BUAN 6320 Database Foundations for Business Analytics

Spring 2019

Instructor: Dr. James Scott

Assignment #2 – Beginning MYSQL

General Instructions

- Students may study together for the assignment and review each other's completed work
- Students must each complete the assignment by their own hand
- Please use the provided word document template
- Please save the completed word document into PDF format before uploading
- Please submit the PDF file electronically through eLearning before the due date and time
- Do not worry about variations among database vendors – you may write SQL to any vendor's dialect
- Do not include output – only the SQL
- **Use table aliases for all tables in all queries (unless otherwise specified)**
- Column aliases are required for all derived columns including aggregate columns (unless otherwise specified)
- Do not use column aliases unless required as stated previously
- If a problem does not ask for a specific sort order, use your best judgement to add a sort order

Chapter 3 Problems – The Relational Database Model

Do Problems 1-9 on page 108 of our textbook.

1. For each table, identify the primary key and the foreign key(s). If a table does not have a foreign key, write None.

EMPLOYEE	
Primary Key	EMP_CODE
Foreign Key	STORE_CODE
STORE	
Primary Key	STORE_CODE
Foreign Key	REGION_CODE, EMP_CODE
REGION	
Primary Key	REGION_CODE
Foreign Key	NONE

2. Do the tables exhibit entity integrity? Answer yes or no, and then explain your answer

Yes the tables exhibit entity integrity. All the three tables EMPLOYEE, STORE and REGION has EMP_CODE, STORE_CODE and REGION_CODE as primary keys respectively which has unique records and no null records exhibiting integrity.

3. Do the tables exhibit referential integrity? Answer yes or no, and then explain your answer. Write NA (Not Applicable) if the table does not have a foreign key.

Yes tables EMPLOYEE and STORE have foreign keys exhibiting referential integrity.
Each STORE_CODE in EMPLOYEE refers to existing STORE_CODE in STORE
Each REGION_CODE in STORE refers to existing REGION_CODE in REGION
Each EMP_CODE in STORE refers to existing EMP_CODE in EMPLOYEE

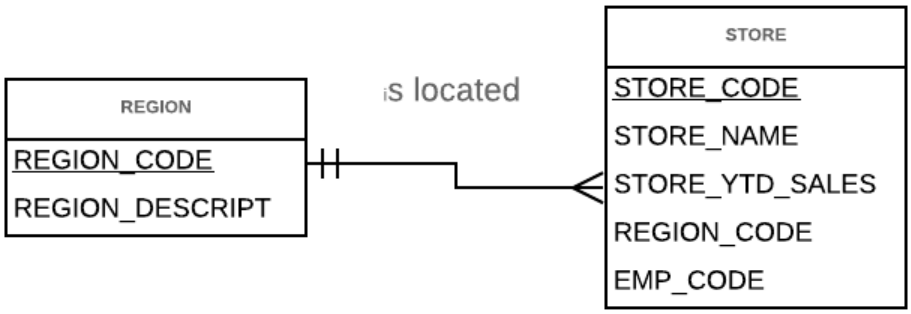
REGION has no foreign keys, so referential integrity is NA.

4. Describe the type(s) of relationship(s) between STORE and REGION.

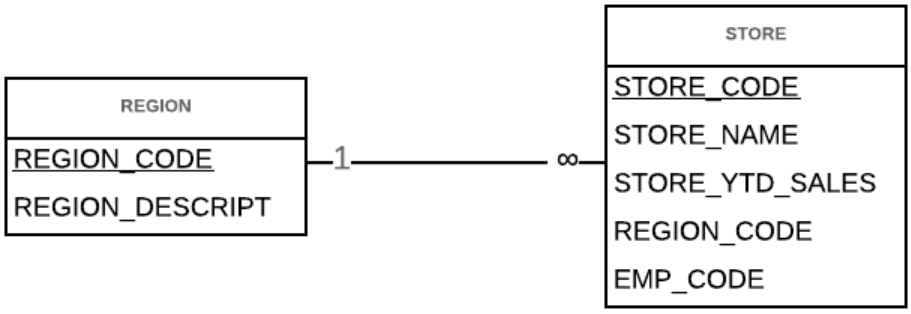
In STORE table, one REGION_CODE appears many times, with which we can conclude that one region has many stores. But each store is located only in one region. So 1:M relationship between REGION and STORE

5. Create the ERD to show the relationship between STORE and REGION.

Crow's Foot Diagram



6. Create the relational diagram to show the relationship between STORE and REGION

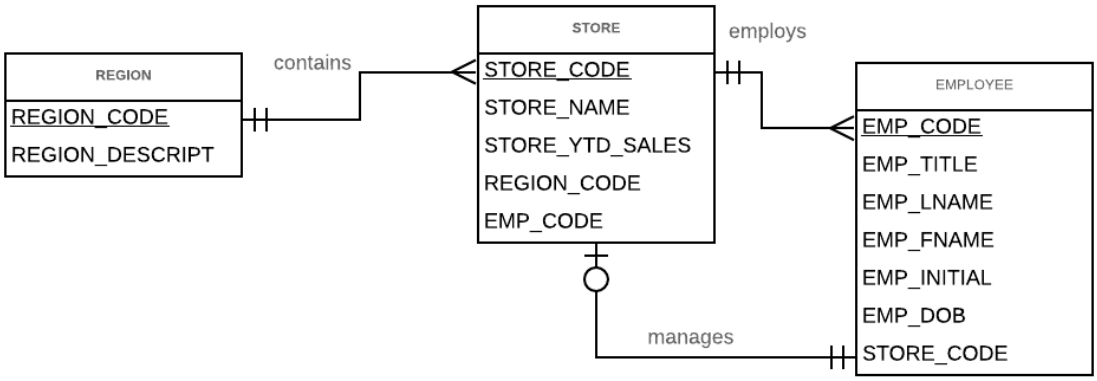


7. Describe the type(s) of relationship(s) between EMPLOYEE and STORE. (Hint: Each store employs many employees, one of whom manages the store.)
There may be two types of relationships exist between EMPLOYEE and STORE.
One relationship is one STORE employs many EMPLOYEEs. So, 1:M relationship between STORE and EMPLOYEE

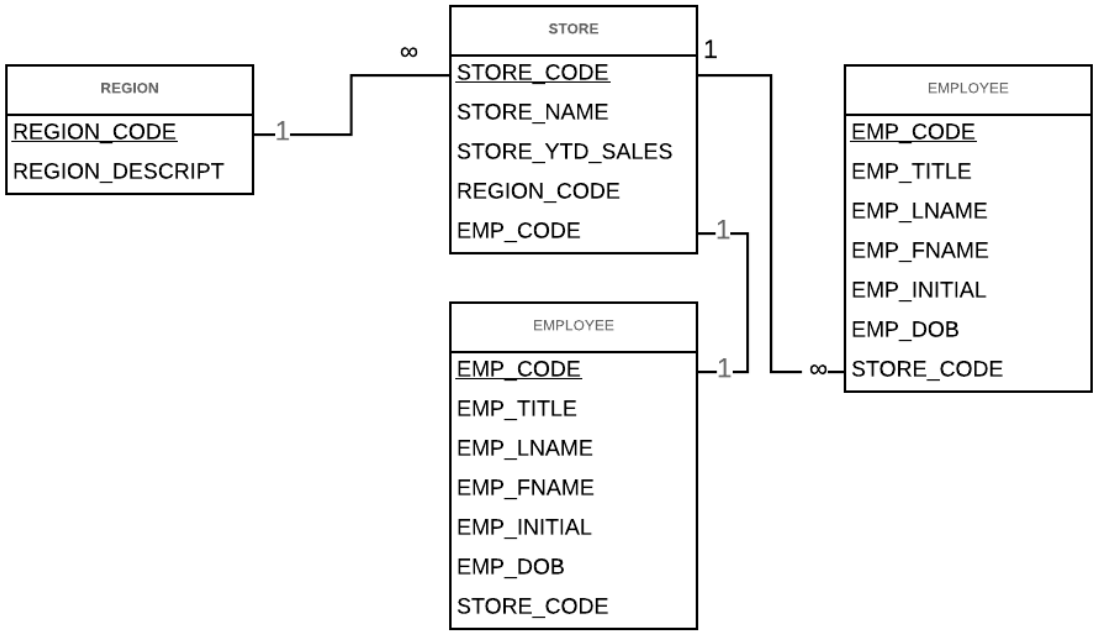
Other relationship is EMPLOYEE manages STORE and one employee manges one STORE. So, 1:1 relationship between STORE and EMPLOYEE

8. Create the ERD to show the relationships among EMPLOYEE, STORE, and REGION.

Crow's Foot Diagram



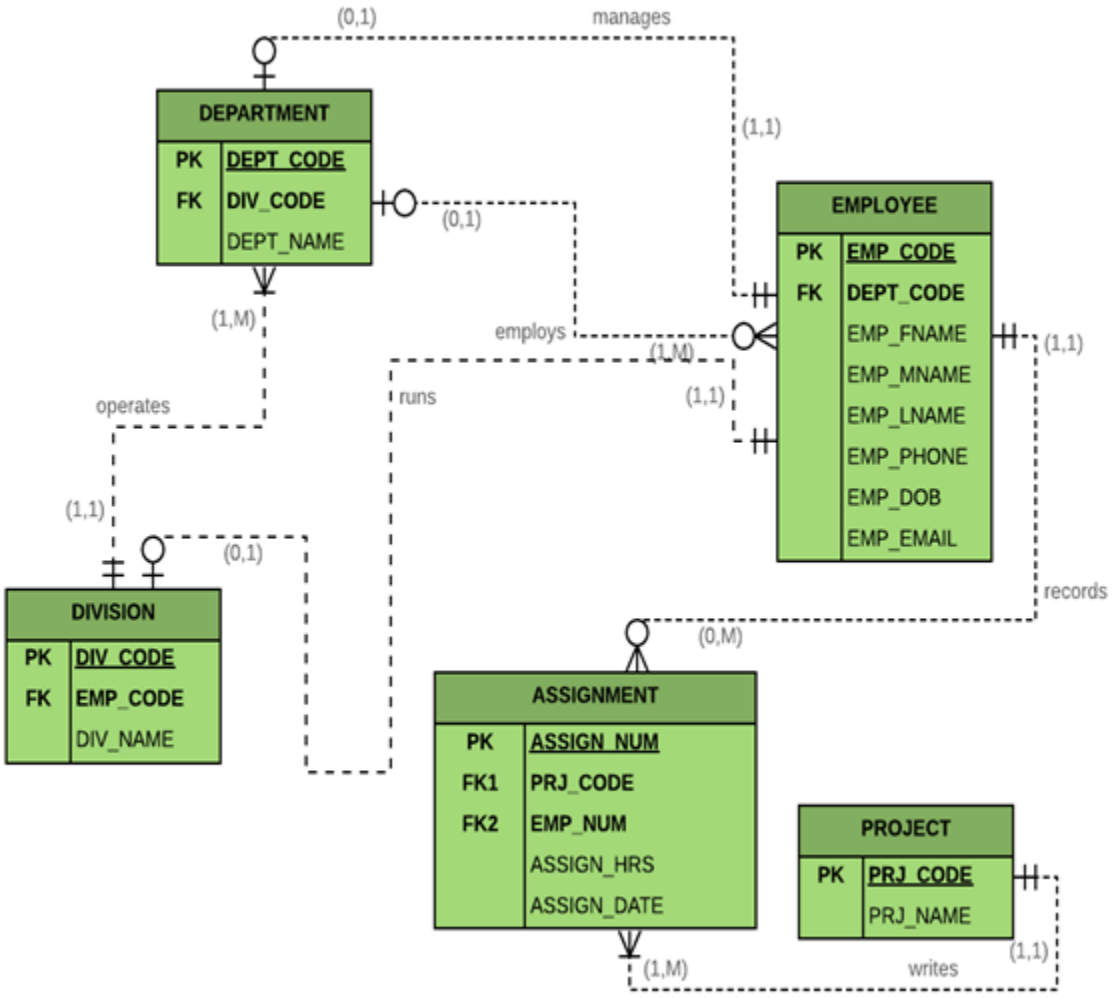
9. Create the relational diagram to show the relationships among EMPLOYEE, STORE, and REGION.



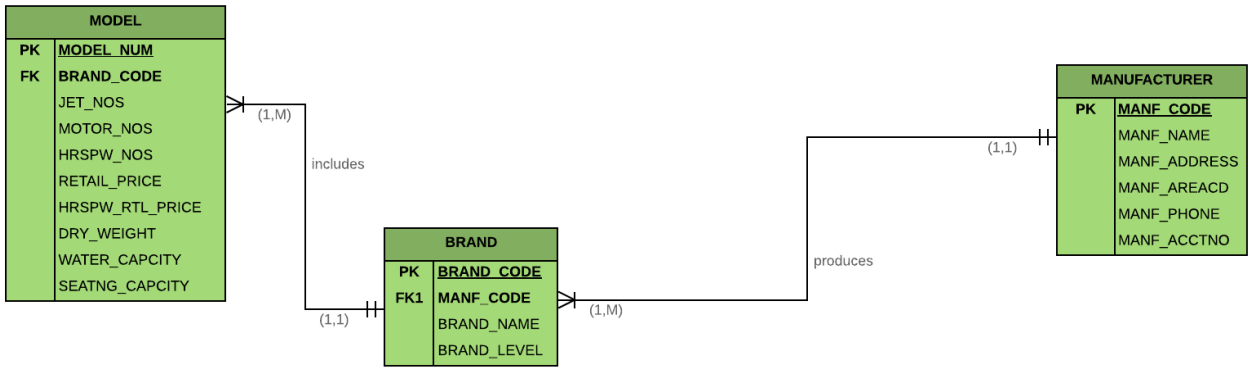
Chapter 4 Problems – Entity Relationship (ER) Modeling

Do Problems 1-3 on pages 152 of our textbook.

1. Use the following business rules to create a Crow's Foot ERD. Write all appropriate connectivities and cardinalities in the ERD



2. Create a complete ERD in Crow's Foot notation that can be implemented in the relational model using the following description of operations. Hot Water (HW) is a small start-up company that sells spas. HW does not carry any stock. A few spas are set up in a simple warehouse so customers can see some of the models available, but any products sold must be ordered at the time of the sale.



3. The Jonesburgh County Basketball Conference (JCBC) is an amateur basketball association. Each city in the county has one team as its representative. Each team has a maximum of 12 players and a minimum of 9 players. Each team also has up to three coaches (offensive, defensive, and physical training coaches). During the season, each team plays two games (home and visitor) against each of the other teams.

   A) Identify the connectivity of each relationship.
   One TEAM has many PLAYERS. So 1:M between TEAM and PLAYERS.
   One CITY has one TEAM. So 1:1 between CITY and TEAM.
   One team is coached by 1 to 3 coaches. So 1:M relationship between TEAM and COACH
   Many games are played in one location. So 1:M relationship between LOCATION and GAME
   One GAME has many STATISTICS. So 1:M relationship between GAME and GAMESTATISTICS
   One player appears in many game statistics. So 1:M relationship between PLAYER and GAMESTATISTICS
   One Team appears in many game lines. So 1:M relationship between TEAM and GAMELINE
   One game appears in many gamelines. So 1:M relationship between GAME and GAMELINE
   In a single city, games can be conducted in many locations. So 1:M relationship between GAME and LOCATION

   B) Identify the type of dependency that exists between CITY and TEAM
   One CITY has only one TEAM. So 1:1 relationship between CITY and TEAM. So the cardinality of TEAM is (1,1) and of CITY is (1,1)

   C) Identify the cardinality between teams and players and between teams and city

   One team has many players (here 9 to 12). So 1:M between Team and Players. So cardinality of Team is (1,1) and of Player (9,12).

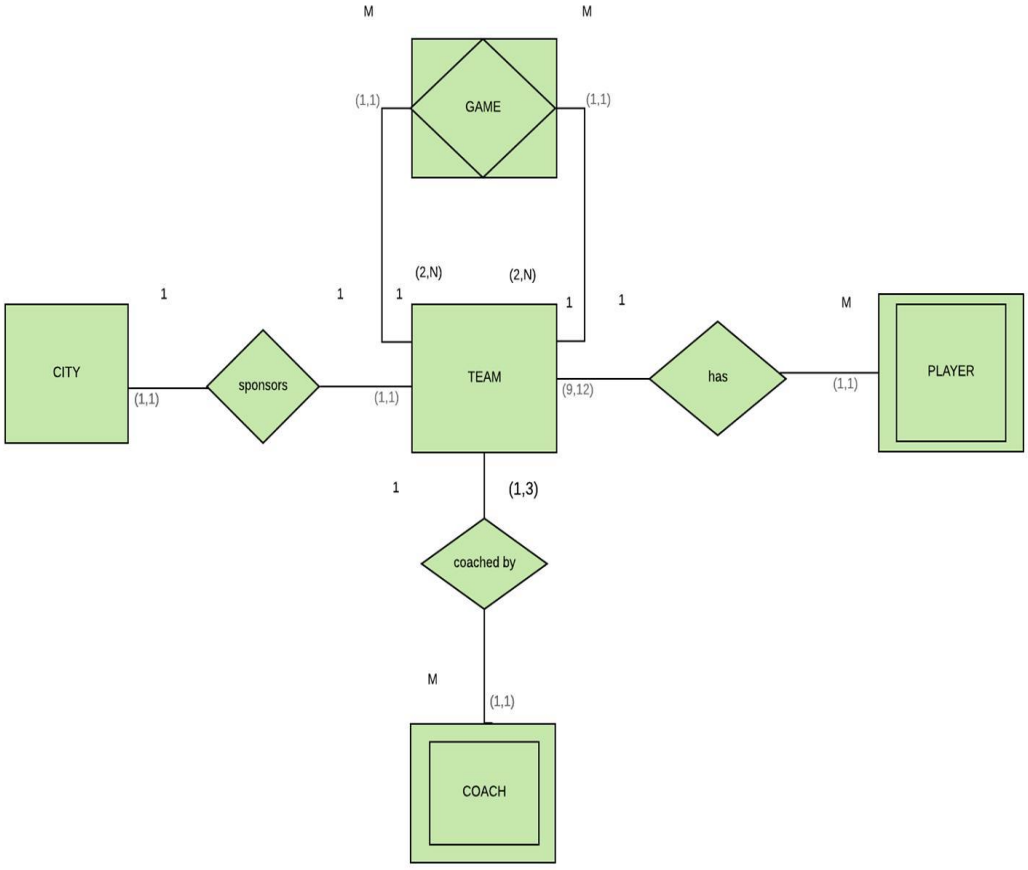
   One City has only one Team. So 1:1 relationship. So the cardinality of TEAM is (1,1) and of CITY is (1,1)

D) Identify the dependency between COACH and TEAM and between TEAM and PLAYER
One team has a minimum of one and maximum of three coaches. So the relationship between COACH and TEAM is many to one M:1.

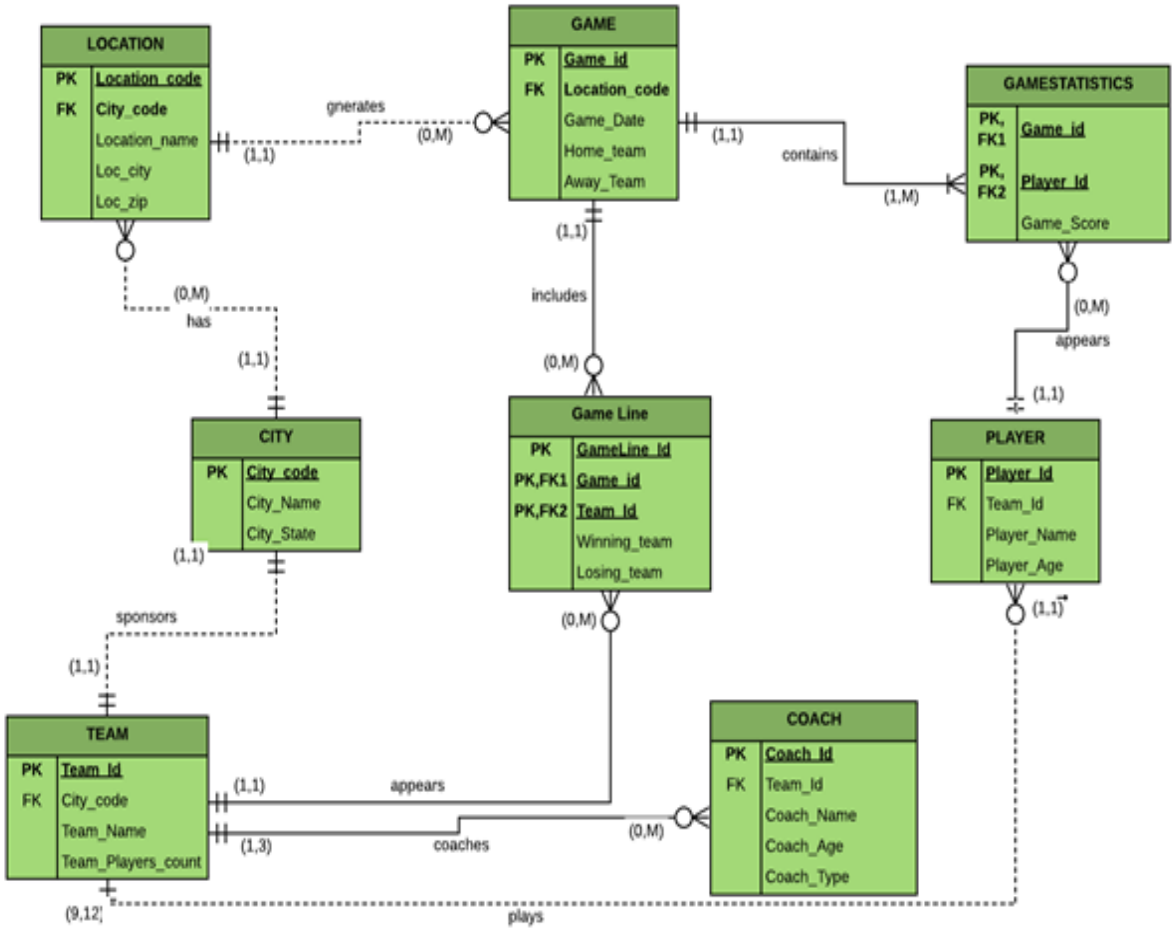
One team has many players (here 9 to 12). So 1:M between TEAM and PLAYERS

E) Draw the Chen and Crow's Foot ERDs to represent the JCBC database

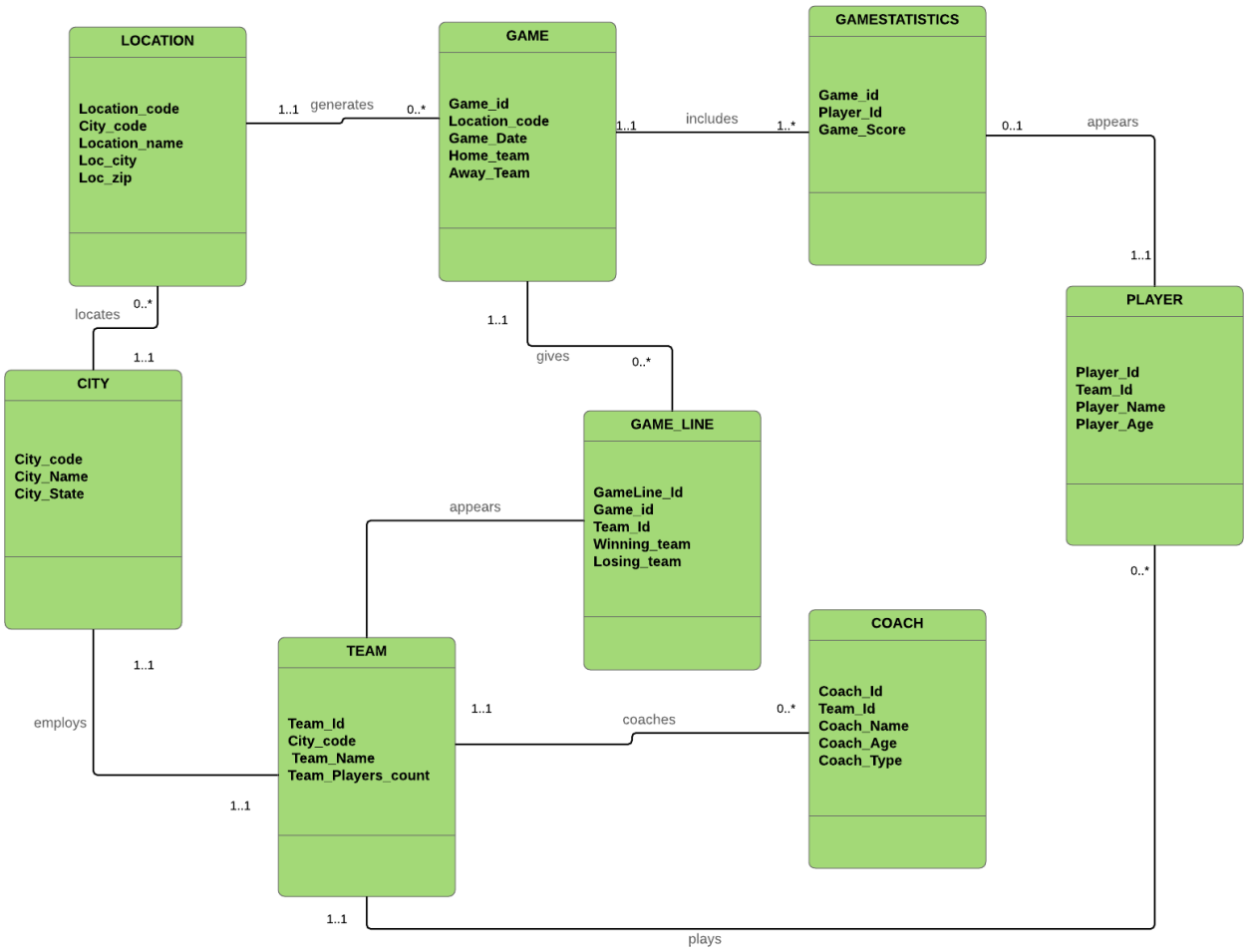
Chen's ERD



Crow's Foot ERD



F) Draw the UML class diagram to depict the JCBC database.



Using the following the previously provided UniversityDDL-Bad script for Oracle create a working MYSQL compatible .sql file. Then copy and paste the working MYSQL script to DBeaver to answer the following eight (9-16) practical SQL questions that follow. You will need to convert the working Oracle script to MYSQL script format.

Problem #9 – Retrieving a subset of rows with testing for an exact string and inexact string

Retrieve the offer number, course number, location, year, and faculty number from all course offerings in location BLM302

```
Select O.OfferNo, O.CourseNo, O.OffLocation, O.OffYear, O.FacNo from Offering O where
O.OffLocation = 'BLM302' order by 1,2,3,4,5;
```

Retrieve the offer number, course number, location, year, and faculty number from all course offerings in location BLM 3rd floor

```
Select O.OfferNo, O.CourseNo, O.OffLocation, O.OffYear, O.FacNo from Offering O where
O.OffLocation like 'BLM3%' order by 1,2,3,4,5;
```

Problem #10 – Using a derived column in both the column list and the WHERE clause

Retrieve the student last name, student first name, and GPA plus 10% for all students with GPA plus 10% greater than 3

```
select S.StdLastName, S.StdFirstName, S.StdGPA+0.1 * S.StdGPA GPA from Student S where
S.StdGPA+0.1 * S.StdGPA > 3 order by 1,2,3;
```

Problem #11 – Retrieving the number of rows from all of our tables

For each of our tables, retrieve the number of rows
Tables are Student, Faculty, Offering, Course, and Enrollment
(omit sorting, table aliases, and column aliases)

```
select count(*) from Student;
select count(*) from Faculty;
select count(*) from Offering;
select count(*) from Course;
select count(*) from Enrollment;
```

Problem #12 – Examining the effect of NULL values on aggregate functions

Retrieve the number of rows in the Faculty table using
COUNT(*)

```
select count(*) from Faculty;
```

COUNT(f.FacSupervisor)

```
select COUNT(f.FacSupervisor) from Faculty f;
```

How many rows does each one return? Why?

COUNTt(*) returned 6, but COUNT(f.FacSupervisor) returned only 4 because FacSupervisor has two nulls in the Faculty table

Problem #13 – Aggregates on all rows of a table

Retrieve the average GPA for all students

```
select avg(S.StdGPA) as average  from Student S;
```

Problem #14 – Aggregates on a subset of rows of a table (using a WHERE clause)

Retrieve the minimum GPA, maximum GPA, average GPA, and average GPA plus 10% for freshman students

```
select
min(S.StdGPA) minimum,
max(S.StdGPA) maximum,
avg(S.StdGPA) average,
(avg(S.StdGPA) + 0.1* avg(S.StdGPA)) additional from Student S
where S.StdClass = 'FR';
```

Problem #15 – Aggregates on a group of rows (using a GROUP BY clause)

Retrieve the class name, minimum GPA, maximum GPA, average GPA, and average GPA plus 10% for each class

```
select s.StdClass,
min(S.StdGPA) minimum,
max(S.StdGPA) maximum,
avg(S.StdGPA) average,
(avg(S.StdGPA) + 0.1* avg(S.StdGPA))  additional from Student S
group BY S.StdClass;
```

Problem #16 – Aggregates on a subset of rows that are grouped (using a WHERE clause and a GROUP BY clause)

Retrieve the class name, minimum GPA, maximum GPA, average GPA, and average GPA plus 10% for each class but only for non-IS majors

```
select s.StdClass,
min(S.StdGPA) minimum,
max(S.StdGPA) maximum,
avg(S.StdGPA) average,
(avg(S.StdGPA) + 0.1* avg(S.StdGPA)) additional from Student S where S.StdMajor != 'IS'
group BY S.StdClass;
```