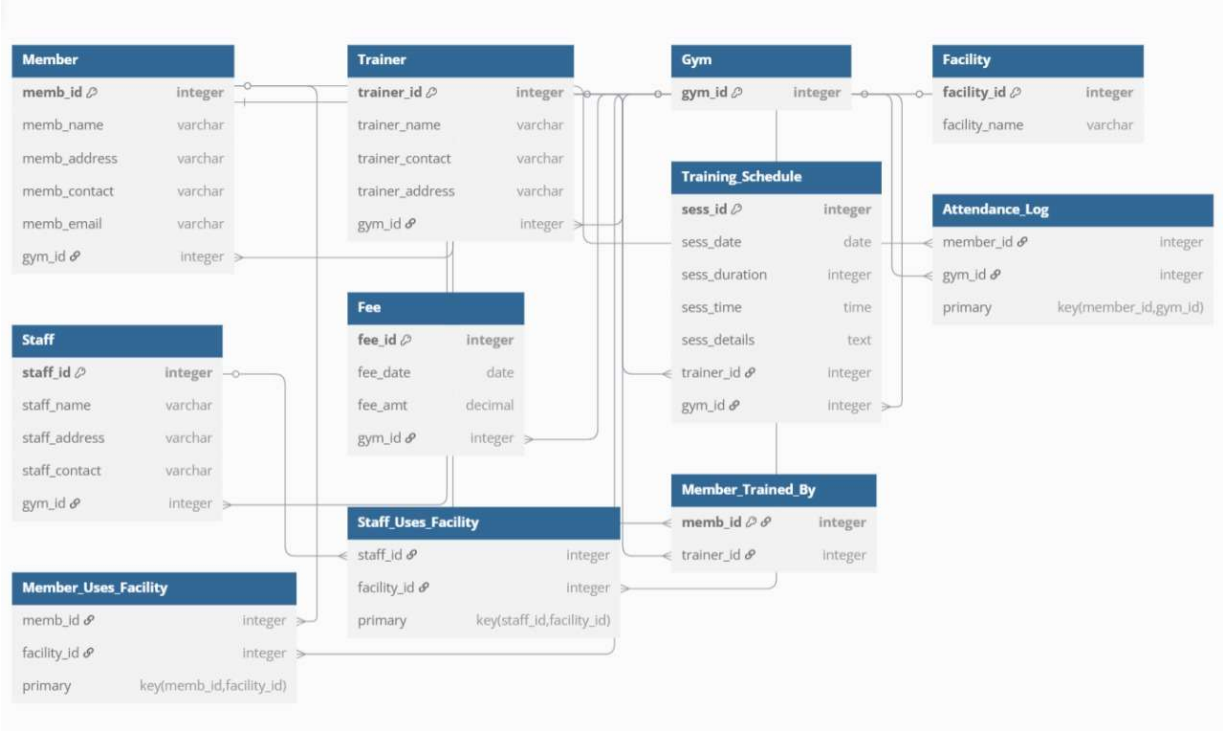
RELATIONAL SCHEMA & ER DIAGRAM

GROUP ID: G2-T10

(1) Relational Schema



(2) Minimal FD set

memb_id → memb_name, memb_address, memb_contact, memb_email, gym_id
trainer_id → trainer_name, trainer_contact, trainer_address, gym_id)
gym_id → (No further attributes; key only)
facility_id → facility_name
staff_id → staff_name, staff_address, staff_contact, gym_id
fee_id → fee_date, fee_amt, gym_id
sess_id → sess_date, sess_duration, sess_time, sess_details, trainer_id, gym_id
(member_id, gym_id) → (No additional attributes; PK only)
(memb_id, trainer_id) → (Only PK, no other attributes)
(memb_id, facility_id) → (Only PK)
(staff_id, facility_id) → (Only PK)

(3) Proof That Relations Are in BCNF

BCNF Condition:
A relation is in BCNF if for every non-trivial functional dependency, is a superkey.

- Member: memb_id is a key, and all dependencies are on it ⇒ BCNF
- Trainer: trainer_id is a key ⇒ BCNF
- Gym: gym_id is a key ⇒ BCNF
- Facility: facility_id is a key ⇒ BCNF
- Staff: staff_id is a key ⇒ BCNF
- Fee: fee_id is a key ⇒ BCNF
- Training_Schedule: sess_id is a key ⇒ BCNF
- Attendance_Log: composite key (member_id, gym_id) is the only determinant ⇒ BCNF
- Member_Trained_By: composite key is the only FD ⇒ BCNF
- Member_Uses_Facility: composite key is the only FD ⇒ BCNF
- Staff_Uses_Facility: composite key is the only FD ⇒ BCNF

Conclusion: All relations satisfy the BCNF condition.

(4) ER Diagram