**SWEN-220  Entity Relationship Modeling Project  
Brick City Widgets**

**Problem Statement**

Brick City Widgets is an up and coming company which manufactures and sells a unique line of widgets. Widgets are organized by widget product lines. For example, the Way Too Cool product line includes the Low-Tone, High-Tone and No-Tone widget products.

Widgets are designed and manufactured at work centers by Brick City employees. Each employee is identified by their employee ID, name and address. Employees also have one or more skills associated with them such as Widget Welder, Widget Designer I, etc. Employees are supervised by another employee designated to be a supervisor. Employees report to exactly one supervisor. There is one supervisor per work area.

The material used to build widgets is supplied by approved vendors. Vendors are identified by a vendor ID and vendor name. The supplied material has a material identifier, material name, unit cost of the material and number of units supplied. Brick City tracks each vendor delivered order by the total cost of that unit and the order date.

Widget products are manufactured at work centers from the materials acquired from supply vendors. The composition of a product includes the name and quantity of material needed in the manufacturing process. As mentioned above products are organized into product lines. Each product has a unique product identifier, product name and price.

Widgets are purchased by customers identified by a customer ID, name, email and zip code. Customers submit orders directly to Brick City. Orders may include one or more different widget products referenced as a line item of the order. An order is identified by an order ID, the date it was received and the date it shipped.

Brick City outsources its customer assistance services to a group of sales representatives that are responsible for sales territories based on zip code. Each territory is assigned to a single salesperson that is identified by a salesperson ID, name and email. Territories are identified by a territory ID and name.

**Submission**

Submit a pdf version of this document and the electronic version (pdf, jpg) of your ERD to the myCourses dropbox named “Brick City Widgets”. Please submit two files (not a zip).

1. List the Entities to be included in the E-R Model:
2. List the attributes to be included in the E-R Model:
3. List the Relationships to be included in the E-R Model. Identify the cardinality of each relationship (1:N, N:M) and the Role of each Entity.
4. List 8-10 “queries” that you can use to test your model.
   * Example: “List all the employees by name in a specific work center”
5. Create an Entity Relationship Diagram (ERD)
   * You are free to use any ERD or drawing tool you would like.
   * Pick the notation of your choice, but use it consistently in your ERD.
6. Create a Logical or Relational Model using RSN based on your ERD in the form:
   * Relation( attribute1, attribute2, ….. )
   * Underline Primary key attribute(s)
   * Circle Foreign key attribute(s)

### Entities

Employees, Widgets, Vendor, Product, Customer, SalesPerson, Orders, Materials, Territories

### Attributes/Keys

Employees 🡪 \*Employee ID, name, address

Widget 🡪 name

Vendor 🡪 \*vendor ID, name

Product 🡪 \*product identifier, name, price

Customer 🡪 \*customer ID, name, email, zip code

SalesPerson 🡪 \*SalesPerson ID, name

Order 🡪 \*order ID, date

Materials 🡪 \*Material identifier, name, unit\_cost, no\_of\_supplied

Territories 🡪 Territory ID, name

### Relationships

Widgets 🡨(N:M)🡪 Employees (design)

Widget (made of) 🡨(1:N)🡪 Materials

Materials 🡨(N:1)🡪 Vendors (supply)

Product 🡨(N:1)🡪 Customer (requests)

Customer 🡨(1:N)🡪 Orders (places)

SalesPerson 🡨(1:N)🡪 Orders (fulfills)

SalesPerson 🡨(1:1)🡪 Territory (assigned to)

**Test Queries**

Select \* from Widgets;

Select \* from Materials;

Select \* from Vendors;

Select \* from Employees;

Select \* orders where data==’5/6/2016’;

Select \* from SalesPerson where Territory\_ID == ‘246’;

Select \* from Orders where Order\_ID >= ‘1000’;

Select Customer.name, Product.name from Customer INNER JOIN Product WHERE Customer.customerID == Product.customerID;

**Relations**

Employee( EmployeeID, name, address )

Widget( name )

Vendor( vendorID, name )

Product( productID, name, price )

Customer( customerID, name, email, zip code )

SalesPerson( SalesPersonID, name )

Order( orderID, date )

Material( MaterialID, name, unit\_cost, no\_of\_supplied )

Territory( TerritoryID, name )