(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.

Diagram

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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 |

1. (20) Try to understand the table and identify all the functional dependencies of the data shown in the table. The answer should be in the following format:
   * colName1 🡪 colName2, colName3.
   * In this case, colName1 is the determinant, and colName2 and colName3 are dependents. State any assumptions you make about the data and the attributes shown in the form if necessary.

Functional Dependencies:

Project ID -> Title, Proj Manager, Proj Budget

Employee ID -> Employee Name

Dept No -> Dept Name

Project ID & Employee ID -> Hourly Rate (I’m assuming this because A. Soo makes 30 on P10 and 20 on P20)

1. (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. Your answer in 2NF and 3NF should be in the following format:



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Col1 | Col2 | Col3 | Col4 | Col5 | Col6 |

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.

The table is already in 1NF so, the first step would be to convert it to 2NF, which also happens to be 3NF ( I believe)

The primary keys are:

Project: Project ID

Table

Description automatically generated Employee: Employee ID

Dept: Dept No



Pay Rate: Project ID & Employee ID

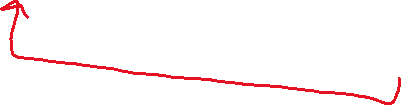
Table

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Table

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Table

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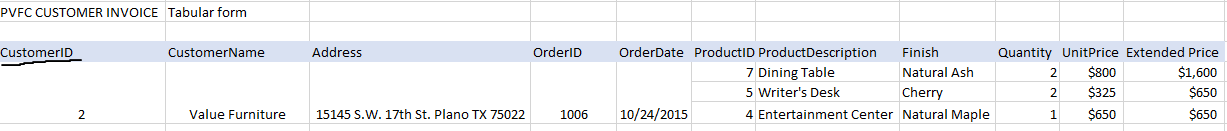


3. (50) Consider the following invoice data.

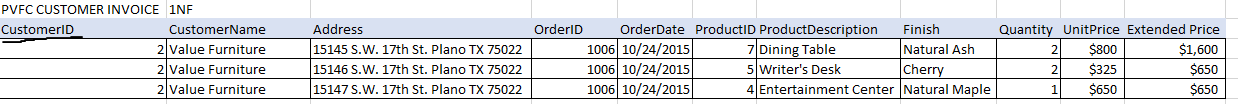
A piece of paper with writing

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1. (10) Convert the invoice data to a tabular form. Your answer should look like the table shown in the following:



1. (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)

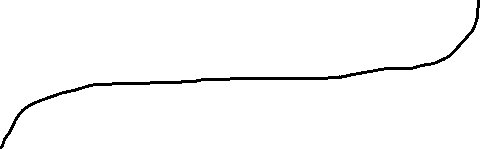
2NF & 3NF)Table

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Table

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Table

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