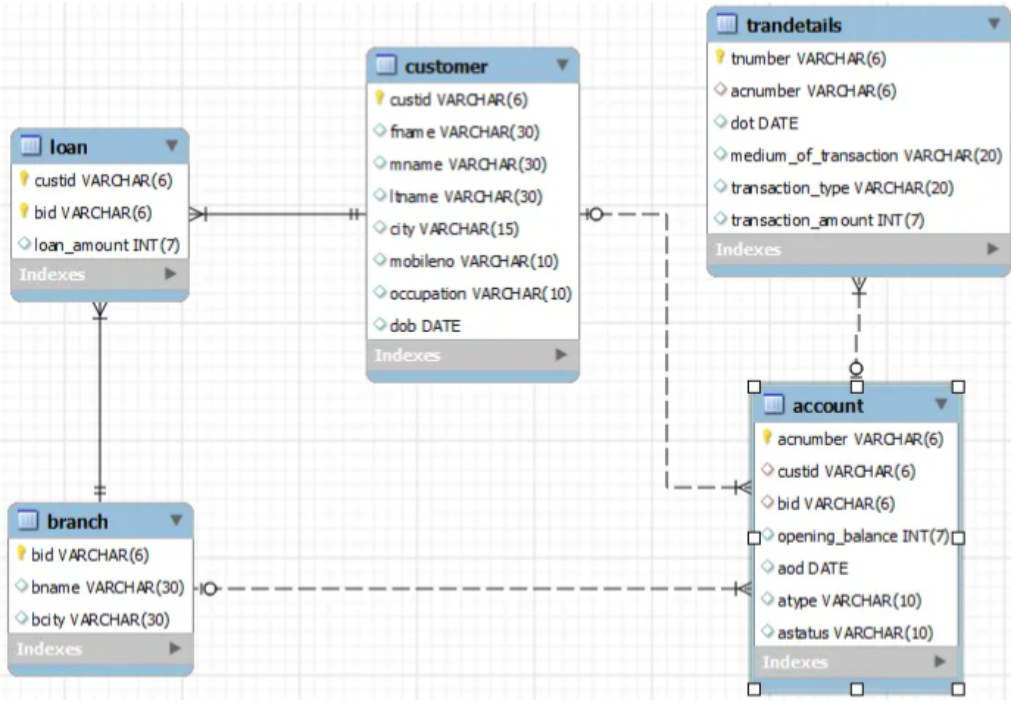
(100 pts) Homework #5 due midnight April 4th

1. (10) Create an ER diagram using WorkBench (or any ER diagramming tool) for the following diagram.



Save the model as hw4-lastname.mwb file.

2. The following shows a project related data.

Project ID	Title	Proj Manager	Proj Budget	Employee ID	Employee Name	Dept No	Dept Name	Hourly Rate
P10	Web site	A. Foo	3000	E101	A. Soo	D04	IT	30
P10	Web site	A. Foo	3000	E130	L. Joo	D23	Retirement	25
P10	Web site	A. Foo	3000	E210	P. Lou	D04	IT	32
P30	Payroll	C. Bar	2000	E110	B. Joe	D04	IT	33
P30	Payroll	C. Bar	2000	E101	A. Soo	D04	iT	20
P30	Payroll	C. Bar	2000	E302	T. Goo	D28	Database	40
P30	Payroll	C. Bar	2000	E310	W. Ree	D08	Payroll	25
P40	Inventory	K. Hunter	2500	E302	T. Goo	D28	Database	30
P40	Inventory	K. Hunter	2500	E210	P. Lou	D04	IT	24
P40	Inventory	K. Hunter	2500	E134	B. No	D09	HR	21

(a) (20) Try to understand the table and identify all the functional dependencies of the data shown in the table.

- **ProjectID → title, proj Manager, proj budget**
- **title → proj Manager, proj budget**
- **employeeID → employee name**
- **Dept No → Dept Name**
- **My assumptions of the data is that the project ID determines the title and for each one of those titles therefore a project manager, and each one of those titles has a particular budget, so therefore project id is the determinant and title and proj manager, budget are functionally dependent.**

(b) (20) Describe and illustrate the process of normalizing the table shown to 3NF relations. You need to first show 1NF, and 2NF, and then 3NF form. Identify the primary and foreign keys in all relations.

1NF Project Table: (1/1)

Project ID	Title	Proj Manager	Proj Budget	Employee ID	Employee Name	Dept No	Dept Name	Hourly Rate

2NF Project Table: (1/4)

Project ID	Dept No	Employee ID	Hourly Rate

2NF Project_Details Table: (2/4)

Project ID	Title	Proj. Manager	Proj. Budget

2NF Department Table: (3/4)

Dept No	Dept Name

2NF Employee Table: (4/4)

Employee ID	Employee Name

3NF Project_Summary Table: (1/5)

Project ID	Dept No	Employee ID	Hourly Rate

3NF Project Table: (2/5)

Project ID	Title

3NF Project_Details Table: (3/5)

Title	Proj. Manager	Proj. Budget

3NF Department Table: (4/5)

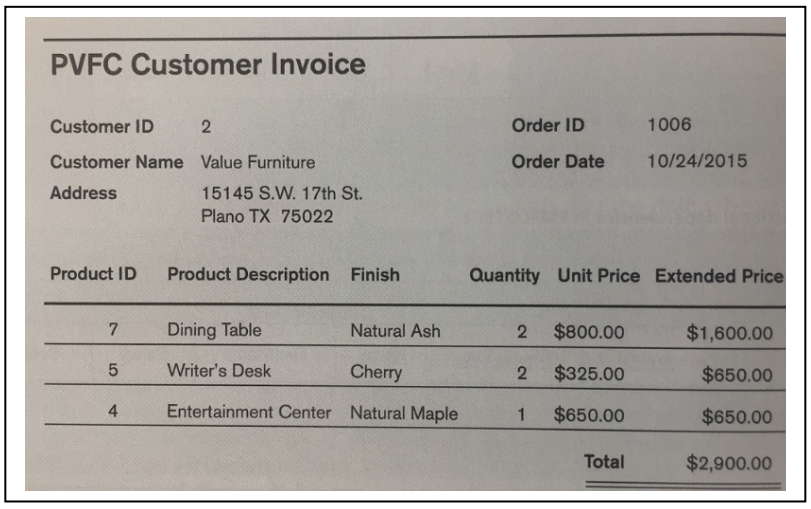
Dept No	Dept Name

3NF Employee Table: (5/5)

Employee ID	Employee Name

Note that the primary key columns are shown with an underline. If there is a foreign key, show a dotted underline under the foreign key column, and draw an arrow from the foreign key to the primary key. Show a proper name for each table, as shown.

3. (50) Consider the following invoice data.



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		

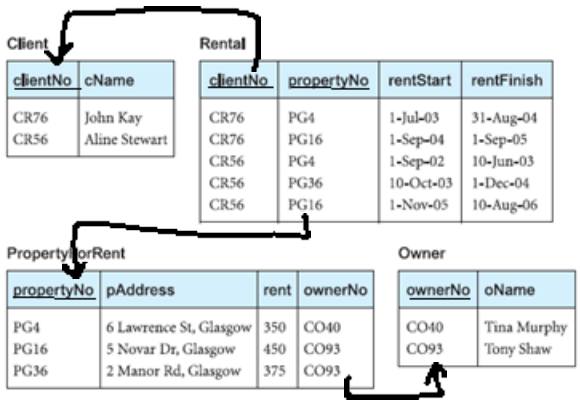
Product ID	Product Description	Finish	Quantity	Unit Price	Extended Price
7	Dining Table	Natural Ash	2	$800.00	$1,600.00
5	Writer's Desk	Cherry	2	$325.00	$650.00
4	Entertainment Center	Natural Maple	1	$650.00	$650.00
				Total	$2,900.00

a. **(10) Convert the invoice data to a tabular form.**

Tabular

C_ID	C_Name	C_Address	O_ID	O_Date	P_ID	P_Desc	P_Finish	P_Quan	P_UnitPrice	P_ExPrice	O_Total
2	Value Furniture	15145 S.W. 17th St. Plano TX 75022	1006	10/24/2015	7 5 4	Dining Table Writer's Desk Entertainment Center	Natural Ash Cherry Natural Maple	2 2 1	800 325 650	1600 650 650	2900

b. (30) Convert the table from (a) to 1NF, 2NF, and 3NF. You answer in 2NF and 3NF should look like the tables in the following:



1NF Customer Invoice Table

C_ID	C_Name	C_Address	O_ID	O_Date	P_ID	P_Desc	P_Finish	P_Quan	P_UnitPrice	O_Total
2	Value Furniture	15145 S.W. 17th St. Plano TX 75022	1006	10/24/2015	7	Dining Table	Natural Ash	2	800	2900
2	Value Furniture	15145 S.W. 17th St. Plano TX 75022	1006	10/24/2015	5	Writer's Desk	Cherry	2	325	2900
2	Value Furniture	15145 S.W. 17th St. Plano TX 75022	1006	10/24/2015	4	Entertainment Center	Natural Maple	1	650	2900

2NF Invoice Table

C_ID	C_Name	C_Address	O_ID	P_ID
2	Value Furniture	15145 S.W. 17th St. Plano TX 75022	1006	7
2	Value Furniture	15145 S.W. 17th St. Plano TX 75022	1006	5
2	Value Furniture	15145 S.W. 17th St. Plano TX 75022	1006	4

2NF Order Table

O_ID	O_Date	O_Total
1006	10/24/2015	2900

2NF Product Table

P_ID	P_Desc	P_Finish	P_Quan	P_UnitPrice
7	Dining Table	Natural Ash	2	800
5	Writer's Desk	Cherry	2	325
4	Entertainment Center	Natural Maple	1	650

3NF Invoice Table

C_ID	O_ID	P_ID
2	1006	7
2	1006	5
2	1006	4

3NF Customer Table

C_ID	C_Name	C_Address
2	Value Furniture	15145 S.W. 17th St. Plano TX 75022

3NF Order Table

O_ID	O_Date	O_Total
1006	10/24/2015	2900

3NF Product Table

P_ID	P_Desc	P_Finish	P_Quan	P_UnitPrice
7	Dining Table	Natural Ash	2	800
5	Writer's Desk	Cherry	2	325
4	Entertainment Center	Natural Maple	1	650

Provide your answer in MS Word file and submit it and the model file (mwb file) to Canvas. Handwritten answers will not be accepted.