ACCT 6321 Database Applications for Business Analytics in Accounting

Fall 2022

Instructor: Dr. James Scott

Assignment #2 – 100 Points

General Instructions

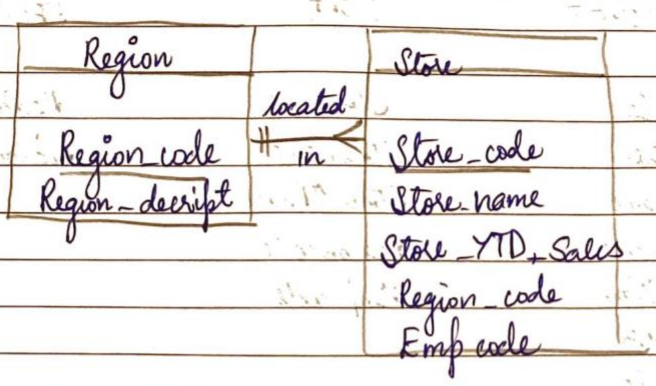
- Students may study together for the assignment and review each other's completed work
- Students must each complete the assignment by their own hand
- Please use the provided word document template
- Please save the completed word document into PDF format before uploading
- Please submit the PDF file 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

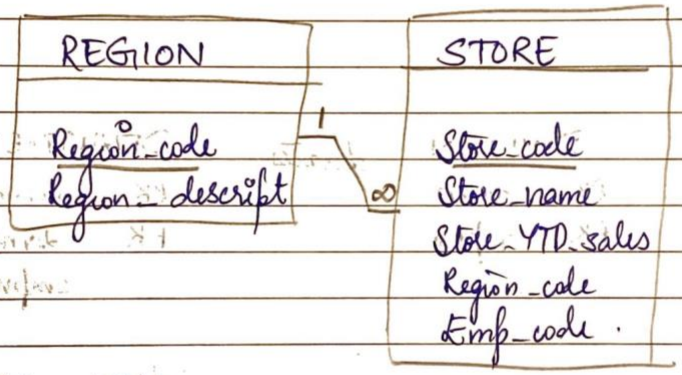
1. The tables have the following parameters:
    a. EMPLOYEE:
        i. PRIMARY KEY: EMP_CODE
        ii. FORGIEN KEY: STORE_CODE
    b. STORE:
        i. PRIMARY KEY: STORE_CODE
        ii. FORGIEN KEY: REGION_CODE
    c. REGION:
        i. PRIMARY KEY: REGION_CODE
        ii. FORGIEN KEY : None
2. All the tables have table integrity as they all have non null and unique primary key.
3. The following tables:

    a. EMPLOYEE: Yes, it exhibits referential integrity as it has a forgien key ‘STORE_CODE’.
    b. STORE: Yes, it exhibits referential integrity as it has a forgien key ‘REGION_CODE & EMP_CODE’.
    c. REGION: NA
4. The relationship between STORE and REGION is 1:M as there are multiple stores in a specific region but only one region for a specific store.
5. Please find diagram below:
6. Please find diagram below:
7. The relationship between EMPLOYEE and STORE is 1:M as there are multiple emplyees at a given store, but an employee can only work at one store.
8. Please find diagram below:

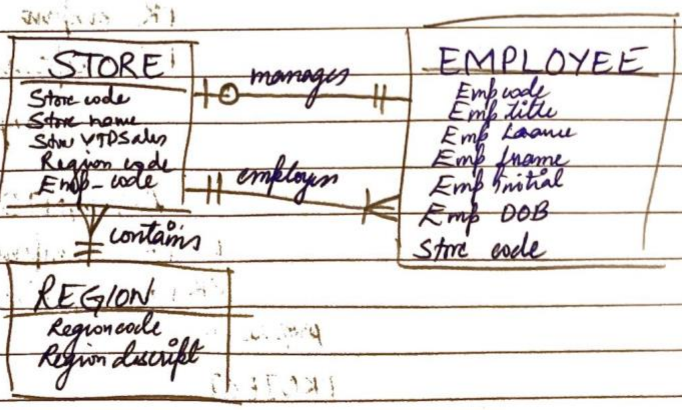
5.

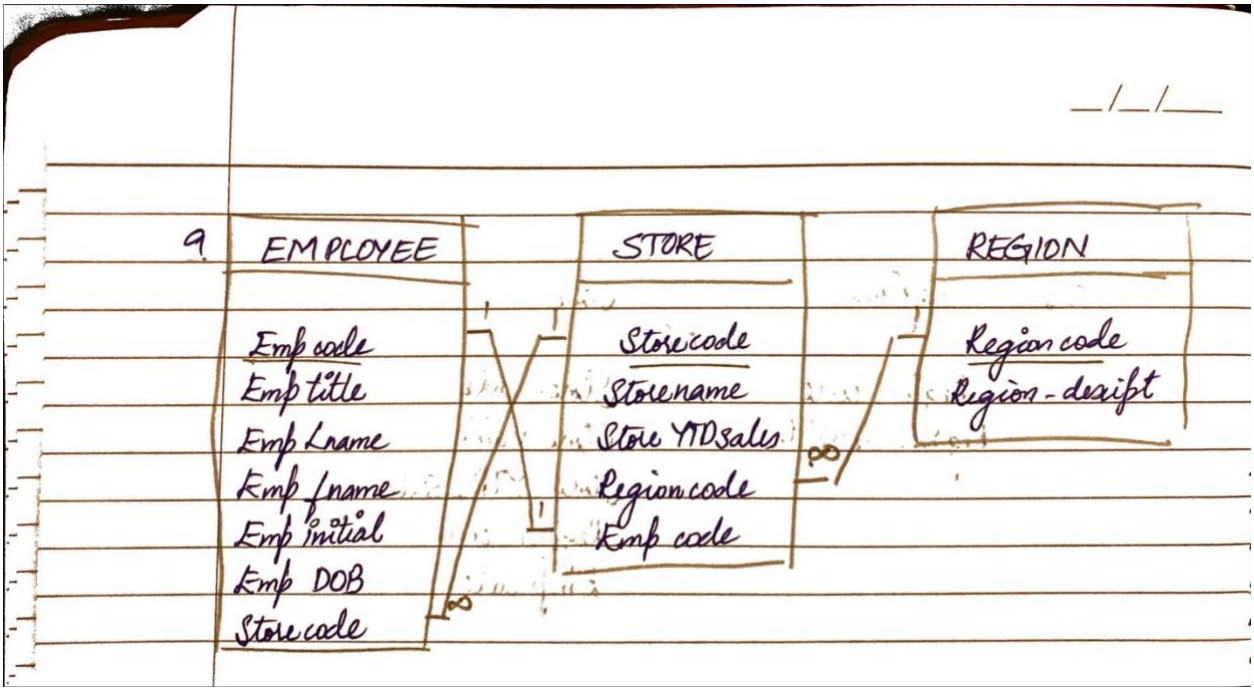

Region
Region_code
Region_descript
located in
Store
Store_code
Store_name
Store_YTD_Sales
Region_code
Emp code

6.


REGION
Region_code
Region_descript
1
∞
STORE
Store_code
Store_name
Store_YTD_sales
Region_code
Emp_code

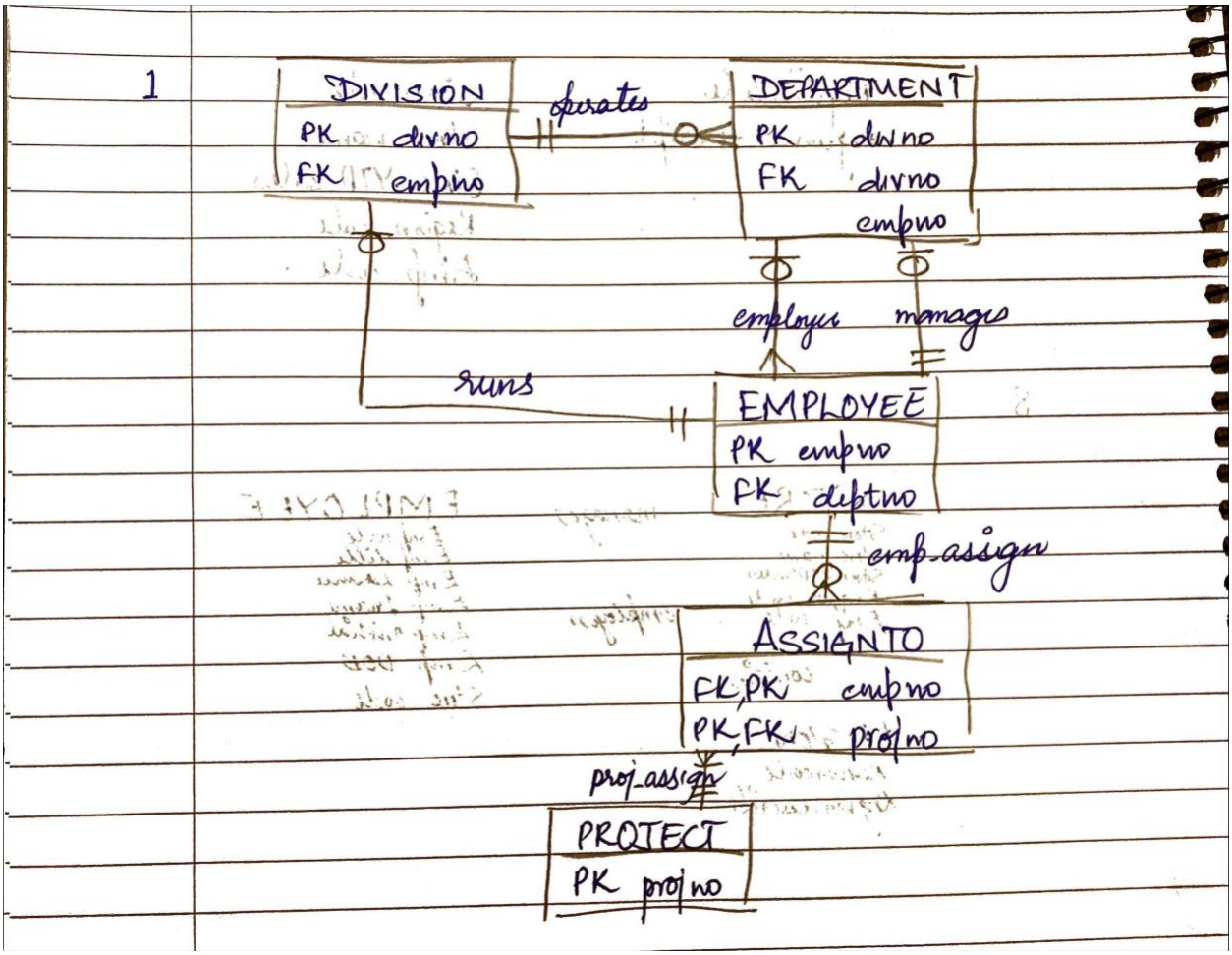
8.

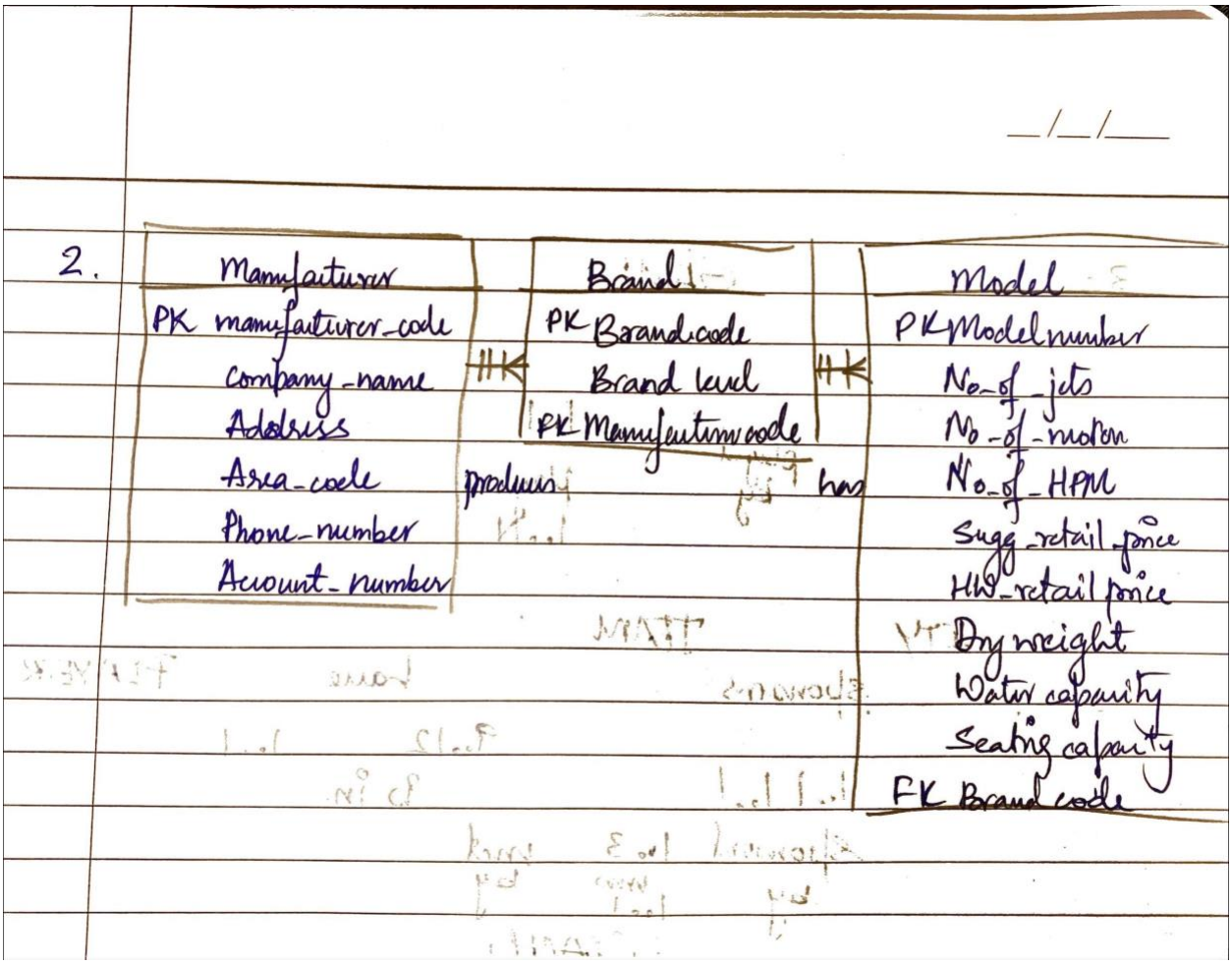

STORE
Store code
Store name
Store YTDSales
Region code
Emp_code
manages
employs
contains
EMPLOYEE
Emp code
Emp title
Emp Lname
Emp fname
Emp Initial
Emp DOB
Store code
REGION
Region code
Region descript


9.
EMPLOYEE
Emp code
Emp title
Emp Lname
Emp fname
Emp initial
Emp DOB
Store code
STORE
Store code
Store name
Store YTD sales
Region code
Emp code
REGION
Region code
Region - descript

Chapter 4 Problems – Entity Relationship (ER) Modeling

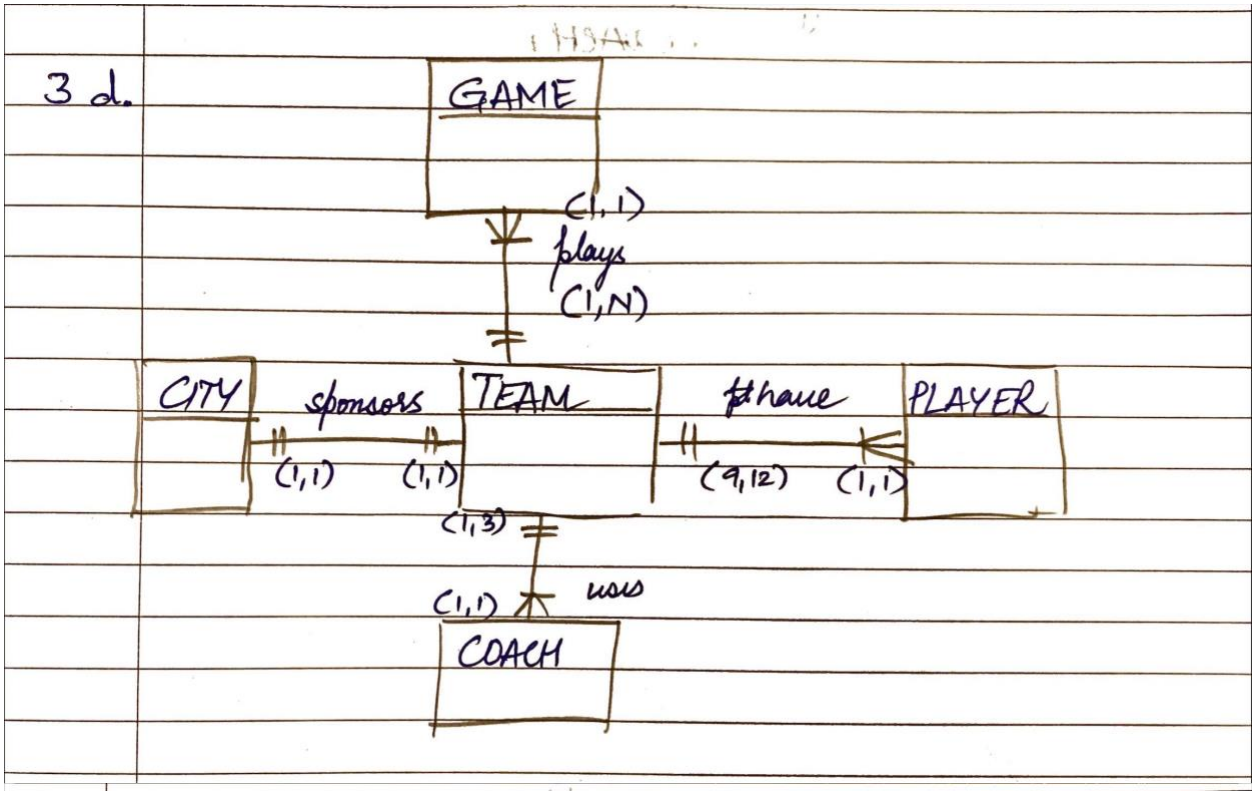
1.

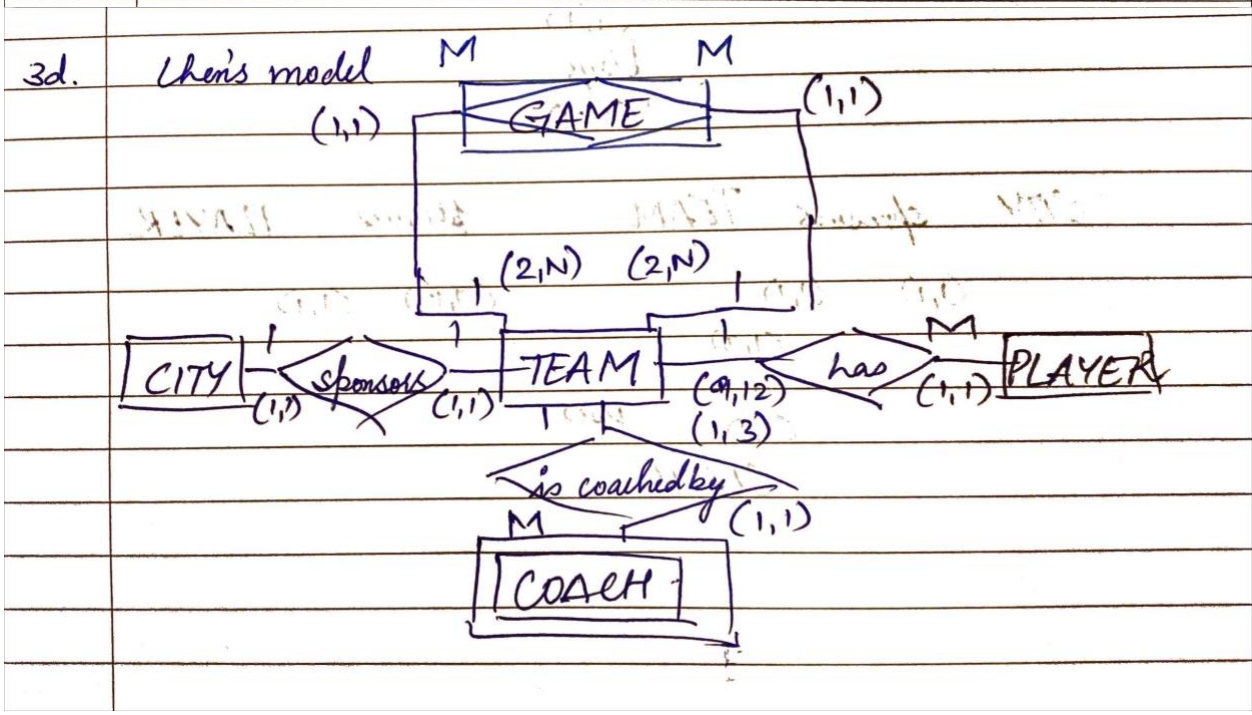


2. 

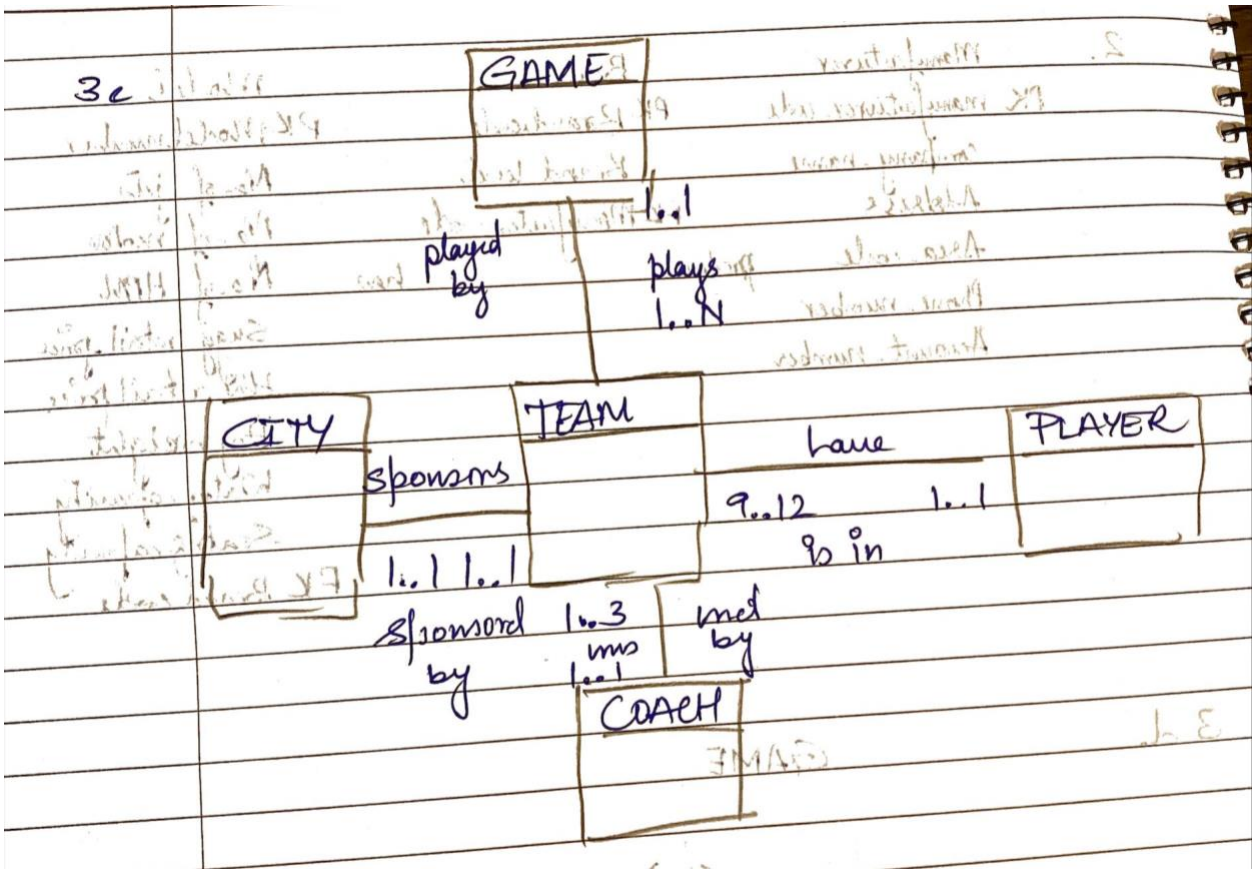
3. Answers are as follows:
    a. These are the following relationships:
        i. CITY and TEAM have a 1:1 relationship as each city can only one team.
        ii. COACH and TEAM have a 1:M relationship as each team can have 3 coacches.
        iii. TEAM and PLAYER have a 1:M relationship as each team has 9-12 players.
    b. TEAM has a existence depedent on CITY
    c. The cardinality are as follows:
        i. TEAM and PLAYER : each team can have minimum of nine players and maximum of 12 players having (9, 12) cardinality
        ii. TEAM and PLAYER: Each player can be only in one team having cardinality of (1,1).

d.


3 d.
GAME
(1,1)
plays
(1,N)
CITY
sponsors
TEAM
#have
PLAYER
(1,1)
(1,1)
(9,12)
(1,1)
(1,3)
(1,1)
uses
COACH


3d.
Chen's model
M
M
(1,1)
GAME
(1,1)
(2,N)
(2,N)
CITY
sponsors
TEAM
has
PLAYER
(1,1)
(1,1)
(9,12)
(1,1)
(1,3)
is coached by
(1,1)
M
COACH

e.


3c
GAME
1..1
played by
plays
1..N
CITY
sponsors
TEAM
have
PLAYER
9..12
1..1
is in
1..1 1..1
sponsored by
1..3
1..1
coached by
COACH

Using the following University DDL code for MySQL and using MySQL with DBeaver, please create the database, tables, and insert the accompanying data to answer the following eight (8-15) practical SQL questions that follow. You may create the database using the SQL code or using DBeaver.

```
--   Script: University_MySQL DDL
--   MySQL/Maria Good

-- DROP TABLE IF EXISTS Faculty
CREATE TABLE Faculty (
  FacNo char(11) NOT NULL,
  FacFirstName varchar(30) NOT NULL,
  FacLastName varchar(30) NOT NULL,
  FacCity varchar(30) NOT NULL,
  FacState char(2) NOT NULL,
  FacDept char(6) DEFAULT NULL,
  FacRank char(4) DEFAULT NULL,
  FacSalary decimal(10,2) DEFAULT NULL,
  FacSupervisor char(11) DEFAULT NULL,
  FacHireDate datetime DEFAULT NULL,
  FacZipCode char(10) NOT NULL,
  PRIMARY KEY (FacNo),
  KEY FacSupervisor_idx (FacSupervisor)
) ENGINE=InnoDB DEFAULT CHARSET=utf8;

-- DROP TABLE IF EXISTS Course;
CREATE TABLE Course (
CourseNo      CHAR(6)       NOT NULL,
CrsDesc       VARCHAR(50)   NOT NULL,
CrsUnits      INTEGER       NULL,
CONSTRAINT CoursePK PRIMARY KEY (CourseNo)
) ENGINE=InnoDB DEFAULT CHARSET=utf8;

-- DROP TABLE IF EXISTS Offering;
CREATE TABLE Offering (
OfferNo       CHAR(6)       NOT NULL,
CourseNo      CHAR(6)       NOT NULL,
OffTerm       CHAR(6)       NOT NULL,
OffYear       INT           NOT null,
OffLocation   VARCHAR(30)   NULL,
OffTime       VARCHAR(10)   null,
FacNo         CHAR(11)      NULL,
OffDays       CHAR(4)       NULL,
CONSTRAINT OfferingPK PRIMARY KEY (OfferNo),
CONSTRAINT CourseFk FOREIGN KEY (CourseNo) REFERENCES Course(CourseNo),
CONSTRAINT FacultyFK FOREIGN KEY (FacNo) REFERENCES faculty(FacNo)
) ENGINE=InnoDB DEFAULT CHARSET=utf8;

-- DROP TABLE IF EXISTS Student;
CREATE TABLE Student (
```

```
StdNo          CHAR(11)      NOT NULL,
StdFirstName   VARCHAR(30)   NOT NULL,
StdLastName    VARCHAR(30)   NOT NULL,
StdCity        VARCHAR(30)   NOT NULL,
StdState       CHAR(2)       NOT NULL,
StdZip         CHAR(10)      NOT NULL,
StdMajor       CHAR(6)       NULL,
StdClass       CHAR(2)       NULL,
StdGPA         DECIMAL(3,2)  NULL,
CONSTRAINT StudentPk PRIMARY KEY (StdNo)
) ENGINE=InnoDB DEFAULT CHARSET=utf8;

-- DROP TABLE IF EXISTS Enrollment;
CREATE TABLE Enrollment(
OfferNo        CHAR(6)       NOT NULL,
StdNo          CHAR(11)      NOT NULL,
EnrGrade       DECIMAL(3,2)  NULL,
CONSTRAINT EnrollmentPK PRIMARY KEY (OfferNo, StdNo),
CONSTRAINT OfferingFK FOREIGN KEY (OfferNo) REFERENCES Offering(OfferNo),
CONSTRAINT StudentFK FOREIGN KEY (StdNo) REFERENCES Student(StdNo)
) ENGINE=InnoDB DEFAULT CHARSET=utf8;

INSERT INTO Faculty VALUES
('543210987','VICTORIA','EMMANUEL','BOTHELL','WA','MS','PROF',120000.00,NULL,STR_TO_D
ATE('4/15/1998','%m/%d/%Y'),'98011-2242');
INSERT INTO Faculty VALUES
('654321098','LEONARD','FIBON','SEATTLE','WA','MS','ASSC',70000.00,'543210987',STR_TO
_DATE('5/1/1996','%m/%d/%Y'),'98121-0094');
INSERT INTO Faculty VALUES
('098765432','LEONARD','VINCE','SEATTLE','WA','MS','ASST',35000.00,'654321098',STR_TO
_DATE('4/10/1997','%m/%d/%Y'),'98111-9921');
INSERT INTO Faculty VALUES
('765432109','NICKI','MACON','BELLEVUE','WA','FIN','PROF',65000.00,NULL,STR_TO_DATE('
4/11/1999','%m/%d/%Y'),'98015-9945');
INSERT INTO Faculty VALUES
('876543210','CRISTOPHER','COLAN','SEATTLE','WA','MS','ASST',40000.00,'654321098',STR
_TO_DATE('3/1/2001','%m/%d/%Y'),'98114-1332');
INSERT INTO Faculty VALUES
('987654321','JULIA','MILLS','SEATTLE','WA','FIN','ASSC',75000.00,'765432109',STR_TO_
DATE('3/15/2002','%m/%d/%Y'),'98114-9954');
INSERT INTO Course VALUES ('FIN300','FUNDAMENTALS OF FINANCE',4);
INSERT INTO Course VALUES ('FIN450','PRINCIPLES OF INVESTMENTS',4);
INSERT INTO Course VALUES ('FIN480','CORPORATE FINANCE',4);
INSERT INTO Course VALUES ('IS320','FUNDAMENTALS OF BUSINESS PROGRAMMING',4);
INSERT INTO Course VALUES ('IS460','SYSTEMS ANALYSIS',4);
INSERT INTO Course VALUES ('IS470','BUSINESS DATA COMMUNICATIONS',4);
INSERT INTO Course VALUES ('IS480','FUNDAMENTALS OF DATABASE MANAGEMENT',4);
INSERT INTO Offering VALUES
(1111,'IS320','SUMMER',2010,'BLM302','10:30:00',NULL,'MW');
INSERT INTO Offering VALUES
(1234,'IS320','FALL',2009,'BLM302','10:30:00','098765432','MW');
INSERT INTO Offering VALUES
(2222,'IS460','SUMMER',2009,'BLM412','13:30:00',NULL,'TTH');
INSERT INTO Offering VALUES
(3333,'IS320','SPRING',2010,'BLM214','8:30:00','098765432','MW');
```

```
INSERT INTO Offering VALUES
(4321,'IS320','FALL',2009,'BLM214','15:30:00','098765432','TTH');
INSERT INTO Offering VALUES
(4444,'IS320','WINTER',2010,'BLM302','15:30:00','543210987','TTH');
INSERT INTO Offering VALUES
(5555,'FIN300','WINTER',2010,'BLM207','8:30:00','765432109','MW');
INSERT INTO Offering VALUES
(5678,'IS480','WINTER',2010,'BLM302','10:30:00','987654321','MW');
INSERT INTO Offering VALUES
(5679,'IS480','SPRING',2010,'BLM412','15:30:00','876543210','TTH');
INSERT INTO Offering VALUES
(6666,'FIN450','WINTER',2010,'BLM212','10:30:00','987654321','TTH');
INSERT INTO Offering VALUES
(7777,'FIN480','SPRING',2010,'BLM305','13:30:00','765432109','MW');
INSERT INTO Offering VALUES
(8888,'IS320','SUMMER',2010,'BLM405','13:30:00','654321098','MW');
INSERT INTO Offering VALUES
(9876,'IS460','SPRING',2010,'BLM307','13:30:00','654321098','TTH');
INSERT INTO Student VALUES ('123456789','HOMER','WELLS','SEATTLE','WA','98121-
1111','IS','FR',3.00);
INSERT INTO Student VALUES ('124567890','BOB','NORBERT','BOTHELL','WA','98011-
2121','FIN','JR',2.70);
INSERT INTO Student VALUES ('234567890','CANDY','KENDALL','TACOMA','WA','99042-
3321','ACCT','JR',3.50);
INSERT INTO Student VALUES ('345678901','WALLY','KENDALL','SEATTLE','WA','98123-
1141','IS','SR',2.80);
INSERT INTO Student VALUES ('456789012','JOE','ESTRADA','SEATTLE','WA','98121-
2333','FIN','SR',3.20);
INSERT INTO Student VALUES ('567890123','MARIAH','DODGE','SEATTLE','WA','98114-
0021','IS','JR',3.60);
INSERT INTO Student VALUES ('678901234','TESS','DODGE','REDMOND','WA','98116-
2344','ACCT','SO',3.30);
INSERT INTO Student VALUES ('789012345','ROBERTO','MORALES','SEATTLE','WA','98121-
2212','FIN','JR',2.50);
INSERT INTO Student VALUES ('876543210','CRISTOPHER','COLAN','SEATTLE','WA','98114-
1332','IS','SR',4.00);
INSERT INTO Student VALUES ('890123456','LUKE','BRAZZI','SEATTLE','WA','98116-
0021','IS','SR',2.20);
INSERT INTO Student VALUES ('901234567','WILLIAM','PILGRIM','BOTHELL','WA','98113-
1885','IS','SO',3.80);
INSERT INTO Enrollment VALUES (1234,'123456789',3.30);
INSERT INTO Enrollment VALUES (1234,'234567890',3.50);
INSERT INTO Enrollment VALUES (1234,'345678901',3.20);
INSERT INTO Enrollment VALUES (1234,'456789012',3.10);
INSERT INTO Enrollment VALUES (1234,'567890123',3.80);
INSERT INTO Enrollment VALUES (1234,'678901234',3.40);
INSERT INTO Enrollment VALUES (4321,'123456789',3.50);
INSERT INTO Enrollment VALUES (4321,'124567890',3.20);
INSERT INTO Enrollment VALUES (4321,'789012345',3.50);
INSERT INTO Enrollment VALUES (4321,'876543210',3.10);
INSERT INTO Enrollment VALUES (4321,'890123456',3.40);
INSERT INTO Enrollment VALUES (4321,'901234567',3.10);
INSERT INTO Enrollment VALUES (5555,'123456789',3.20);
INSERT INTO Enrollment VALUES (5555,'124567890',2.70);
INSERT INTO Enrollment VALUES (5678,'123456789',3.20);
```

```
INSERT INTO Enrollment VALUES (5678,'234567890',2.80);
INSERT INTO Enrollment VALUES (5678,'345678901',3.30);
INSERT INTO Enrollment VALUES (5678,'456789012',3.40);
INSERT INTO Enrollment VALUES (5678,'567890123',2.60);
INSERT INTO Enrollment VALUES (5679,'123456789',2.00);
INSERT INTO Enrollment VALUES (5679,'124567890',3.70);
INSERT INTO Enrollment VALUES (5679,'678901234',3.30);
INSERT INTO Enrollment VALUES (5679,'789012345',3.80);
INSERT INTO Enrollment VALUES (5679,'890123456',2.90);
INSERT INTO Enrollment VALUES (5679,'901234567',3.10);
INSERT INTO Enrollment VALUES (6666,'234567890',3.10);
INSERT INTO Enrollment VALUES (6666,'567890123',3.60);
INSERT INTO Enrollment VALUES (7777,'876543210',3.40);
INSERT INTO Enrollment VALUES (7777,'890123456',3.70);
INSERT INTO Enrollment VALUES (7777,'901234567',3.40);
INSERT INTO Enrollment VALUES (9876,'124567890',3.50);
INSERT INTO Enrollment VALUES (9876,'234567890',3.20);
INSERT INTO Enrollment VALUES (9876,'345678901',3.20);
INSERT INTO Enrollment VALUES (9876,'456789012',3.40);
INSERT INTO Enrollment VALUES (9876,'567890123',2.60);
INSERT INTO Enrollment VALUES (9876,'678901234',3.30);
INSERT INTO Enrollment VALUES (9876,'901234567',4.00);
```

Problem #8 – 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

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

```
select OfferNo ,CourseNo ,OffLocation ,OffYear , FacNo
from Offering o
where OffLocation = 'BLM302';


select OfferNo ,CourseNo ,OffLocation ,OffYear , FacNo
from Offering o
where OffLocation LIKE  'BLM3%';
```

Problem #9 – 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 StdLastName , StdFirstName , StdGPA *1.10 as updatedGPA
from Student s
where StdGPA *1.10 > 3;
```

Problem #10 – 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(1) from Student ;

select COUNT(1) from Faculty  ;

select COUNT(1) from Offering ;

select COUNT(1) from Course ;

select COUNT(1) from Enrollment ;
```

Problem #11 – Examining the effect of NULL values on aggregate functions

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

How many rows does each one return? Why?

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

- 6

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

- 4

There are two records in the column 'FacSupervisor' with NULL in the table 'FACULTY'. So there are two faculties with no Fac Supervisors.

Problem #12 – Aggregates on all rows of a table

Retrieve the average GPA for all students

```
select AVG(StdGPA)
from Student s ;
```

Problem #13 – 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(StdGPA),
MAX(StdGPA),
AVG(StdGPA),
AVG(StdGPA) * 1.1
```

```
from Student s
where StdClass = 'FR';
```

Problem #14 – 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 StdClass, min(StdGPA),
MAX(StdGPA),
AVG(StdGPA),
AVG(StdGPA) * 1.1 as updatedGPA
from Student s
group by StdClass ;
```

Problem #15 – 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 StdClass, min(StdGPA),
MAX(StdGPA),
AVG(StdGPA),
AVG(StdGPA) * 1.1 as updatedGPA
from Student s
where StdMajor <> 'IS'
group by StdClass ;
```