CS60 Problem Set 1 – Summer 2021

Total 37.5 Pts

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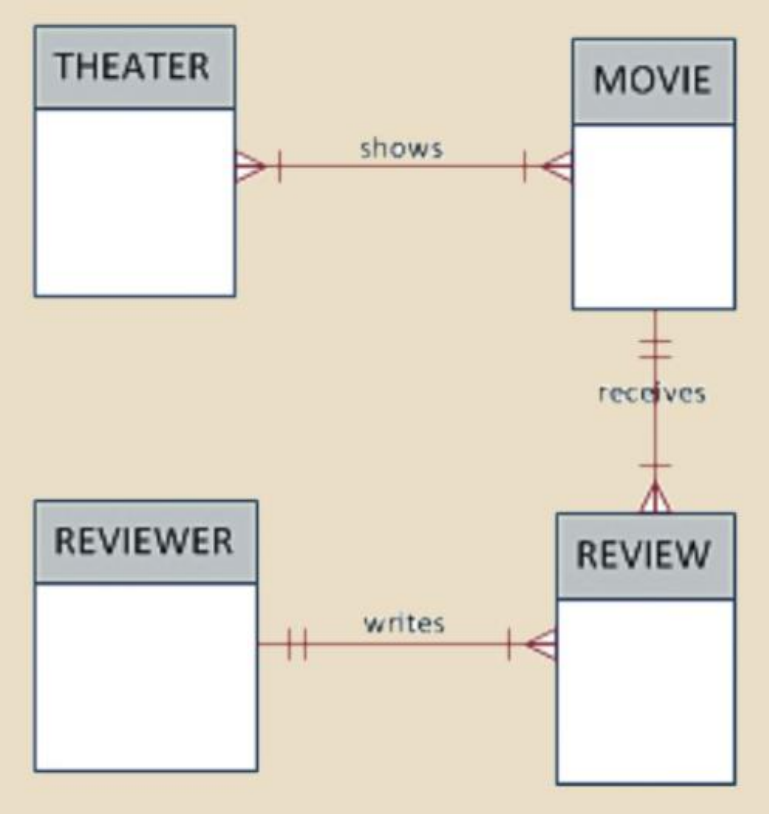
1. Write the **business rules** that are reflected in the ERD shown below. (Note that the ERD reflects some simplifying assumptions. For example, each reviewer can write 1 or many reviews. Also, remember that the ERD is always read from the "1" to the "M" side, regardless of the orientation of the ERD components.) (4 Pts)

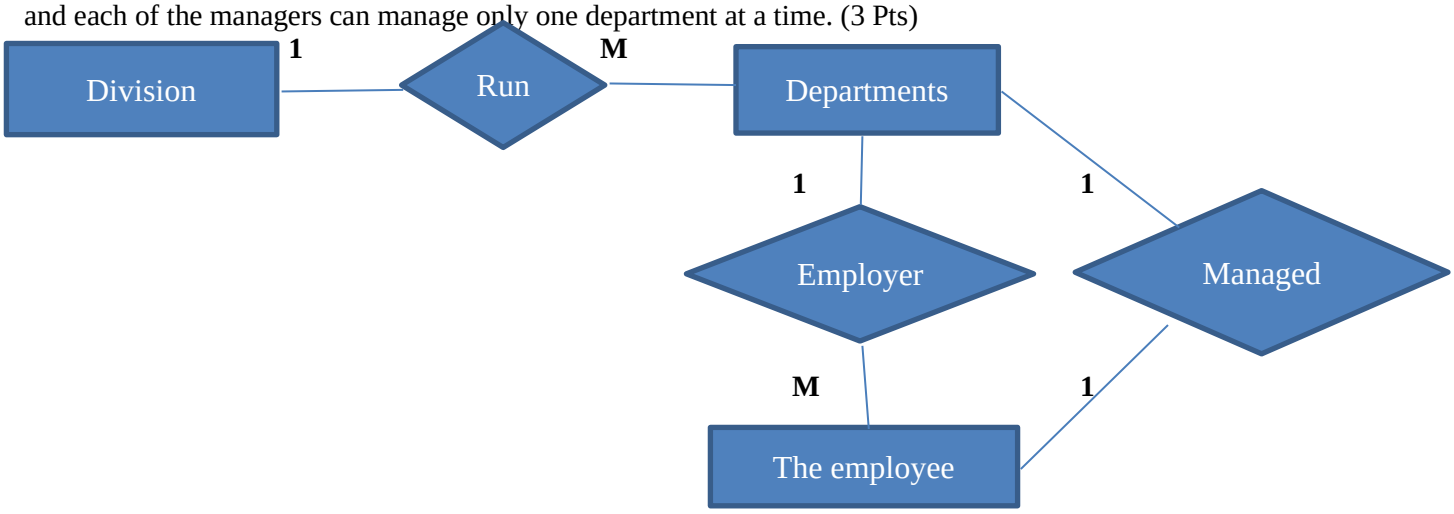


The relationship between the theater and the movie is that there could be a theater with multiple movies and the same thing for the movie, there could be a movie in multiple theaters. **M:N. (shows)**
Then for the review and reviewer means that a reviewer can give multiple reviews and a review is given by a reviewer. **1:M.**

2. Create an ERD for each of the following descriptions. (Note the work *many* merely means *more than one* in the database modeling environment.) If you have access to Visio, you can use that for your drawings – if you don't, you can draw it using Word or one of these tools:-
   https://www.lucidchart.com
   https://erdplus.com

   For a **trial Visio download**, go to this website and create an account. Site should generate a serial key unique to you.
   https://azureforeducation.microsoft.com/devtools

a) Each of the ABC Corp's divisions is composed of many departments. Each department has many employees assigned to it, but each employee works for only one department. Each department is managed by one employee and each of the managers can manage only one department at a time. (3 Pts)

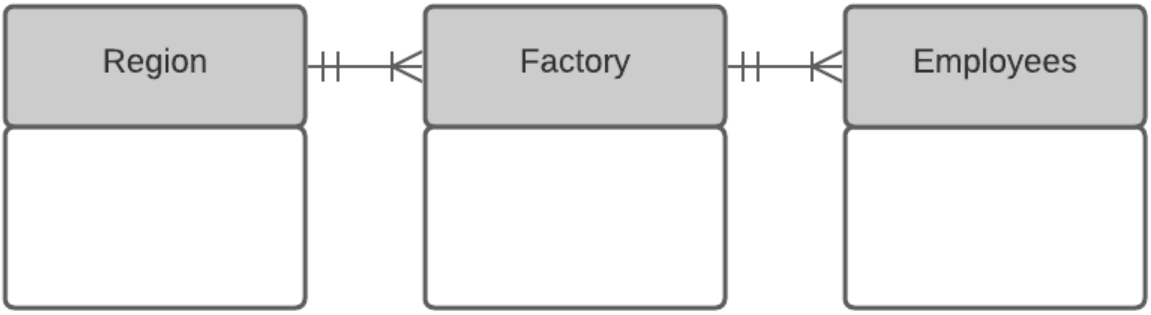


b) During some period of time, a customer can download many ebooks from BooksOnline. Each of the books can be downloaded by many customers during this period of time. (2 Pts)

Downloads

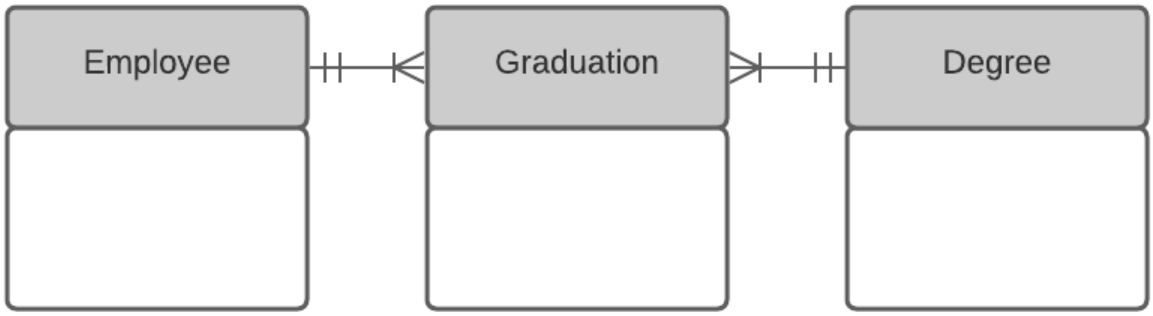
c) QuickTime Corp operates many factories. Each factory is located in a region and each region can be home to many QuickTime factories. Each factory has many employees but each employee is employed by only one factory. (3 Pts)

Location Employer



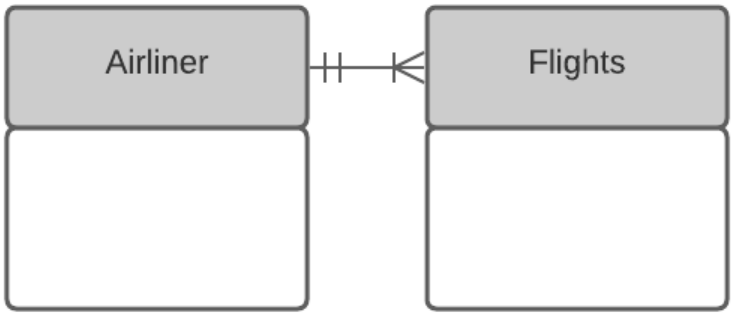
d) An employee may have earned many degrees and each degree may have been earned by many employees. (3 Pts)

Gradutaion

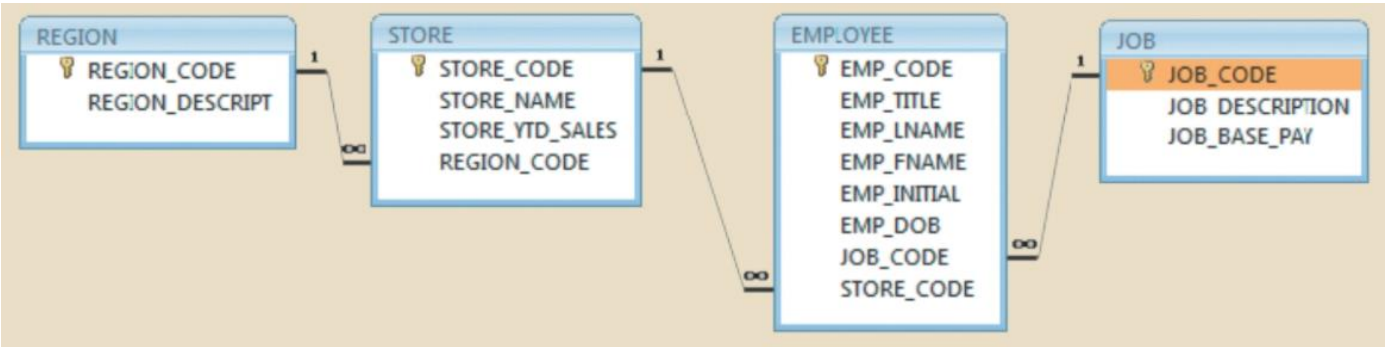


e) An airliner can be assigned to fly many flights, but each flight is flown by only one airliner. (2.5 Pts)

flown

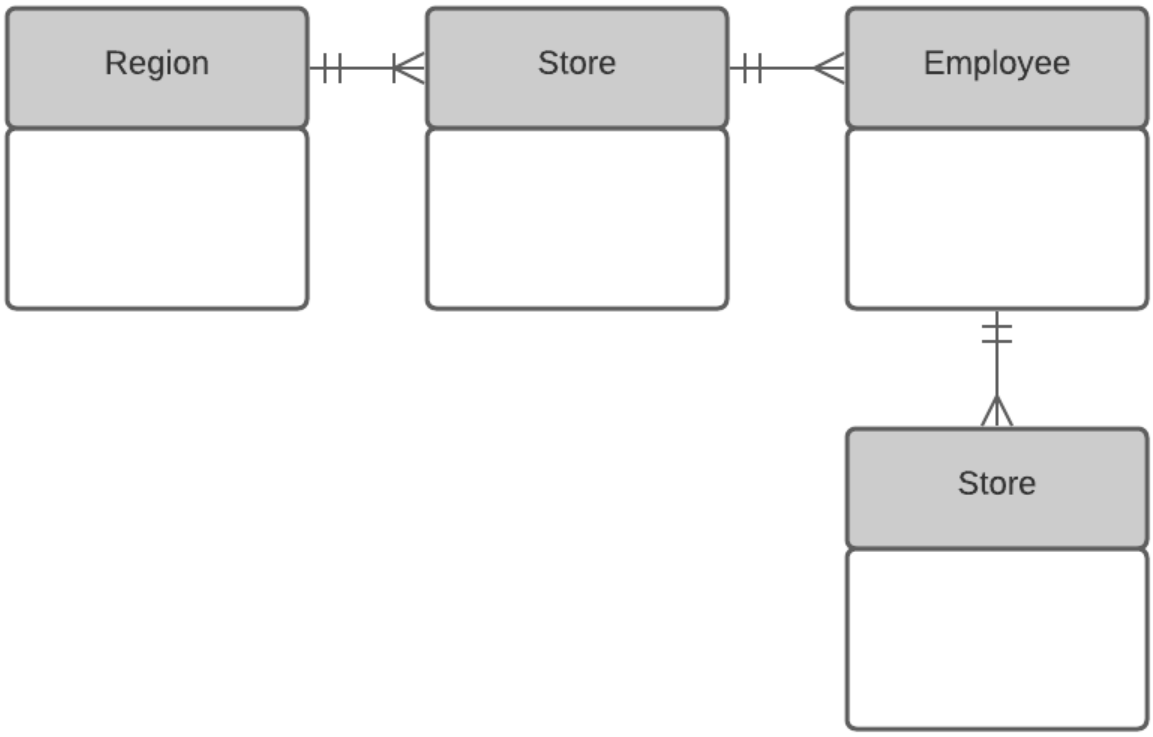


3. The DealCo relational diagram shows the initial entities and attributes for DealCo Stores which are located in two regions of the country. Use this Figure as a guide to answer parts (a) to (c).

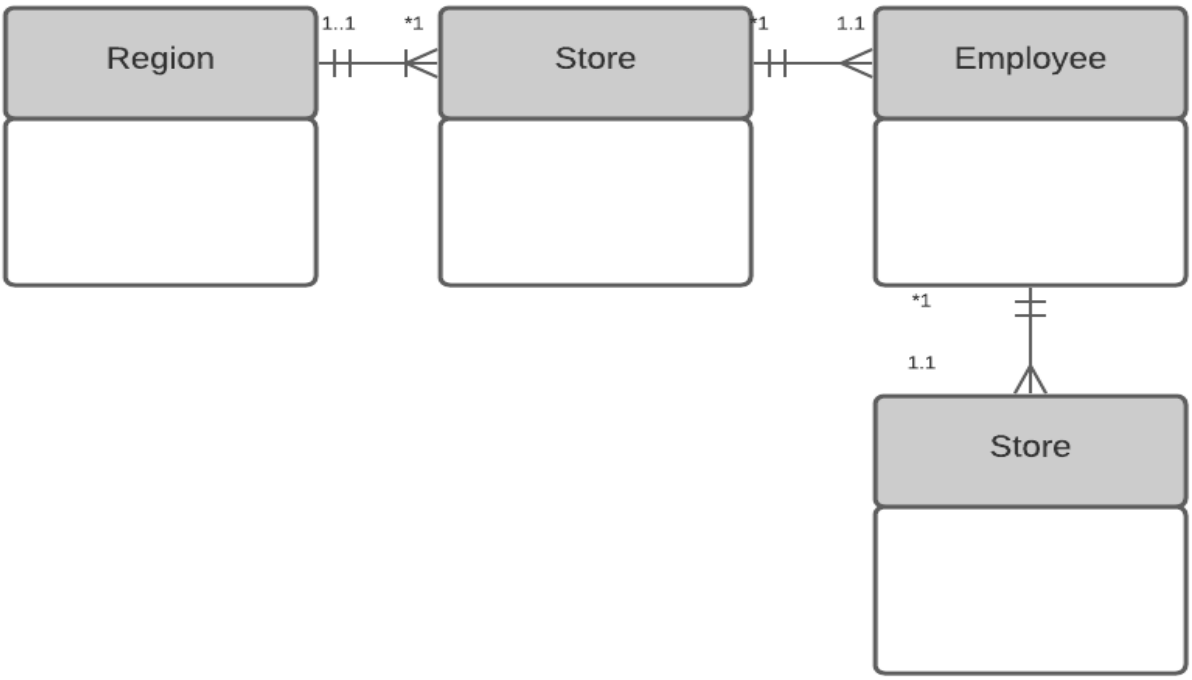


a. identify each relation type and write all of the business rules. (3 Pts)
Each of the regions can have one more or stores. **1:M**
Then each store can many multiple employees. **1:M**
Each of the employees will only have one job. **1:M**

b. create the basic Crow's Foot ERD for DealCo Stores. (3 Pts)



c. create the UML class diagram that reflects the entities and relationships you identified in the relational diagram. (3 Pts)



Use the database tables shown to answer Problems (a) to (d) below.

Table name: TRUCK
Primary key: TRUCK_NUM
Foreign keys: BASE_CODE, TYPE_CODE

Database name: Ch03_TransCo

TRUCK_NUM	BASE_CODE	TYPE_CODE	TRUCK_MILES	TRUCK_BUY_DATE	TRUCK_SERIAL_NUM
1001	501	1	32123.5	23-Sep-07	AA-322-12212-W11
1002	502	1	76984.3	05-Feb-06	AC-342-22134-Q23
1003	501	2	12346.6	11-Nov-06	AC-445-78656-Z99
1004		1	2894.3	06-Jan-07	WQ-112-23144-T34
1005	503	2	45673.1	01-Mar-06	FR-998-32245-W12
1006	501	2	193245.7	15-Jul-03	AD-456-00845-R45
1007	502	3	32012.3	17-Oct-04	AA-341-96573-Z84
1008	502	3	44213.6	07-Aug-05	DR-559-22189-D33
1009	503	2	10932.9	12-Feb-08	DE-887-98456-E94

Table name: BASE
Primary key: BASE_CODE
Foreign key: none

BASE_CODE	BASE_CITY	BASE_STATE	BASE_AREA_CODE	BASE_PHONE	BASE_MANAGER
501	Murfreesboro	TN	615	123-4567	Andrea D. Gallager
502	Lexington	KY	568	234-5678	George H. Delarosa
503	Cape Girardeau	MO	456	345-6789	Maria J. Talindo
504	Dalton	GA	901	456-7890	Peter F. McAvee

Table name: TYPE
Primary key: TYPE_CODE
Foreign key: none

TYPE_CODE	TYPE_DESCRIPTION
1	Single box, double-axle
2	Single box, single-axle
3	Tandem trailer, single-axle

a) For each table, identify the primary key and the foreign key(s). If a table does not have a foreign key, write *None* in the space provided. [2]

TABLE	PRIMARY KEY	FOREIGN KEY(S)
TRUCK	TRUCK_MAN	BASE_CODE_ AND TYPE_CODE
BASE	BASE_C0DE	NONE
TYPE	TYPE_CODE	NONE

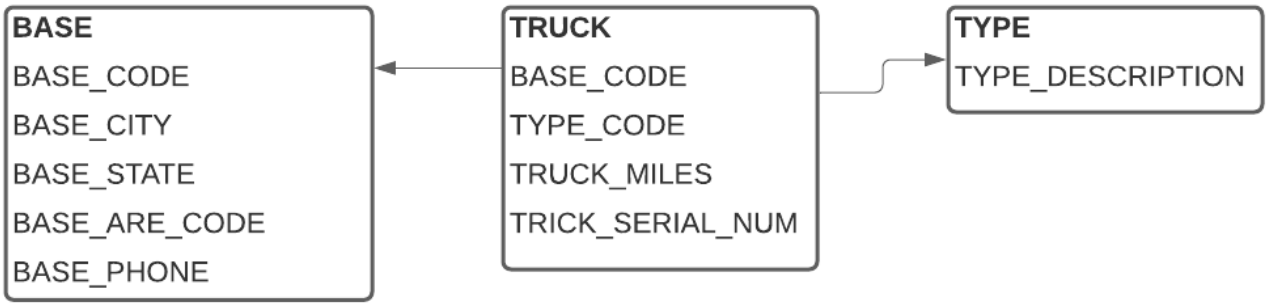
b) Do the tables exhibit entity integrity? Answer yes or no and then explain your answer.
Yes, due that each all the primary key entries are different and no parts of primary keys are null.

TABLE	ENTITY INTEGRITY	EXPLANATION
TRUCK	YES	TRUCK_BASE is unique and no primary keys are null
BASE	YES	BASE_CODE is unique and no primary keys are null
TYPE	YES	TYPE_CODE is unique and no primary keys are null.

c) For each table, identify **a** superkey and a secondary key. [3]

TABLE	SUPERKEY	SECONDARY KEY
TRUCK	TRUCK_NUM, TRUCK_SERIAL_NUM, TRUCK_NUM, TRUCK_SERIAL_NUM, TRUCK_NUM, TYPE_CODE	BASE_CODE TYPE_CODE
BASE	BASE_CODE, BASE_CODE, BASE_MANAGER BASE_CODE, BASE_CITY, BASE_STATE	BASE_CITY, BASE_MANAGER BASE_CITY, BASE_PHONE
TYPE	TYPE_CODE	TYPE_DISCRIPTION, TYPE_CODE, TYPE_DISCRIPTION

d) Create the relational diagram for this database [3]



e) Create a Crow's Foot ERD for this database