Class Exercises
Database Design

DRIVER LICENSE ISSUES

Driver License Issues

Road Transport Department (RTD) administers driving tests and issues driver's licenses. Any driver who wants a driver's license must first take a computerized examination at any branch of driving school in the province. Normally, driving school have several branches, which are the name, the owner, and the location of driving school are recorded by the RTD. If the driver fails the examination, he/she can take the examination again at any time after a week of the failed examination date, at any branch. If a driver passes the examination, he/she will be issued a license (type license = learner's) with a unique license number. A driver license (type=learner) may contain a single restriction on it to inform the driver is novices. The driver may take his driver's practical examination at any driving school and any time before the learner's license expired (which is usually set at six months after the learner’s license issue date). If a driver passes the examination, the RTD will issue him a driver's license. A driver's license must also record the status of driver's education (completed/uncompleted), and cost involved for insurance purposes.

Driver License Issues

Based on the given scenario, answer this question by provide these:

- Determine entity type and their possibility attributes, the primary key (PK), alternate key (AK), and other related keys.
- List relationship and their possibility attributes.
- List constraint (multiplicity) between entities and relationships.
- Create a conceptual and logical design (ER/EER Diagram) based on the information given.
- Define the relational structure/schema of the database.

Solution

- Determine entity type and their possibility attributes, the primary key (PK), alternate key (AK), and other related keys.

1. License (License Class (PK), License Number, License Expiry Date)
2. Driver (Driver ID (PK), No IC, Name, DOB, Address, City, Postcode, Telephone)
3. Branch (Branch ID, Name, Address, City, Postcode, Telephone)
4. Driving School (School ID (PK), Name, Owner, Location)
5. Driver license (Drivers education, Cost and the inherited attributes from License)
6. Learner license (Restrictions and the inherited attributes from the License)

Solution

- List relationship and their possibility attributes.

1. Driver **Own** License
2. Driver **Take Examination** Branch
3. Branch **Issue** License
4. Driving School **Has** Branch
5. **Examination** (Driver ID, Branch ID, Examination Date, Examination Type, Examination Score)
6. **Issue License** (License Class, Branch ID, Issue Date)

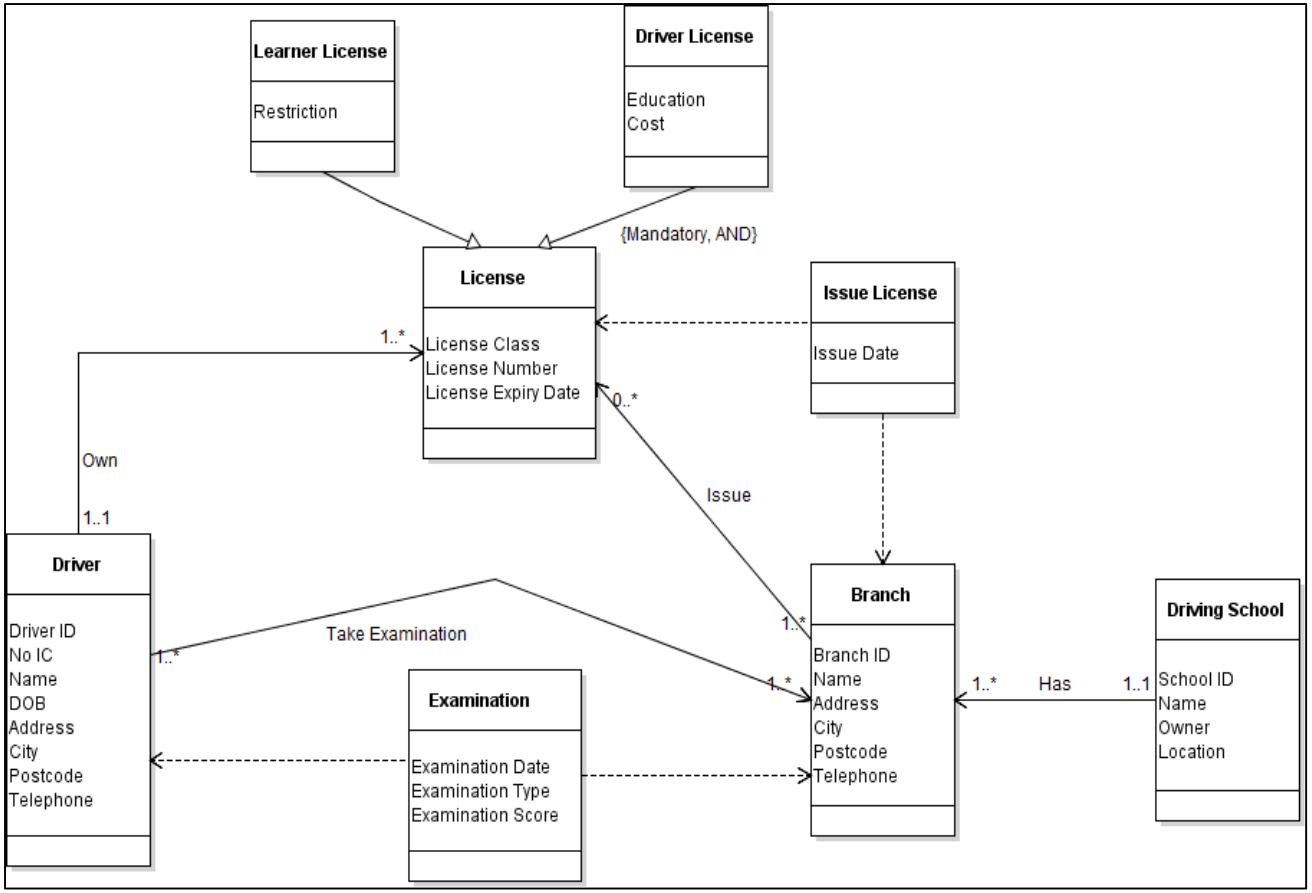
Solution

- List constraint (multiplicity) between entities and relationships.

1. 1..1 Driver MUST OWN 1..* License
2. 1..1 Driving School HAS 1..* Branch
3. 1..* Driver MUST TAKE EXAMINATION 1..* Branch
4. 1..* Branch MUST ISSUE 0..* License

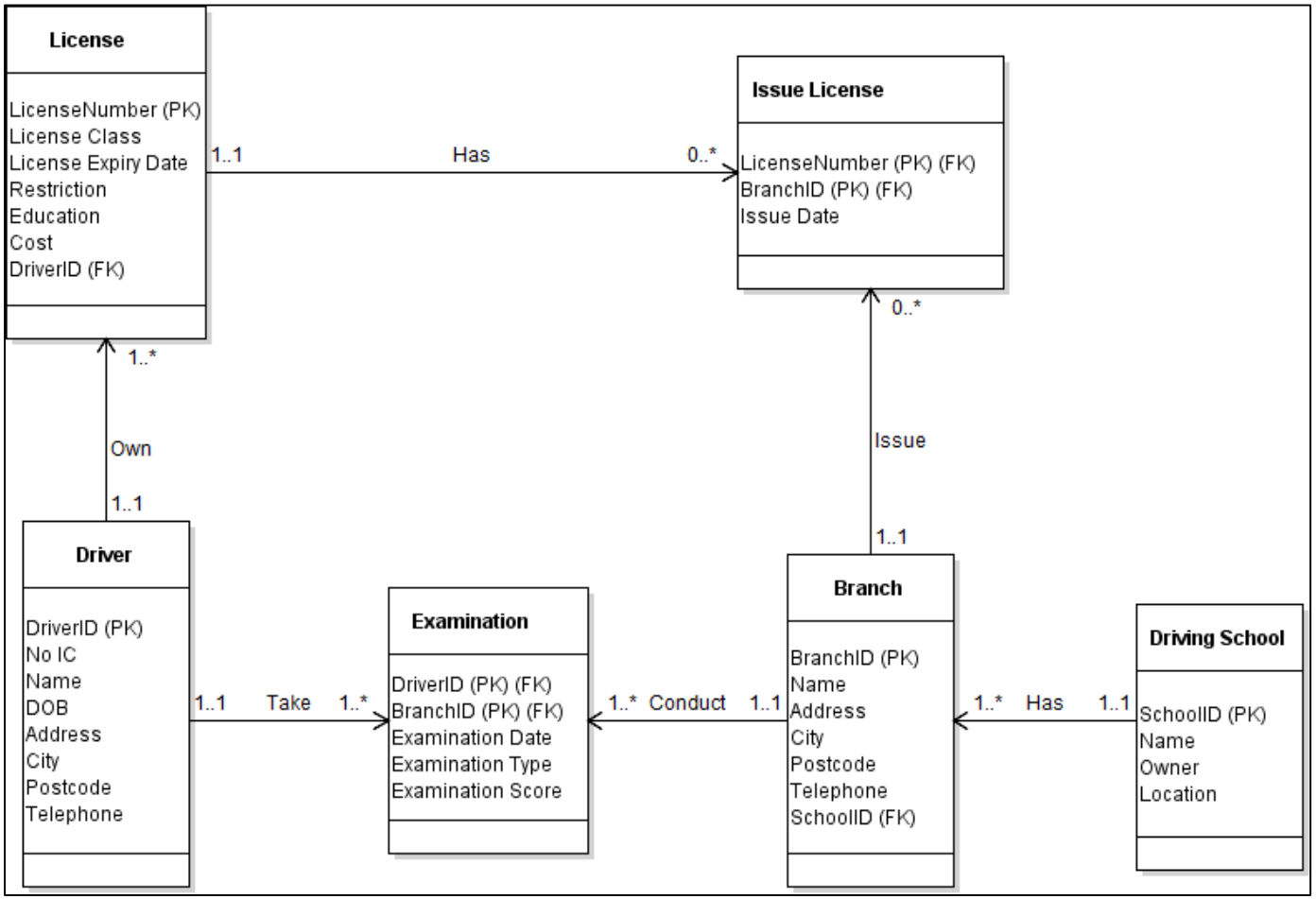
Solution

- Conceptual data model



Solution

- Logical data model



Solution

- Define the relational structure/schema of the database.
  1. **Driver** (DriverID (PK), No IC, Name, DOB, Address, City, Postcode, Telephone)
  2. **License** (LicenseNumber (PK), License Class, License Expiry Date, Restriction, Education, Cost, DriverID (FK))
  3. **Branch** (BranchID (PK), Name, Address, City, Postcode, Telephone, SchoolID (FK))
  4. **Driving School** (SchoolID (PK), Name, Owner, Location)
  5. **Examination** (DriverID (PK) (FK), BranchID (PK) (FK), Examination Date, Examination Type, Examination Score)
  6. **Issue License** (LicenseNumber (PK) (FK), BranchID (PK) (FK), Issue Date)