

Assignment: 2 [100 points]

Please submit your assignment to NYU Brightspace with a single PDF document attachment. Please mention Student ID, Name, Course, Section Number, and date of submission on the first page of your submission. Insert picture of ERD diagrams in the same PDF document. **For each entity in your database design use your initial as prefix, e.g. AP_CUSTOMER where AP is the initial of the student.**

Problem 1: 40 points

DEAR (Department of Education and Administration Research) of a university has undertaken a project to consolidate people's data from Human Resources and Students Affair departments. In this effort, DEAR is developing a database design with following considerations,

DEAR intends to keep the following details of each person associated with the university

Name, Address, Gender, Age, Email, Contact Number, SSN

In addition to it, DEAR has identified following business requirements:

DEAR will store only one address, email and contact number for each individual.

An individual may not have SSN

An individual can be either Employee, Alumnus or Student. Also, an employee can be a student as well.

If an individual is an Employee or Student, DEAR will store a unique Employee ID or Student ID respectively. If a Student is an Employee as well, he/she will have a unique Student ID and Employee ID.

If an individual is Employee, DEAR will store Hire Date, Salary, and Department Name

An employee can be Faculty or Staff but not both. If an employee is a Faculty, DEAR will store Faculty Rank such as Adjunct Professor, Assistant Professor, Professor etc. If an employee is Staff, DEAR will store the job title such as Manager, Administrator, Director, Analyst etc.

If an individual is an Alumnus, DEAR will store the highest Degree (Year, Designation, and Date) of the individual.

An individual can be either Graduate or Undergrad student.

For Graduate student, DEAR will store graduate major, and undergrad major

For Undergrad student, DEAR will store undergrad major and high school diploma year

Consider EER (Enhance ER), Subtypes and Supertypes, appropriate Completeness constraints, and Disjointness constraints. Identify proper relationships among entities. Resolve composite/derived/multi-valued attributes, if any. For each attribute identify appropriate data type, size, and constraints (Mandatory/Optional). Identify proper Primary Keys and Foreign Keys. Using Oracle Data Modeler, draw EER (Logical and Relational Model). Submit a screenshot of the logical and relational model along with any assumptions you have made other than business rules defined by DEAR.

Problem 2: 60 points

The competition in manufacturing has intensified and competitors seem to progress more rapidly than “Perfect Value Furniture Company (PVFC)”. PVFC manufactures very high quality furniture and carries a high reputation in the market. However, in recent years the sales have fallen down drastically and there are many complaints reported by customers for errors in invoice, wrong items delivered or product not available in stock etc. A research team at PVFC has identified the root cause of all issues as their data management system. PVFC is maintaining all data about customers, orders, and products in a spreadsheet based file. To address the problems and to make their data management system accurate, consistent, integrated and efficiently manageable, PVFC has decided to migrate its file system based database to a modern relational database management system.

Following is the sample of the Customer Invoice.

PVFC Customer Invoice					
Customer ID	2	Order ID	1006		
Customer Name	Value Furniture	Order Date	10/24/2015		
Address	15145 S.W. 17th St. Plano TX 75022				
Product ID	Product Description	Finish	Quantity	Unit Price	Extended Price
7	Dining Table	Natural Ash	2	\$800.00	\$1,600.00
5	Writer's Desk	Cherry	2	\$325.00	\$650.00
4	Entertainment Center	Natural Maple	1	\$650.00	\$650.00
				Total	\$2,900.00

Following is the sample of invoice data PVFC maintains in the spreadsheet file system.

OrderID	Order Date	Customer ID	Customer Name	Customer Address	ProductID	Product Description	Product Finish	Product StandardPrice	Ordered Quantity
1006	10/24/2015	2	Value Furniture	Plano, TX	7	Dining Table	Natural Ash	800.00	2
1006	10/24/2015	2	Value Furniture	Plano, TX	5	Writer's Desk	Cherry	325.00	2
1006	10/24/2015	2	Value Furniture	Plano, TX	4	Entertainment Center	Natural Maple	650.00	1
1007	10/25/2015	6	Furniture Gallery	Boulder, CO	11	4-Dr Dresser	Oak	500.00	4
1007	10/25/2015	6	Furniture Gallery	Boulder, CO	4	Entertainment Center	Natural Maple	650.00	3

2A) Review the sample Customer Invoice and sample invoice data and answer the following questions. [30 points]

- How many different types of entities (Person/ Place/ Object/ Event/ Concept) are there in customer invoice data? And what are they? Identify entities and give them suitable names.
- What is the insertion anomaly in this data set?
- What is the update anomaly in this data set?
- What is the deletion anomaly in this data set?
- Is this dataset normalized? Why or Why not?

2B) Data Normalization and ERD [30 points]

Normalize this data set to normalized form and draw ERD of data model with proper relationships amongst entities and attributes, primary and foreign keys for each entity.