A – **Conceptual design** for "E-Shopping Company"

Deliverables (2):

1) **ER Diagram**   *(may be hand-drawn if very neatly printed/drawn)*
> *Commonly used ER modeling notations:*   *- Chen model notation (as shown in class slides)*
> *- UML (Unified Modeling Language)*
> *- Crow's Feet Notation*

> **For this asgn, use the CHEN model notation**

> *Alternative methods to describe relationships' cardinality & participation:*
> *- 1:1, 1:M, M:N along with single/double lines for partial/total participation*
> *(as shown in class slides and the YeOleBank ER Diagram for part B)*
> *- min . . max [where min indicates partial (0) or total (1) participation*
> *and max indicates cardinality (1, or >1 implies M)]*

> **For this asgn, use the first method** (1:1, 1:M, M:N and single/double lines for participation)

2) **Attribute List** *(must be done with text-editor or word processor)* – includes:
> - attribute name (descriptive, commonly-used abbreviations OK, in the form: e.g., lastName)
> - datatype
> - domain description including all constraints (PK, partial key, unique, check, not null)
> & default
> - description (if attribute name doesn't fully describe it)
> - stored or derived
>
> *[Group attributes by the owner-entity or owner-relationship]*

The E-Shopping Company

This mail-order company provides its customers with the ability to shop and place orders over the web. The company sells a wide range of products, each of which has the following information displayed on its web page: a unique picture, a name (perhaps duplicated), a model# (sometimes, where relevant to the product), the manufacturer (sometimes), a weight (used to calculate shipping, but not displayed), its 3 dimensions (used to calculate shipping, but not displayed) and a description associated with it. To make DB processing easier, each product also has a unique 6-digit number assigned to it by the DBS. Products come in a variety of sizes (e.g., S, M, L, XL, XXL) and colors. The price is always the same for a particular product, regardless of the item size or color. A customer can only order items from the current inventory (i.e., an item is a particular size & particular color product), if there's a sufficient quantity in stock for that particular size & color required. Inventory items each have a 2-digit numeric code assigned to them, unique within a particular product.

Customers browse the on-line store by category (e.g., electronics, books, clothing, miscellaneous) in order to find the product he/she wants and the range of items (colors, sizes) in stock. To make DB processing easier, each category is assigned a unique 3-char code, besides having its category name (e.g., electronics) and brief-

example-list (e.g., "digital cameras, mp3 players, etc."). Each product that the store sells falls into only 1 category.

The DB needs to store customer information including name (last & first), address (street, apt#, city, state, zip code), phone number (area code & number) and email address. To place an order, the customer must be a registered user and thus have a login name (which must be unique, of course) and a password. A customer can browse the website without ordering anything. Certain customers are "Preferred Customers" and thus can be billed for their order rather than paying at the time of their order.

While shopping, a customer places inventory items (i.e., a particular size & color for a specific product) into his/her shopping cart and specifies the quantity for that item. (A customer cannot order more items than are currently in stock – nor order colors or sizes of a product which have 0 quantity in stock). When a customer first puts an item(s) in his/her cart, a unique 8-digit number is assigned to the cart along with the date and time. The current total cart price is kept (referred to as "Cart Price") (calculated as the sum of all the item-purchases in the cart, where each item-purchase is the quantity ordered * price for that product). The contents of the shopping cart can be updated until the user checks out – e.g., the quantity ordered for a particular item can be changed, items can be added or removed from the cart.

When a customer checks out, his/her cart is reclassified as a completed order ready for shipping (referred to as "The Order"). It has a shipping date associated with it (calculated as the current date + 5 business days). It also has a final order price (calculated as the cart price plus the state sales tax plus shipping costs). Payment information includes payment type (credit card, paypal, billed, other).

When "The Order" is completed, the cart is emptied, and the customer can start another order. A customer can have at most 1 shopping cart at a time (for a particular on-line session) – but that cart can include many item-purchases. Two customers cannot share a shopping cart. Information about customers and their orders is maintained in the DB for 3 years.

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B – **Logical design** for "Ye Olde Bank"

Deliverable: Logical Schema *(must be done with text-editor or word processor)*

FORMAT: TableName (<u>primaryKey</u>, attribute1, ... attributeN)
>   FK: attribute4 references OtherTableName (otherAttributeName)

ER Diagram provided in class.

Make these changes to the ER Diagram before mapping it to its relational model:
- All addresses subdivided into streetAddress, City, State (2-char), zipcode (9-digit)
- All person-names are subdivided into firstName and lastName