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

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

Diagram

Description automatically generated

//Add screenshot and add file

Diagram

Description automatically generated

Save the model as hw4-lastname.mwb file.

2. (50) The following shows a patient medication data form for a hospital.

Table

Description automatically generated

1. (20) Identify all the functional dependencies of the data shown in the form. 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.

PatientNumber 🡪 FullName, BedNumber, RoomNumber, RoomName

RoomNumber 🡪 RoomName

DrugNumber 🡪 Name, Description, Dosage, MethodofAdmin

DugNumber, PatientNumber, unitsPerDay 🡪 startDate, finishDate

(b) (20) Describe and illustrate the process of normalizing the table shown in the table to 3NF relations. You need to first show 1NF, and 2NF, and then 3NF form. Identify the primary and foreign keys in your 3NF relations. Your answer can 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 arrows from the foreign key to the primay key. Show a proper name for each table, as shown.

1NF:

Table in the form of a relation with the PatientNumber + DrugNumber + UnitsPerDay together are the primary key.

Patients\_Drugs

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PatientNumber | fullName | BedNumber | roomNumber | roomName | DrugNumber | Name | Description | Dosage | MethodOfAdmin | UnitsPerDay | StartDate | FinishDate |

2NF:

Removed all partial dependencies

Patient:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PatientNumber | FullName | BedNumber | RoomNumber | RoomName |

Drugs:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DrugNumber | Name | Description | Dosage | MethodOfAdmin |

Patients\_Drugs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DrugNumber | PatientNumber | UnitsPerDay | StartDate | FinishDate |

3NF:

Removed Transitive dependency

Rooms:

|  |  |
| --- | --- |
| roomNumber | roomName |

Patients:

|  |  |  |  |
| --- | --- | --- | --- |
| Patient Number | Full Name | Bed Number | roomNumber |

Patients\_Drugs:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Patient Number | Drug Number | Units Per Day | Start Date | Finish Date |

Drugs:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Drug Number | Name | Description | Dosage | Method of Admin |

3. (40) Consider the following invoice data.

A piece of paper with writing

Description automatically generated with low confidence

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

Table

Description automatically generated

CustomerInvoice

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Customer  ID | Customer  Name | Customer Address | Order  ID | Order  Date | Product  ID | Product  Description | Finish | Quantity | Unit Price | Extended Price |
| 2 | Value Furniture | 15145 S.W. 17th St. Piano TX 75022 | 1006 | 10/24/2015 | 7  5  4 | Dining Table  Writer’s Desk  Entertainment Center | Natural Ash  Cherry  Natural Maple | 2  2  1 | $800.00  $325.00  $650.00 | $1600.00  $650.00  $650.00 |

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

Table

Description automatically generated

1NF:

Customers\_Orders

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Customer  ID | Customer  Name | Customer Address | Order  ID | Order  Date | Product  ID | Product  Description | Finish | Quantity | Unit Price | Extended Price |
| 2 | Value Furniture | 15145 S.W. 17th St. Piano TX 75022 | 1006 | 10/24/2015 | 7 | Dining Table | Natural Ash | 2 | $800.00 | $1600.00 |
| 2 | Value Furniture | 15145 S.W. 17th St. Piano TX 75022 | 1006 | 10/24/2015 | 5 | Writer’s Desk | Cherry | 2 | $325.00 | $650.00 |
| 2 | Value Furniture | 15145 S.W. 17th St. Piano TX 75022 | 1006 | 10/24/2015 | 4 | Entertainment Center | Natural Maple | 1 | $650.00 | $650.00 |

2NF:

Customers

|  |  |  |
| --- | --- | --- |
| CustomerID | CustomerName | CustomerAddress |
| 2 | Value Furniture | 15145 S.W. 17th St. Piano TX 75022 |

Orders

|  |  |
| --- | --- |
| OrderID | OrderDate |
| 1006 | 10/24/2015 |

Products

|  |  |  |  |
| --- | --- | --- | --- |
| ProductID | ProductDescription | Finish | UnitPrice |
| 7 | Dining Table | Natural Ash | $800.00 |
| 5 | Writer’s Desk | Cherry | $325.00 |
| 4 | Entertainment Center | Natural Maple | $650.00 |

Cutomers\_Orders\_Products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| OrderID | CustomerID | ProductID | Quantity | Extended Price |
| 1006 | 2 | 7 | 2 | $1600.00 |
| 1006 | 2 | 5 | 2 | $650.00 |
| 1006 | 2 | 4 | 1 | $650.00 |

3NF:

Customers

|  |  |  |
| --- | --- | --- |
| CustomerID | CustomerName | CustomerAddress |
| 2 | Value Furniture | 15145 S.W. 17th St. Piano TX 75022 |

Orders

|  |  |
| --- | --- |
| OrderID | OrderDate |
| 1006 | 10/24/2015 |

Products

|  |  |  |  |
| --- | --- | --- | --- |
| ProductID | ProductDescription | Finish | UnitPrice |
| 7 | Dining Table | Natural Ash | $800.00 |
| 5 | Writer’s Desk | Cherry | $325.00 |
| 4 | Entertainment Center | Natural Maple | $650.00 |

Cutomers\_Orders\_Products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| OrderID | CustomerID | ProductID | Quantity | Extended Price |
| 1006 | 2 | 7 | 2 | $1600.00 |
| 1006 | 2 | 5 | 2 | $650.00 |
| 1006 | 2 | 4 | 1 | $650.00 |

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