CS60 Problem Set 1 – Spring 2022

Due – Midnight Mar 4, 2022

Total 37.5 Pts

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YourStudentId#_<Your_Section_Number>_CS60_Lastname_Firstname.docx.
To complete the Problem Set, create spaces below each of the problems and add your answers. After completing, load the file using the **Problem Set 1 Upload option** in Canvas.
Note:- If you end up with multiple files for your Problem Set, create a zipped folder and load using the Problem Set 1 upload option.

1. 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)

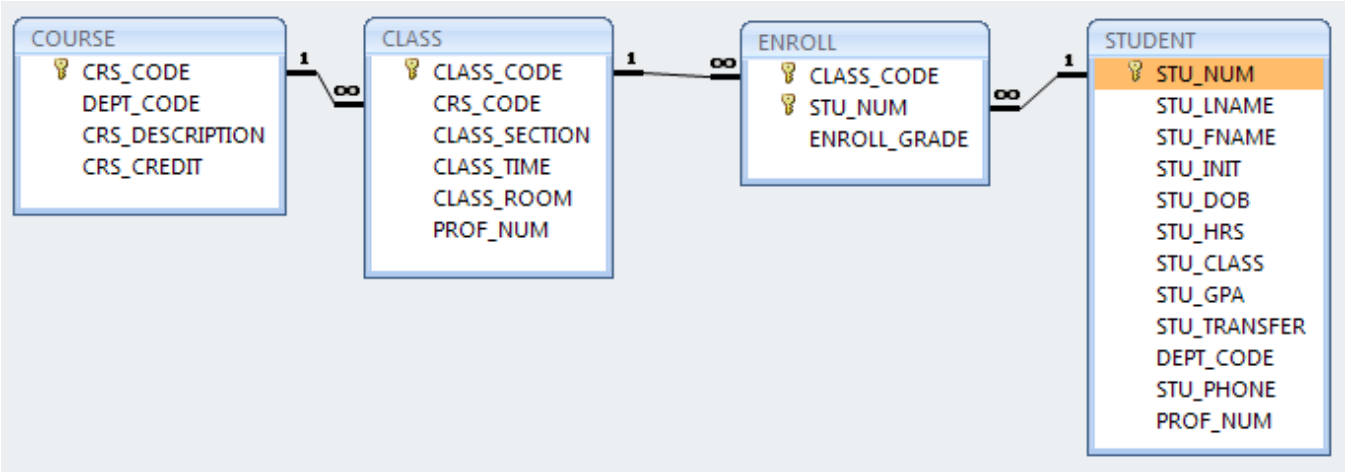
   b) During some period of time, a customer can download many ebooks from BooksOnline. Each of the books can be downloaded by many customers during this period of time. (2 Pts)

   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)

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

2. Create a **single** Crow's Foot ERD to include the following business rules for the ProdCo company: (5 pts)
   a. Each sales representative writes many invoices.
   b. Each invoice is written by one sales representative.
   c. Each sales representative is assigned to one department.
   d. Each department has many sales representatives.
   e. Each customer can generate many invoices.
   f. Each invoice is generated by one customer.

3. The relational diagram below shows the initial entities and attributes for ABC College. Use it to answer parts (a) to (c).



a. identify each relation type and write all of the business rules. (2 Pts)

b. create the basic Crow's Foot ERD for ABC College. (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		
BASE		
TYPE		

b) Do the tables exhibit entity integrity? Answer yes or no and then explain your answer. [2.5]

TABLE	ENTITY INTEGRITY	EXPLANATION
TRUCK		
BASE		
TYPE		

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

TABLE	SUPERKEY	SECONDARY KEY
TRUCK		
BASE		
TYPE		

d) Create the relational diagram for this database. Include the key attributes. [3]

e) Create a Crow's Foot ERD for this database. Include the key attributes. [3]