# **Relational Mapping – Tutorial 2.2**

Introduction

**Purpose:** This tutorial aims to help you develop the skills required for mapping conceptual model diagrams (specifically ER diagrams) into a relational schema. You will additionally learn how to evaluate different mapping choices which could be made for one ER diagram.

**Learning Outcomes:** By the end of this tutorial, you will be able to:

* Create relation schemas from ER and EER diagrams
* Understand the role foreign keys play in the mapping process
* Develop critical thinking skills to make effective decisions during the mapping process
* Understand the role of mapping in database design

# Section A: Basic Mapping

Create relational mappings for the following ER Diagrams. Note: All foreign keys between tables must be stated. Each question may have several correct answers.

## A.1

**CAR**

* **Attributes:**
  + VehicleID (PK)
  + State
  + Number
  + Year
  + Model
  + Make
* **Alternate Key:**
  + (State, Number)

**CAR\_COLOUR**

* **Attributes:**
  + VehicleID (PK, FK)
  + Colour (PK)
* **Foreign Key:**
  + VehicleID references CAR(VehicleID)

**A.2**

**ATHLETE**

* **Attributes:**
  + ID (PK)
  + Name
  + Sex
  + Age
  + Country

**EVENT**

* **Attributes:**
  + ID (PK)
  + Name
  + Category
  + VenueID (FK)
* Foreign Key:
  + VenueID references VENUE(ID)

**VENUE**

* **Attributes:**
  + ID (PK)
  + Name
  + Address

**PARTICIPATES**

* **Attributes:**
  + AthleteID (PK, FK)
  + EventID (PK, FK)
  + Placement
* **Foreign Keys:**
  + AthleteID references ATHLETE(ID)
  + EventID references EVENT(ID)

Section B: Advanced Mapping

Create relational mappings for the following ER Diagrams. Note: All foreign keys between tables must be stated.

## B.1

## 

**DOCTOR**

* **Attributes:**
  + Lic\_no (PK)
  + d

**GP**

* **Attributes:**
  + Lic\_no (PK, FK)
* **Foreign Key:**
  + Lic\_no references DOCTOR(Lic\_no)

**SPECIALIST**

* **Attributes:**
  + Lic\_no (PK, FK)
  + Specialisation
* **Foreign Key:**
  + Lic\_no references DOCTOR(Lic\_no)

**PATIENT**

* **Attributes:**
  + Pid (PK)

**CLINIC**

* **Attributes:**
  + Rno (PK)

**APPOINTMENT**

* **Attributes:**
  + Lic\_no (PK, FK)
  + Pid (PK, FK)
  + DateTime (PK)
  + Fee
* **Foreign Keys:**
  + Lic\_no references DOCTOR(Lic\_no)
  + Pid references PATIENT(Pid)

**WORKS\_IN**

* **Attributes:**
  + Lic\_no (PK, FK)
  + Rno (PK, FK)
* **Foreign Keys:**
  + Lic\_no references DOCTOR(Lic\_no)
  + Rno references CLINIC(Rno)

**B.2**



**STUDENT**

* **Attributes:**
  + ID (PK)
  + Name
  + HopesAndDreams

**COURSE**

* **Attributes:**
  + Code (PK)
  + Year
  + Semester
  + Level

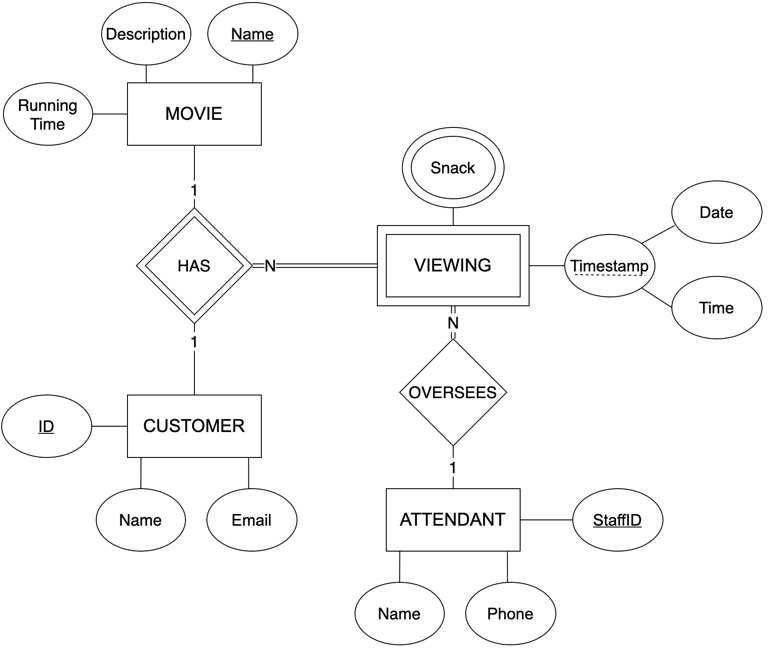
**LECTURER**

* **Attributes:**
  + Name (PK)
  + Qualification

**TAKES**

* **Attributes:**
  + Student\_ID (FK)
  + Course\_Code (FK)
  + Lecturer\_Name (FK)
* **Foreign Keys:**
  + Student\_ID references STUDENT(ID)
  + Course\_Code references COURSE(Code)
  + Lecturer\_ID references LECTURER(LecturerID)

**B.3**



**MOVIE**

* **Attributes:**
  + Name *(PK)*
  + Description
  + Running\_Time

**CUSTOMER**

* **Attributes:**
  + ID *(PK)*
  + Name
  + Email

**VIEWING**

* **Attributes:**
  + Movie\_Name *(PK, FK)*
  + Customer\_ID *(PK, FK)*
  + Date *(PK)*
  + Time *(PK)*
  + StaffID *(FK, NOT NULL)*
* **Foreign Keys:**
  + Movie\_Name references MOVIE(Name)
  + Customer\_ID references CUSTOMER(ID)
  + StaffID references ATTENDANT(StaffID)

**VIEWING\_SNACK**

* **Attributes:**
  + Movie\_Name *(PK, FK)*
  + Customer\_ID *(PK, FK)*
  + Date *(PK)*
  + Time *(PK)*
  + Snack *(PK)*
* **Foreign Key:**
  + (Movie\_Name, Customer\_ID, Date, Time) references VIEWING

**ATTENDANT**

* **Attributes:**
  + StaffID *(PK)*
  + Name
  + Phone

**B.4**

**BANK**

* **Attributes:**
  + Code *(PK)*
  + Name *(PK)*
  + Address

**BRANCH**

* **Attributes:**
  + Bank\_Code *(PK, FK)*
  + Bank\_Name *(PK, FK)*
  + Number *(PK)*
  + Address
* **Foreign Keys:**
  + *(Bank\_Code, Bank\_Name)* references BANK(Code, Name)

**LOAN**

* **Attributes:**
  + Number *(PK)*
  + Type
  + Amount
  + Bank\_Code *(FK)*
  + Bank\_Name *(FK)*
  + Branch\_Number *(FK)*
* **Foreign Keys:**
  + *(Bank\_Code, Bank\_Name, Branch\_Number)* references BRANCH(Bank\_Code, Bank\_Name, Number)

**ACCOUNT**

* **Attributes:**
  + Number *(PK)*
  + Type
  + Balance
  + Bank\_Code *(FK)*
  + Bank\_Name *(FK)*
  + Branch\_Number *(FK)*
* **Foreign Keys:**
  + *(Bank\_Code, Bank\_Name, Branch\_Number)* references BRANCH(Bank\_Code, Bank\_Name, Number)

**CUSTOMER**

* **Attributes:**
  + ID *(PK)*
  + Name
  + Address
  + Phone

**CUSTOMER\_LOAN**

* **Attributes:**
  + Customer\_ID *(PK, FK)*
  + Loan\_Number *(PK, FK)*
* **Foreign Keys:**
  + Customer\_ID references CUSTOMER(ID)
  + Loan\_Number references LOAN(Number)

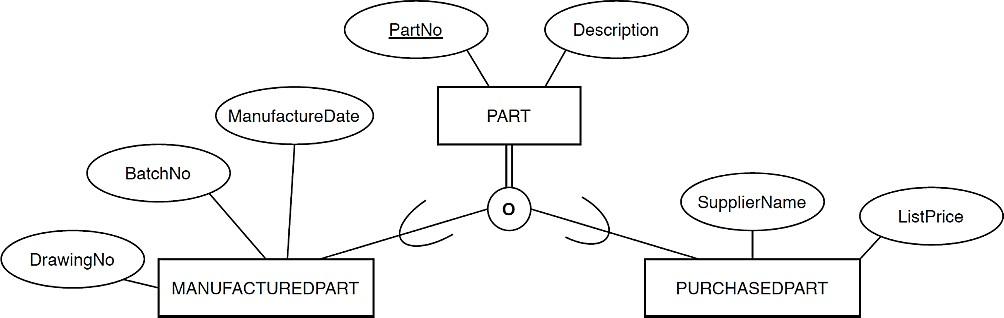
**CUSTOMER\_ACCOUNT**

* **Attributes:**
  + Customer\_ID *(PK, FK)*
  + Account\_Number *(PK, FK)*
* **Foreign Keys:**
  + Customer\_ID references CUSTOMER(ID)
  + Account\_Number references ACCOUNT(Number)

Section C: Extended Entity Relationship Diagram Mapping

Create relational mappings for the following EER Diagrams. Note: All foreign keys between tables must be stated. When mapping subclasses, please remember that there may be several correct ways. Using your intuition, try to select the most appropriate mapping method. Consult with your tutor if your answer differs from the sample solution.

## C.1



**PART**

* **Attributes:**
  + PartNo (PK)
  + Description

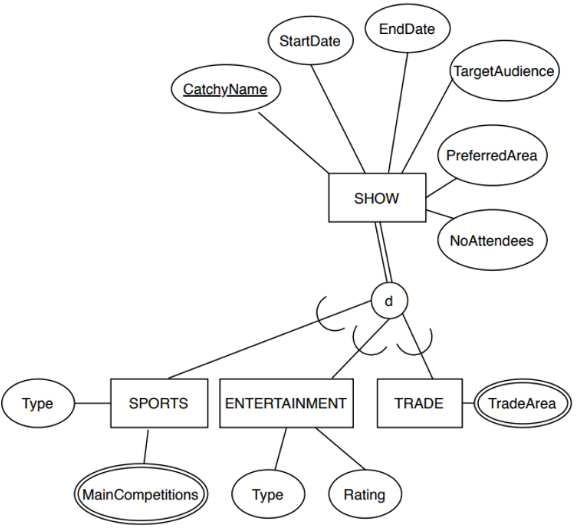
**MANUFACTURED\_PART**

* **Attributes:**
  + PartNo (PK, FK)
  + ManufactureDate
  + BatchNo
  + DrawingNo
* **Foreign Key:**
  + PartNo references PART(PartNo)

**PURCHASED\_PART**

* **Attributes:**
  + PartNo (PK, FK)
  + SupplierName
  + ListPrice
* **Foreign Key:**
  + PartNo references PART(PartNo)

**C.2**



**SHOW**

* **Attributes:**
  + CatchyName (PK)
  + StartDate
  + EndDate
  + TargetAudience
  + PreferredArea
  + NoAttendees

**SPORTS**

* **Attributes:**
  + CatchyName (PK, FK)
  + Type
* **Foreign Key:**
  + CatchyName references SHOW(CatchyName)

**SPORTS\_MAIN\_COMPETITIONS**

* **Attributes:**
  + CatchyName (FK)
  + MainCompetition (PK)
* **Foreign Key:**
  + CatchyName references SPORTS(CatchyName)

**ENTERTAINMENT**

* **Attributes:**
  + CatchyName (PK, FK)
  + Type
  + Rating
* **Foreign Key:**
  + CatchyName references SHOW(CatchyName)

**TRADE**

* **Attributes:**
  + CatchyName (PK, FK)
* **Foreign Key:**
  + CatchyName references SHOW(CatchyName)

**TRADE\_TRADEAREA**

* **Attributes:**
  + CatchyName (FK)
  + TradeArea (PK)
* **Foreign Key:**
  + CatchyName references TRADE(CatchyName)