

# EVERYTHING AUTO

## ONLINE CHANNEL AND INVENTORY SYSTEM

A sample business case designed to facilitate discussions in a classroom context.

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Everything Auto (EA) is a dealership which sells a variety of auto-part products. It maintains partnerships with a list of vendors who supply auto-part products. With its impressive growth over the past 3 years, EA has expanded its business into different regions in Ontario and Quebec with 6 stores.

Most sales are currently conducted in stores or by customers calling in to place orders.

The current data that EA collects includes financial info (orders, billing), customer information, inventory, vendors, sales, promotions are stored in Excel and flat files local to each store. A self-taught IT technician who is also the firm's accountant maintains all aspects of the firm's IT.

EA believes that there is a great potential demand for their products. If customers could reach them via an online channel, view product catalogue, and place orders, sales would increase. There is also a need for process efficiency improvement, which would reduce the amount of manual work for bookkeeping and taking orders via telephone. Product inventory would be tracked in real-time to support just-in-time stock level requirements and facilitate better integration with suppliers.

Your team has been hired as consultants to build the online order system and create a centralized relational database to support both internal and external operations.

For this exercise, you are only required to focus on designing a database for the online order system.

## **A) Review the business case from the business owner's viewpoint**

You would play a role as a consulting team to identify the business opportunities & challenges before looking into technologies as enablers. Ask the follow questions:

1. What is the business goal the business owner seeks when this project is implemented? For example: Increase sales and maximize profit.
2. What are the operations this project will support to achieve the business goal?
  - a. Provide an online channel to reach customers across different geographic locations and potentially globally; order fulfillment is open 24/7.
  - b. Online transactions require less support operations, hence would reduce operating costs
  - c. Inventories tracked in real time hence would result in more effective supply chain operation and vendors/supplier management
  - d. Online customer data are collected for analysis to better support customers and identify opportunities to boost sales
  - e. Financial operations are carried more effectively and timely
    - i. Monthly, quarterly, bi-annually, and annually sales per store
    - ii. Revenue versus expense per store
  - f. Track customer acquisition costs and loyalty to provide customer insights
3. Other supportive operations
  - a. Customer can register online and create a shopping account
  - b. Customer can define methods of payment (visa, master card), contact information, shipping information
  - c. Personnel have different roles: admin, sales, managers
  - d. Orders' HST and Total amount generated real time based on order items
  - e. Invoices can be generated and printed

## **B) Review the business case from the project implementation perspective.**

Ask the following questions

1. Who are the key stakeholders of this project (they are the people you will need to interview to gather detailed business requirements and later define system requirements)?
  - a. Business owner
  - b. Store managers
  - c. Accountant
  - d. Technician
  - e. Store/sales staffs
  - f. Inventory management staffs
2. What is the data being collected today?
3. Where is data being stored (files, hardcopy, book of records...)
4. What is new data to be collected?

5. What are the data types to be collected to support the new online order system with regard to the operations identified in Section A) 2.

### **C) Database Design**

Items to be in focus:

- List of Entities
- Use purpose (support what operations)
- Entities and their attributes
- Relationships between the entities
- Entity Diagrams
- Entity physical specifications (required an underlying DB, I.e MySQL, to support, data types, constrains, etc.)

#### **1. Conceptual Data Model -- Identify the data entities required for the system**

- a. Customer
- b. CustomerAccount
- c. Contact
- d. Store
- e. Personnel
- f. Suppliers
- g. Order
- h. Order Item
- i. Product
- j. Payment
- k. Customer Contact
- l. Shipment
- m. Inventory

#### **2. Logical Data Modelling – Identify the attributes for each data entity**

Entity	Attributes
Customer	Customer ID, First Name, Last Name, Date of Birth, Registered Date
Customer Contact	Contact ID, Apt Unit, Address, City, Province, Country, Postal Code, Phone 1, Phone 1, Phone 1 Label, Phone 2, Phone 2 Label, Email
CustomerAccount	AccountID, Password, Active, CreatedDateTime, LastUpdatedDateTime, LastLogOn

Store	Store ID, Address, City, Province, Country, Postal Code, Phone, Fax, Email
Payment	Payment ID, Payment Method, Card Number, Card Holder First Name, Cust Holder Middle Name, Card Order Last Name, Card Expiry Date, Card Security Code
Order	Order ID, Order Date, Customer ID, Salesperson ID, Shipment ID, Promotion Code, Shipment Cost, HST, Total Amount, Note
Order Item	Order Item ID, Order ID, Product ID, Unit Price, Quantity, Total Amount
Product	Product ID, Skew Code, Name, Description, Manufactured Date, Origin Country, Supplier ID
Supplier	Supplier ID, Name, Description, Address, City, Province, Country, Postal Code, Phone, Fax, Email, Website
Personnel	Personnel ID, First Name, Last Name, Department, Role, Phone, Email
Shipment	Shipment ID, Description, From Address, To Address ID, Customer ID, Shipment Start, Expected Delivery Date, Status
Inventory	Inventory ID, Product Id, Quantity Available, Note

### Entity Relationship Analysis

- a) A Customer may have 1 or more Contact's, e.g. Home Address, Shipment Address
- b) A Customer may have 1 or more Payment's method, e.g. Visa 1, Visa 2, Master Card
- c) An Order has 1 or more Order Item's
- d) An Order Item has 1 and only 1 product
- e) An Order has 1 Shipment
- f) A Supplier has 1 or more Product's
- g) An Inventory has 1 Product
- h) An Inventory has 1 Supplier
- i) A Store has 1 manager
- j) A Store has several employees
- k) An employee may work for several stores

Note: Managers and employees are part of Personnel

### Entity Relation Diagram

*To be specified*

### 3. Physical Data Modelling

CUSTOMER	
CustomerID	INT PRIMARY KEY AUTO_INCREMENT
FirstName	VARCHAR(50) NOT NULL
LastName	VARCHAR(50) NOT NULL
DateOfBirth	MEDIUMINT NOT NULL
RegisteredDate	MEDIUMINT NOT NULL
CreatedDateTime	DATETIME NOT NULL
UpdatedDateTime	DATETIME NOT NULL

CONTACT	
ContactID	INT PRIMARY KEY AUTO_INCREMENT
AptUnit	SMALLINT
Address	VARCHAR(50) NOT NULL
City	VARCHAR(50) NOT NULL
Province	VARCHAR(50) NOT NULL
Country	VARCHAR(50) NOT NULL
PostalCode	VARCHAR(10) NOT NULL
Phone1	VARCHAR(10) NOT NULL
LabelPhone1	VARCHAR(20) NOT NULL
Phone2	VARCHAR(10)
LabelPhone2	VARCHAR(20)
Email	VARCHAR(50) NOT NULL

PAYMENT	
PaymentID	INT PRIMARY KEY AUTO_INCREMENT
PaymentMethod	ENUM('V', 'M') NOT NULL
CardNumber	VARCHAR(10) NOT NULL
FirstName	VARCHAR(50) NOT NULL

MiddleName	VARCHAR(50) NOT NULL
LastName	VARCHAR(50) NOT NULL
ExpiryDate	MEDIUMINT NOT NULL
SecurityCode	CHAR(3) NOT NULL

STORE	
StoreID	INT PRIMARY KEY AUTO_INCREMENT
Address	VARCHAR(50) NOT NULL
City	VARCHAR(50) NOT NULL
Province	VARCHAR(50) NOT NULL
Country	VARCHAR(50) NOT NULL
PostalCode	VARCHAR(10) NOT NULL
Phone	VARCHAR(10) NOT NULL
Fax	VARCHAR(10)
Email	VARCHAR(50) NOT NULL

CUSTOMERACCOUNT	
AccountID	VARCHAR(20) NOT NULL
Password	VARCHAR(20) NOT NULL
CreatedDateTime	DATETIME NOT NULL
LastLogOnDateTime	DATETIME NOT NULL
Active	TINYINT NOT NULL
CustomerID	INT
PRIMARY KEY (AccountID)	
FOREIGN KEY(CustomerID) REFERENCES Customer(CustomerID)	

PRODUCT	
ProductID	INT PRIMARY KEY AUTO_INCREMENT
SkewCode	VARCHAR(30) NOT NULL
Name	VARCHAR(50) NOT NULL

Description	VARCHAR(200) NOT NULL
ManufacturedDate	MEDIUMINT NOT NULL
OriginCountry	VARCHAR(50) NOT NULL
SupplierID	INT
FOREIGN KEY (SupplierID) REFERENCES Supplier(SupplierID)	

SHIPMENT	
ShipmentID	INT PRIMARY KEY AUTO_INCREMENT
Description	VARCHAR(50) NOT NULL
FromAddressID	INT
ToAddressID	INT
CustomerID	INT
ShipmentStart	DATETIME NOT NULL
ExpectedDeliveryDate	MEDIUMINT
Status	ENUM('P', 'S', 'R')
FOREIGN KEY (CustomerID) REFERENCES Customer(CustomerID)	
FOREIGN KEY (FromAddressID) REFERENCES Contact(ContactID)	
FOREIGN KEY (ToAddressID) REFERENCES Contact(ContactID)	

INVENTORY	
InventoryID	INT PRIMARY KEY AUTO_INCREMENT
ProductID	INT
QuantityAvailable	INT
Note	VARCHAR(50)
FOREIGN KEY (ProductID) REFERENCES Product(ProductID)	

ORDER	
OrderID	INT PRIMARY KEY AUTO_INCREMENT
OrderDate	MEDIUMINT NOT NULL
CustomerID	INT
SalespersonID	INT
ShipmentID	INT
PromotionCode	VARCHAR(50)
Note	VARCHAR(100)
CreatedDateTime	DATETIME NOT NULL

UpdatedDateTime	DATETIME NOT NULL
FOREIGN KEY (CustomerID) REFERENCES Customer(CustomerID)	
FOREIGN KEY (SalespersonID) REFERENCES Personel(PersonelID)	
FOREIGN KEY (ShipmentID) REFERENCES Shipment(ShipmentID)	

ORDERITEM	
OrderItemID	INT PRIMARY KEY AUTO_INCREMENT
OrderID	INT
ProductID	INT
UnitPrice	DECIMAL(5,2)
Quantity	INT NOT NULL
TotalAmount	DECIMAL(5,2)
FOREIGN KEY (OrderID) REFERENCES Order(OrderID)	
FOREIGN KEY (ProductID) REFERENCES Order(OrderID)	

SUPPLIER	
SupplierID	INT PRIMARY KEY AUTO_INCREMENT
Name	VARCHAR(50) NOT NULL
Description	VARCHAR(50) NOT NULL
Address	VARCHAR(50) NOT NULL
City	VARCHAR(50) NOT NULL
Province	VARCHAR(50) NOT NULL
Country	VARCHAR(50) NOT NULL
PostalCode	VARCHAR(10) NOT NULL
Phone	VARCHAR(10) NOT NULL
Fax	VARCHAR(20)
Email	VARCHAR(50) NOT NULL
Website	VARCHAR(50)

PERSONNEL	
PersonnelID	INT PRIMARY KEY AUTO_INCREMENT



FirstName	VARCHAR(50) NOT NULL
LastName	VARCHAR(50) NOT NULL
Department	VARCHAR(50) NOT NULL
Role	VARCHAR(50) NOT NULL
Phone	VARCHAR(10) NOT NULL
Email	VARCHAR(50) NOT NULL