**COMP 1630 - Module 2 - Discussion Questions And On-line Work**

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**A. Chapter 2**

**Problem 10:**

United Broke Artists (UBA) is a broker for not-so-famous artists. UBA maintains a small database to track painters, paintings, and galleries. A painting is created by a particular artist and then exhibited in a particular gallery. A gallery can exhibit many paintings, but each painting can be exhibited in only one gallery. Similarly, a painting is created by a single painter, but each painter can create many paintings. Using PAINTER, PAINTING, and GALLERY, in terms of a relational database:

a. What tables would you create, and what would the table components be?

b. How might the (independent) tables be related to one another?

Solution:

a. Three tables are created and their components are described as below.

Table 1: PAINTER; The components may include attributes related to each painter such as membership number, name, nationality, etc.

Table 2: PAINTING; The components may include attributes related to each painting such as registration number, author, and which gallery it is exhibited.

Table 3: GALLERY; The components may include attributes related to each gallery such as gallery number, location, etc.

b. As shown in the ERD below, Table PAINTING are connected to the other two tables through two foreign keys, namely PAINT\_NO and GALLERY\_NO, respectively. These two foreign keys are actually primary keys in the other two tables.



**Problem 11:**

Using the ERD from Problem 10, create the relational schema. (Create an appropriate collection of attributes for each of the entities. Make sure you use the appropriate naming conventions to name the attributes.)

Solution:

Table One: PAINTER

Fields: MEMBERSHIP\_NO (Primary Key), LAST\_NAME, FIRST\_NAME, DATE\_OF\_BIRTH

Table Two: PAINTING

Fields: REGISTRATION\_NO (Primary Key), AUTHOR (Foreign Key), GALLERY (Foreign Key)

Table Three: GALLERY

Fields: GALLERY\_NO (Primary Key), LOCATION, SIZE

Problem 12:

Convert the ERD from Problem 10 into a corresponding UML class diagram.

Solution:



Problem 13:

Describe the relationships (identify the business rules) depicted in the Crow’s

Foot ERD shown in Figure P2.13.

Solution:

One professor can advise one or more students while one student can be advised by one and only one professor.

One professor can teach one or more classes while one class can be taught by one and only one professor.

Problem 14:

Create a Crow’s Foot ERD to include the following business rules for the ProdCo company:

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.

Solution:



Problem 15

Write the business rules that are reflected in the ERD shown in Figure P2.15. (Note that the ERD reflects some simplifying assumptions. For example, each book is written by only one author. Also, remember that the ERD is always read from the “1” to the “M” side, regardless of the orientation of the ERD components.)

Solution:

One publisher publishes many books while one book is published by only one publisher.

One publisher submits many contracts while one contract is submitted by only one publisher.

One author writes many books while one book is written by only one author.

One author signs many contracts while one contract is signed by only one author.

**B. Chapter 3**

**Problem 17:**

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.

**Solution:**

|  |  |  |
| --- | --- | --- |
| TABLE | PRIMARY KEY | FOREIGN KEY(S) |
| TRUCK | TRUCK\_NUM | BASE\_CODE, TYPE\_CODE |
| BASE | BASE\_CODE | None |
| TYPE | TYPE\_CODE | None |

**Problem 18:**

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

**Solution:**

|  |  |  |
| --- | --- | --- |
| TABLE | ENTITY INTEGRITY | EXPLANATION |
| TRUCK | yes | TRUCK\_NUM values are unique and not null |
| BASE | yes | BASE\_CODE values are unique and not null |
| TYPE | yes | TYPE\_CODE values are unique and not null |

**Problem 19:**

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.

**Solution:**

|  |  |  |
| --- | --- | --- |
| TABLE | REFERENTIAL INTEGRITY | EXPLANATION |
| TRUCK | yes | non-null foreign key can refer to fields in other tables |
| BASE | NA | no foreign key |
| TYPE | NA | no foreign key |

**Problem 20:**

Identify the TRUCK table’s candidate key(s).

**Solution:**

TRUCK\_NUM, TRUCK\_SERIAL\_NUM

**Problem 21:**

For each table, identify a superkey and a secondary key.

**Solution:**

|  |  |  |
| --- | --- | --- |
| TABLE | SUPERKEY | SECONDARY KEY |
| TRUCK | TRUCK\_NUM | TRUCK\_SERIAL\_NUM |
| BASE | BASE\_CODE | {BASE\_CITY, BASE\_STATE, BASE\_AREA\_CODE, BASE\_PHONE, BASE\_MANAGER} |
| TYPE | TYPE\_CODE | TYPE\_DESCRIPTION |

**Problem 22:**

Create the ERD for this database.

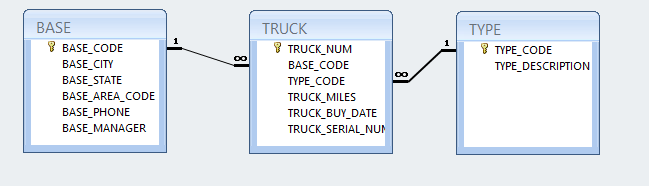
**Solution:**



**Problem 23:**

Create the relational diagram for this database.

**Solution:**

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