Program 4 Design

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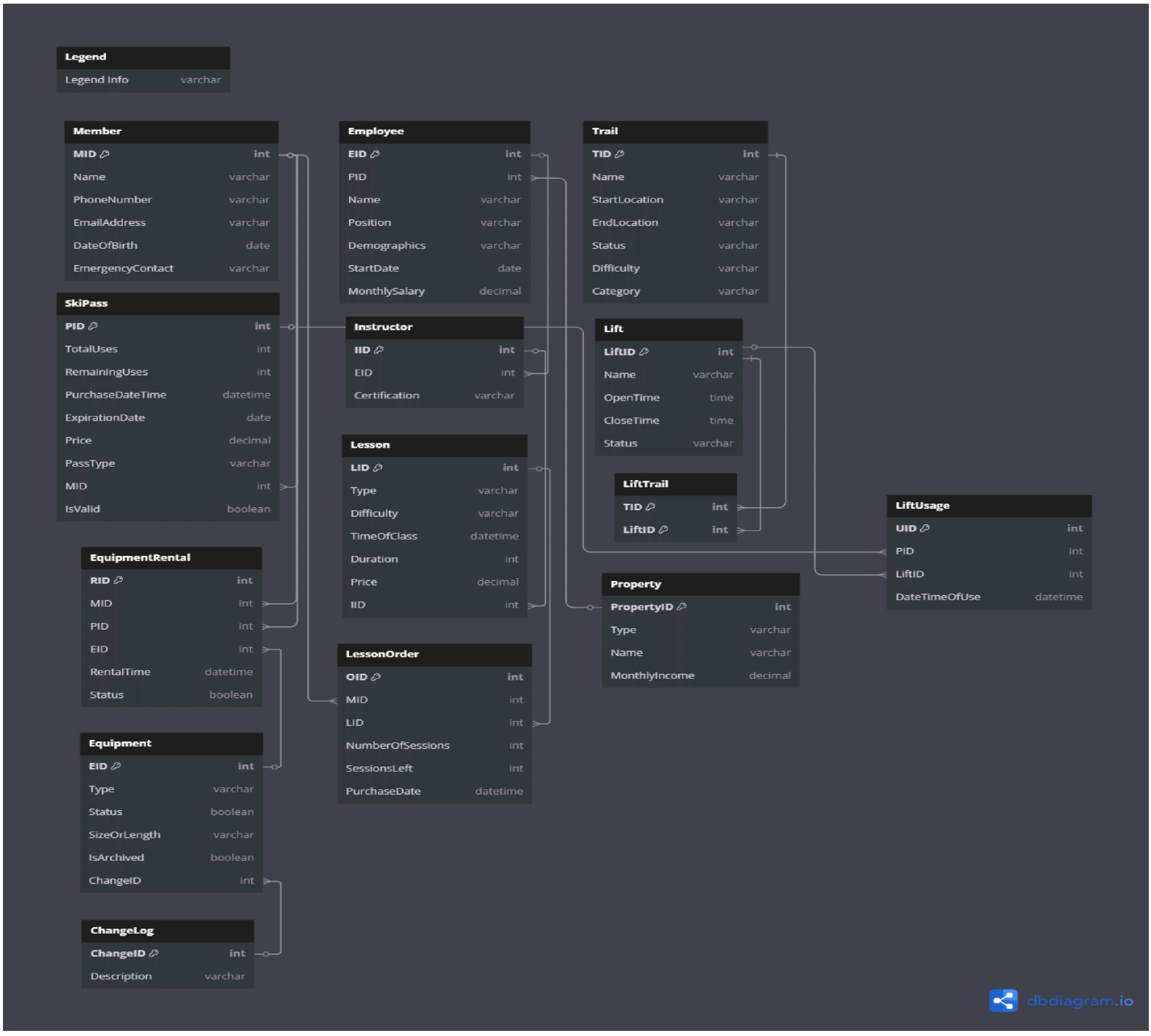
i. Conceptual database design



Any necessary high–level text description of the data model (e.g., constraints, or anything you were not able to show in the E–R diagram but that is necessary to help people understand your database design). PLACE HERE

ii. Logical database design

iii. Normalization analysis: For each of your entity sets (tables), provide all of the FDs of the table and justify why your the table adheres to 3NF / BCNF.

Member Table
MID -> Name
MID -> PhoneNumber
MID -> EmailAddress
MID -> DateOfBirth
MID -> EmergencyContact

The Member table adheres to BCNF because every nontrivial FD, MID is the superkey

SkiPass Table
PID -> TotalUses
PID -> RemainingUses
PID -> PurchaseDateTime
PID -> ExpirationDate
PID -> Price
PID -> PassType
PID -> isValid
PID -> MID

The SkiPass table adheres to BCNF because every nontrivial FD, PID is the superkey

EquipmentRental Table
RID -> PID
RID -> EID
RID -> RentalTime
RID -> Status

EquipmentRental adheres to BCNF because every nontrivial FD, RID is the superkey

Equipment Table
EID -> Type
EID -> Status
EID -> SizeOrLength
EID -> IsArchived
EID -> CID

Equipment adheres to BCNF because every nontrivial FD, EID is the superkey

ChangeLog Table
CID -> Description

ChangeLog adheres to BCNF because every nontrivial FD,CID is the superkey

Trail Table
TID -> Name
TID -> StartLocation
TID -> EndLocation
TID -> Status
TID -> Difficulty
TID -> Category

Trail adheres to BCNF because every nontrivial FD, TID is the superkey

LiftTrail Table
No Functional Dependencies

LiftTrail is in BCNF because there are no key attributes

Lift Table
LifdID -> Name
LiftID -> OpenTime
LiftID -> CloseTime
LiftID -> Status

Lift adheres to BCNF because every nontrivial FD, LiftID is the superkey

LiftUsage Table
UID -> PID
UID -> LiftID
UID -> DateTimeOfUse

LiftUsage adheres to BCNF because every nontrivial FD, UID is the superkey

Lesson Table
LID -> Type
LID -> Difficulty
LID -> TimeOfClass
LID -> Duration
LID -> Price
LID -> IID

Lesson adheres to BCNF because every nontrivial FD, LID is the superkey

LessonOrder Table
OID -> MID
OID -> LID
OID -> NumberOfSessions
OID -> SessionsLeft
OID -> PurchaseDate

LessonOrder adheres to BCNF because every nontrivial FD, OID is the superkey

Instructor Table
IID -> EID
IID -> Certification

Instructor adheres to BCNF because every nontrivial FD, IID is the superkey

Employee Table
EID -> PID
EID -> Name
EID -> Position
EID -> Demographics
EID -> StartDate
EID -> MonthlySalary

Employee adheres to BCNF because every nontrivial FD, EID is the superkey

Property Table
PropertyID -> Type
PropertyID -> Name
PropertyID -> MonthlyIncome

Property adheres to BCNF because every nontrivial FD, PropertyID is the superkey

iv. Query description

Our query is “For a given LID (Lesson ID) display the Instructors Certification Level” The question it is answering is a concern a member might have in wanting the instructor for a lesson they are going to buy to be of a certain certification level. The utility of having this query in the system is so that a member can quickly see information about the Instructor according to a Lesson rather than just the Lesson’s difficulty level.