## Homework # 1

## Data Normalization

This homework is worth 70 points (70/1000, or 7%) toward your final grade.

Create 3rd Normal Form Schemas for the business documents depicted in your "Case Study" text, specifically the "**Customer Record**" and the "**Retail Sales Ticket**" forms used by the Eden Landscaping company.  Your final 3NF column should show entities, attributes and primary keys for all the data appearing in these documents.

## Submission

You should present your finished results in a "Spreadsheet" format as provided in the example below that we looked at in class.  Please save your spreadsheet as a PDF and submit the PDF via Moodle where the assignment appears in the Week Four materials.

## Spreadsheet

Record your results in columnar format imitating the spreadsheet template provided. Your spreadsheet should have four columns:

Unnormalized          1st Normal Form          2nd Normal Form          3rd Normal Form

Begin by listing, for each document, all data elements ("attributes") on the document in the "unnormalized" column.

List the document name in UPPER CASE and HIGHLIGHT it in yellow.

For example:

Unnormalized
CUSTOMER ORDER
Order Number
Order Date
Delivery Date
Customer Number
Customer Name
Etc.
Etc.

After listing all data elements ("attributes") in the "unnormalized" column for these two documents, then go through the list and put all data into First Normal Form. Replace each document name with an entity name as needed. If an attribute appears on multiple documents (for example, CustomerName), then you should only list it once in your First Normal Form column.

Identify the Primary Keys by highlighting them in a different color other than yellow (as you see in grey in the example below.)

Do the same for the second and third normal form columns.

Your final 3NF column should contain all the data in all the documents organized by entity, listing all attributes in each entity with primary keys defined.

If an entity does not change from first to third normal form, then simply copy and paste the data in the second normal form column to show that the data is already in second normal form. HINT: you'll know this if the entity has an atomic key – that is, NOT concatenated/compound. Without a compound key, the data is already in 2NF.

Example:

| | A | UNNORMALIZED | C | FIRST NORMAL FORM | E | SECOND NORMAL FORM | G | THIRD NORMAL FORM |
|---|---|---|---|---|---|---|---|---|
| 1 | | UNNORMALIZED | | FIRST NORMAL FORM | | SECOND NORMAL FORM | | THIRD NORMAL FORM |
| 2 | | Customer Order | | Customer Order | | Customer Order | | Order |
| 3 | | Order Number | | Order Number | | Order Number | | Order Number |
| 4 | | Order Date | | Order Date | | Order Date | | Order Date |
| 5 | | Delivery Date | | Delivery Date | | Delivery Date | | Delivery Date |
| 6 | | Customer Discount | | Customer Discount | | Customer Discount | | discount amount |
| 7 | | discount amount | | discount amount | | discount amount | | invoiced amount |
| 8 | | invoiced amount | | invoiced amount | | invoiced amount | | customer number |
| 9 | | customer number | | customer number | | customer number | | order total |
| 10 | | customer name | | customer name | | customer name | | |
| 11 | | bill to address | | Contact | | Contact | | Customer |
| 12 | | bill to city | | ContactType | | ContactType | | customer number |
| 13 | | bill to state | | bill to address | | bill to address | | customer name |
| 14 | | bill to zip | | bill to city | | bill to city | | Contact |
| 15 | | ship to address | | bill to state | | bill to state | | ContactType |
| 16 | | ship to city | | bill to zip | | bill to zip | | bill to address |
| 17 | | ship to state | | ship to address | | ship to address | | bill to city |
| 18 | | ship to zip | | ship to city | | ship to city | | bill to state |
| 19 | --- | Product Number | | ship to state | | ship to state | | bill to zip |
| 20 | \| | Description | | ship to zip | | ship to zip | | ship to address |
| 21 | \| | quantity ordered | | order total | | order total | | ship to city |
| 22 | --- | unit price | | OrderProduct | | OrderProduct | | ship to state |
| 23 | | order total | | Order number | | Order number | | ship to zip |
| 24 | | | | Product Number | | Product Number | | OrderProduct |
| 25 | | | | Product Description | | Quantity | | Order number |
| 26 | | | | Quantity | | unit price | | Product Number |
| 27 | | | | unit price | | total | | Quantity |
| 28 | | | | | | Product | | unit price |
| 29 | | | | | | Product Number | | total |
| 30 | | | | | | Product Description | | Product |
| 31 | | | | | | | | Product Number |
| 32 | | | | | | | | Product Description |