Data Management and Database Design

INFO 6210

Fall 2016

Assignment _5

Submission Date – Oct/22/2016 Saturday

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Program: MS in Information Systems

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College: College Of Engineering

University: Northeastern University

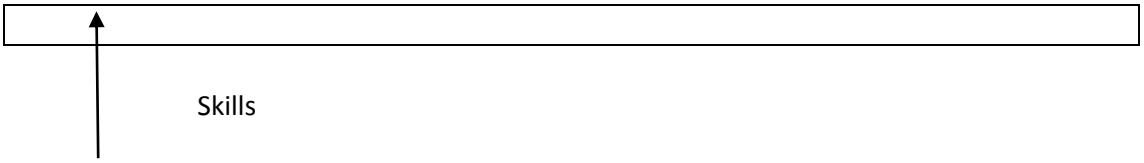
PART – 4

1.

a)

Employee

Employee Id Employee Name Payroll Address City State Postal Employed Year



Skills

Employee Id **Skill Id** Skills

Employee

EmployeeID	Employee	Payrool Adress	City	State	Postal	Employed Year

Skills

Employee Id	Skills ID	Skills

In the below figure the tables are converted to 3NF where the employeeID from the skill table is comnnected to the employeeID in the Employee table.

Employee

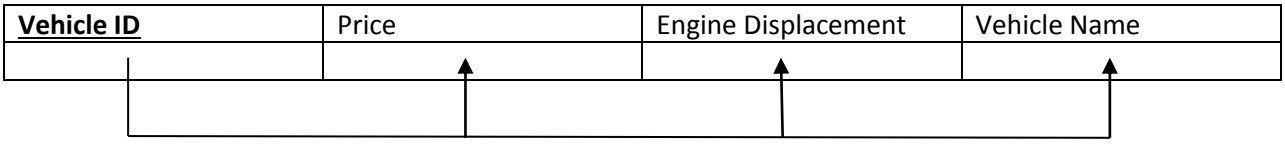
EmployeeID	Employee	Payrool Adress	City	State	Postal	Employed Year

Skills

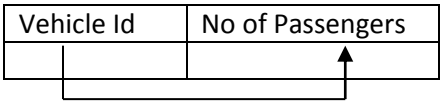
Employee Id	Skills ID	Skills

2 a)

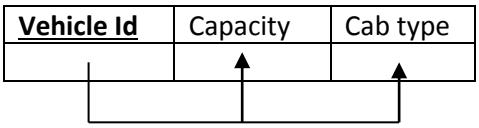
Vehicle



Car

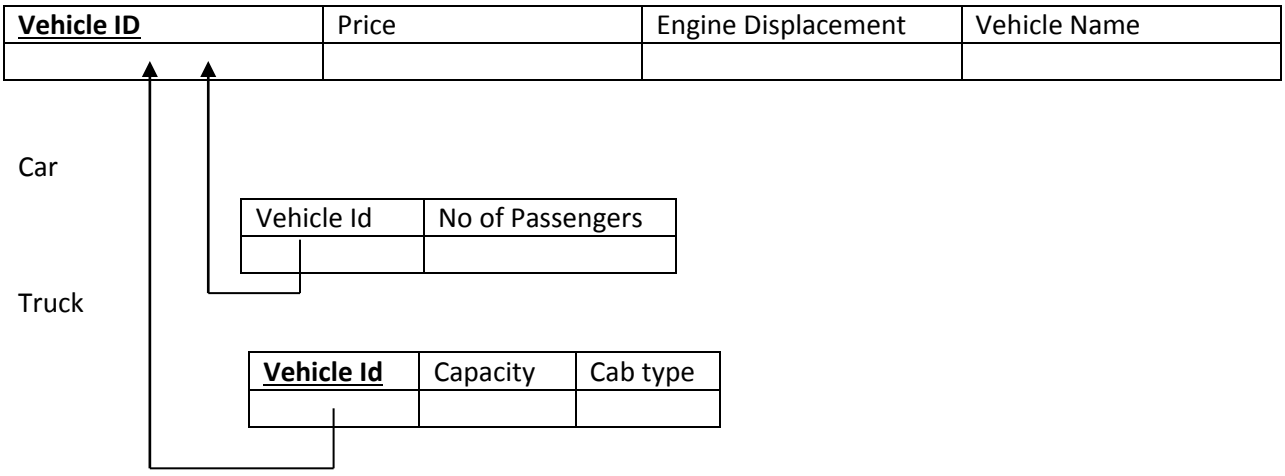


Truck



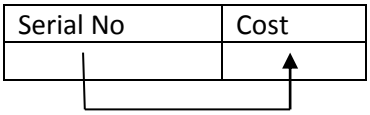
This figure is converted to 3NF

Vehicle

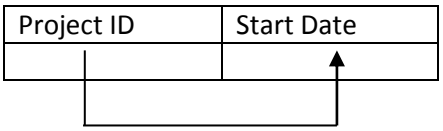


4.a)

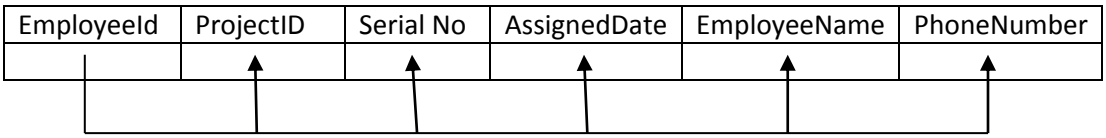
Equipment



Project

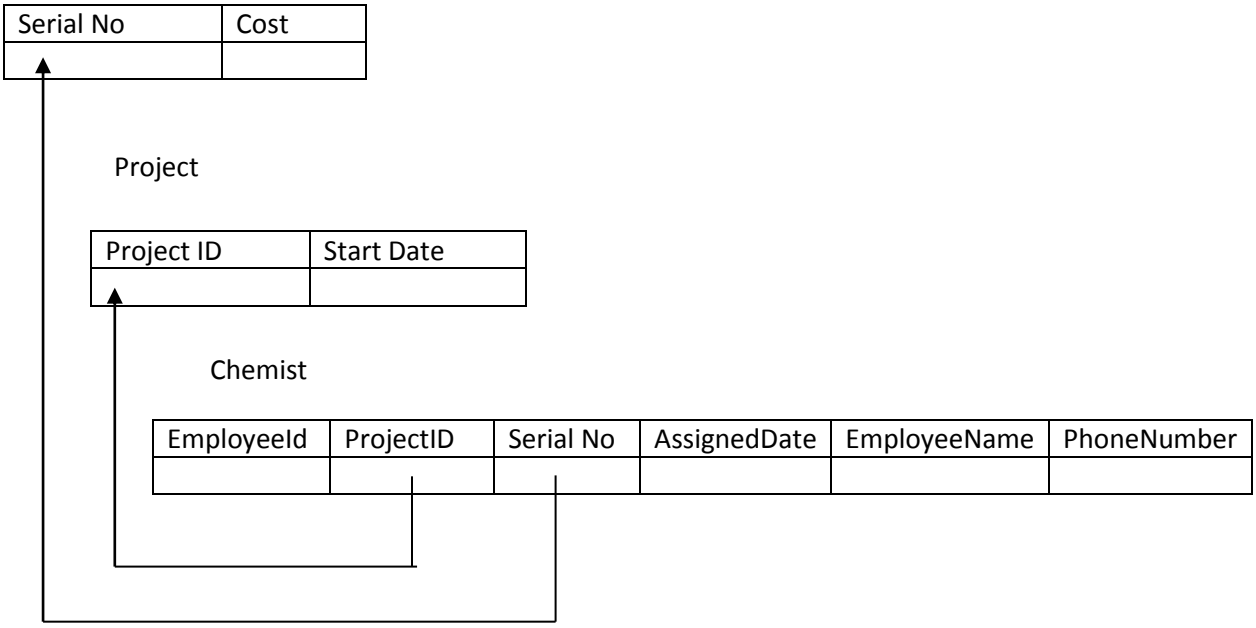


Chemist



This figure is converted to 3NF

Equipment



5)

Object

Oid	Object Type
1	Instructor
2	Student

Course

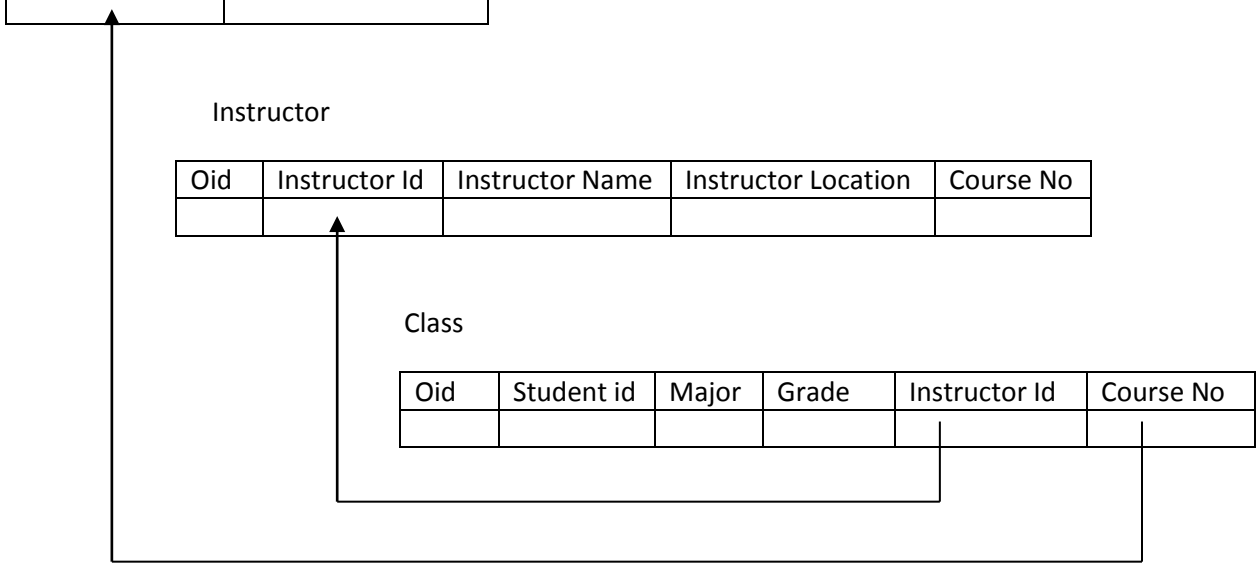
Course No	Course Title

Instructor

Oid	Instructor Id	Instructor Name	Instructor Location	Course No

Class

Oid	Student id	Major	Grade	Instructor Id	Course No



PART – 5

1)

The main components that make up the table in the relational model are columns and its data types along with foreign key constrains.

2)

a. Each column in a row should be atomic that is the column can have only one value.
b. Each row in the table should have same count of columns.
c. All the rows should be unique to the table that is when considering the complete row.

3)

In one to many relationship a row from the first table can refer to one or more row in the second table but a row from the second table can refer only one row in the first table.

In many to many relationship a row from the first table can refer one or more row in the second table and similarly a row from the second table can refer one or more row in the first table.

4)

When creating a data model first we identify the object which is entities and attributes, and then group them into categories of related data. The purpose of this is to name the type of information grouped. The next step is to identify the type of data that need to be stored in the table.

5)

The many to many relationship are implemented in MYSQL by adding the third table between the two tables that matches the primary key values of one table and the primary key values of second table. And it is logical and not physical that is why they are represented in dotted lines in data model.

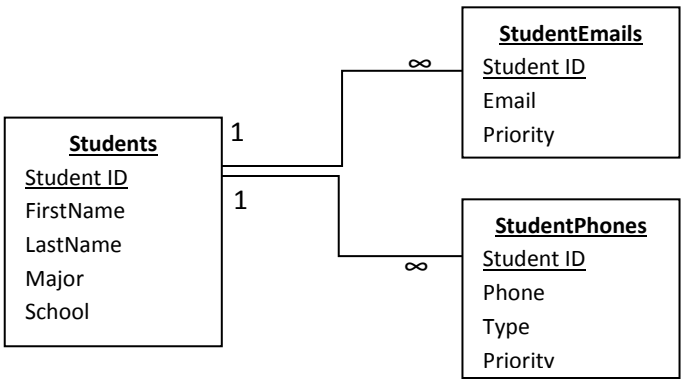
PART – 6-A

1)

a) The student contact list is not 1NF because of the following reasons

a. There are two identical column “Email”. It should be unquie.
b. Each column should maintain one data type but there are two in a column “MajorOrSchool”.
c. There is no indication for the preferred email address in the column.
d. In the Name field there is no specification for Last name and first name.

b)



2)

a. The table is not 1NF because of the following reasons

i. It represents the row’s priority,
ii. There should be one value in each column but in column Item there are multiple values

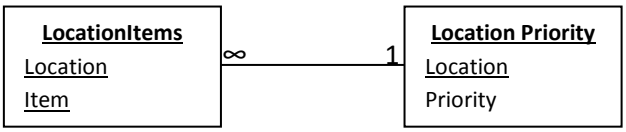
b.

Location	Item	Priority
Grocery store	Milk	2
Grocery store	Eggs	2
Grocery store	Bananas	2
Office supply store	Paper	1
Office supply store	Pencil	1
Office supply store	Divining rod	1
Post Office	Stamps	3
Computer Store	Flash drive	4
Computer Store	8 Floppy disk	4

For this table the combination of columns Location and Item can be the primary Key.

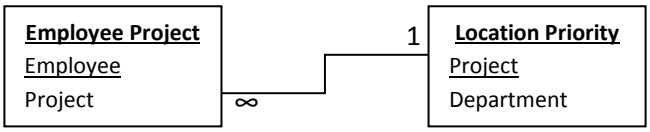
3)

a. The table is not 2NF because of the following reasons
    i. The Values are repeated so many times in the columns
b. This can be resolved by separating the tables for priority.



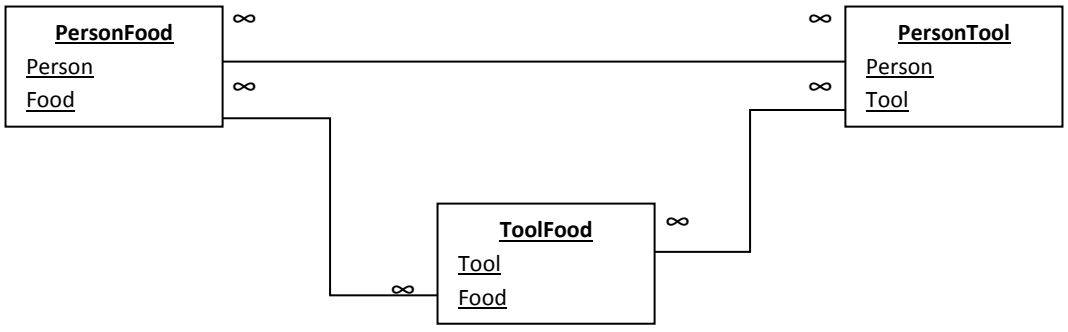
4)

a. This table is not in 3NF because of the following reason
    i. It is a transitive dependency because the department column depends on project column and it is not the key field.
b. We can convert this into 3NF by separating the table for department.

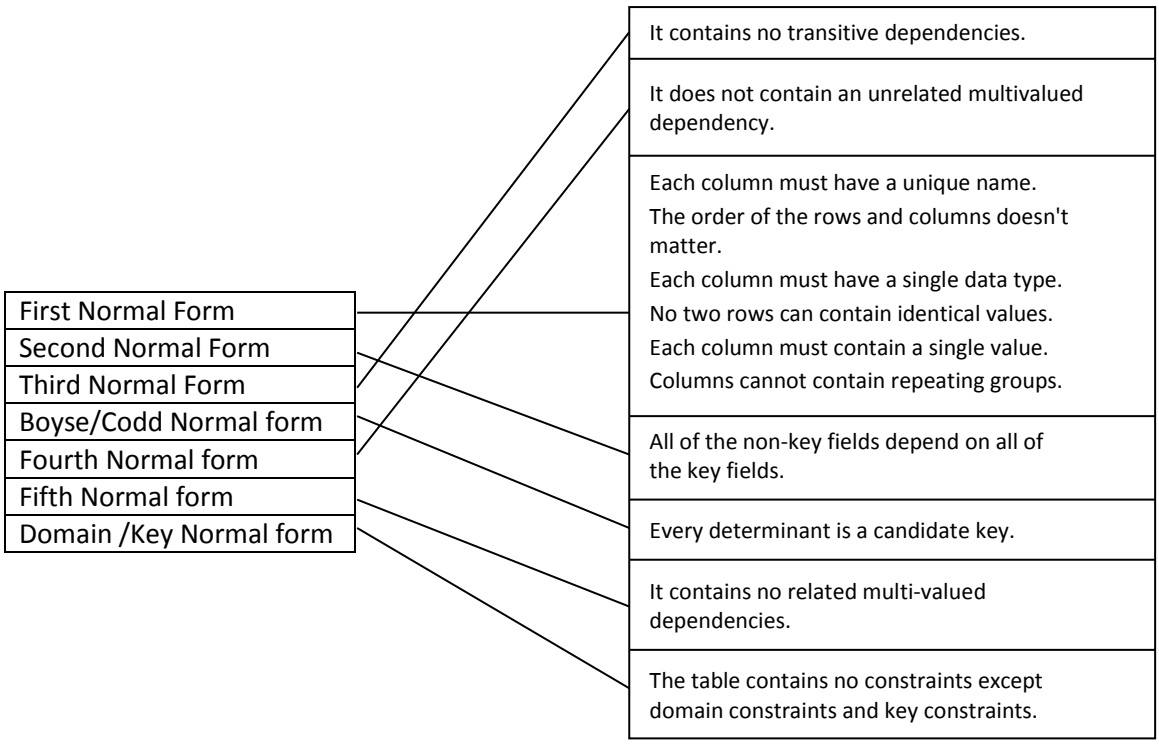


5) A

a. This table is not 5NF because of the following reason
    i. In this table the column person depends on column tools and column tool depends on column food, which is a multi value dependency.
b. To solve this we need to separate this table into three table and will have the primary key has the combination of two columns in the table.



6)


First Normal Form
Second Normal Form
Third Normal Form
Boyse/Codd Normal form
Fourth Normal form
Fifth Normal form
Domain /Key Normal form
It contains no transitive dependencies.
It does not contain an unrelated multivalued dependency.
Each column must have a unique name.
The order of the rows and columns doesn't matter.
Each column must have a single data type.
No two rows can contain identical values.
Each column must contain a single value.
Columns cannot contain repeating groups.
All of the non-key fields depend on all of the key fields.
Every determinant is a candidate key.
It contains no related multi-valued dependencies.
The table contains no constraints except domain constraints and key constraints.

PART – 6-B

1)

SHIP	CLASS
Luxury Liner	1st class
Luxury Liner	2nd class
Luxury Liner	3rd class
Luxury Liner	4th class
Luxury Liner	5th class
Schooner	1st class
Schooner	2nd class
Tuna Boat	1st Class

Since there are two columns in the table this should be a two column foreign constrains. The Ship class fields will refer the ship class tables.

2)

The student tables contains the information about the students similarly the department table and classes tables contains of department and classes respectively so they are called as object tables. The StudentClasses table and DepartmentClasses table in the links the student – classes tables and department – classes tables so they are called as link tables.

3)

This table contains information about Player1, player2 and the match time they are going to play. To solve this we can create a table with the columns Player ID, Player Name and their rank. As this table has the information about the players it is a object table. Similarly we need to create another table were we will have the columns PlayerID1, PlayerID2 and Match time. This table will contains the information about the players and one addition information is the match time they are going to play, so it is called link table.

4)

a. It will be possible to calculate as needed since to average up of an airline will be a few hundred values.
b. In this case we might require several hundred values and may still be possible to figure out.
c. For this it will require lot of calculation so it's better to store the information of takeoff and landing rather than performing the calculation.
d. This will take huge calculations so it's better to store the value instantly to avoid such calculations.