**CASE STUDY: SALES ORDER SYSTEM**

**1. Objectives**

a) To prepare Conceptual Design using ER Diagram

b) Prepare the relations

c) Normalize the relations up to 3NF

**2. Pre-requisites**

a) ER Diagram Concepts

b) Normal forms up to 3NF

c) Relational database concepts

**3. Skills/concepts**

ER Diagrams, Normalization

**4. Duration in hours**

5 hours

**5. Scenario set up**

General Description

A distribution organization sells its wares through personal contact. Its sales people visit prospective customers either with sample wares or with brochures and other descriptive material. Any customer orders are forwarded by the salesperson either to branch offices or the main office (depending on the salesperson’s location).The orders may be forwarded by mail or by telephone. Each order contains the information shows in Case 1 Table 2.

Case 1 Table 1 An order register

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Order-no | Customer | Salesman | Location | Status | Comment |
| 075 | Rajesh | Kranti | Store7 | Orderd |  |
| 09Z | B.Jog | Stan | In manufacture | Waiting | Expected in August |

Branch offices and the main office have an order-processing clerk who receives orders from salespeople. The order-processing keeps a register of all the orders. A typical register is shown in Case 1 Table .Part of the registration process is to give order a unique number, identify any items not completely describes and allocate the appropriate item codes to items in the order. Any errors or inconsistencies detected by the order-processing clerk are often checked with the salesperson before final registration. The whole order is held over by the order-processing clerk until all inconsistencies have been resolved.

Case Table 2 Information in an order

|  |  |
| --- | --- |
| Sequence | Information |
| 1  2  3  4  5  6 | Customer name  Customer address  Date order taken  Salesperson  Any number of lines containing:   * An item code(if the salesperson remembers it)and an item description; * The quantity of item * The negotiated price   Any special requirements |

COMMISSIONS

The order processing clerk is also responsible for computing the salespeople’s commissions. Salespeople send in their commission invoices at the end of every month, with the commission for each individual order itemized on the invoice. The order-processing clerk must check these invoices for accuracy and verify any detected discrepancies with the salesperson. The order-processing clerk then subtracts any commission for orders cancelled or lost through delivery days. Usually a cancelled or lost order results in only 5% of the normal commission with a limit of $5.The normal is 12.5% for sales generating up to $2500 sales revenue for the month and 15% for amounts that exceed 2500$.When the commission amount is adjusted (if this is necessary)a commission check is ordered and a payment advice is sent to the sales-person. Records of commissions paid to sales person are kept by the order-processing clerk.

CANCELLATIONS:

Occasionally customers cancel orders. These cancellations are telephones through to the order-processing clerk by the salesperson. The order-processing clerk changes the order to reflect the cancellation and also sends a cancellation advice to the expeditor.

ORDERS AND ORDER REGISTERS:

Orders are normally kept by the order-preprocessing clerk, whereas the order register is the responsibility of the expenditure. The order-processing clerk, however, has access to the register to make the initial order entry. The order is also sometimes removed from the order-processing area and sent to other areas if needed.

HOW ORDERS ARE FILLED:

Order can be filled in one of three ways:

* By obtaining the required items from a store(owned by the organization);
* By ordering the items from a manufacturer(or wholesaler);
* By manufacturing it.

It is the job of the order expeditor to choose of these methods. The preferred way is to obtain the item directly from store. If the item is not lovely in store, the next preference is to order it from a wholesaler. The last resort is to manufacture it internally (if it is one of the items from a wholesaler.)The last resort is to manufacture it internally (if it is one of the items produced by the organization). If none of these methods is possible, the order must be rejected.

Each line of the order can be treated separately. Thus items in one order line can be obtained from the store and those from another line by ordering from a manufacturer. In fact, it is also possible to split an order line so that part of it is obtained from one source and part from another.

OBTAINING AN ITEM FROM STORE

The usual approach here is to select one or more orders for processing and formulate an item request to store for all items in these orders. One copy of the item request is sent to store and another retained by the expeditor. Each item has a unique identifier.

The staff at the store will check whether the requested items are in the store and uncommitted. If so the store advises the expeditor accordingly by availability note. A copy of the availability note is kept in the store. This commits the store to hold the item for a specified period. The availability note includes a commitment number and length of commitment. A subsequent order must quote the commitment number. If the expeditor requires the items requested in the availability note,a store order is sent. The store checks each received order against its record of availability notes and if the order quotes a current commitment number, that order is met. If there is no current commitment number for the order then the store file is checked for item availability. If the item is available then it is available then it is issued; otherwise the order id rejected.

PLACING WHOLESALER PURCHASE ORDERS:

Suppose the expeditor cannot get an item from store? In this the expeditor will attempt to buy the item from a wholesaler. The expeditor will search a wholesaler file, select a wholesaler, negotiate a price and delivery date, and then prepare a wholesaler order request register.

Purchase order processing is done centrally. The wholesaler order request form (prepared by the expeditor)is sent to the main office for processing. At the main office, the purchased order request form is first keypunched and then read into the machine. The machine then generates the purchase orders. If the delivery matches the purchase order, it is accepted; otherwise, a query is sent back to the wholesaler.

The whole sale supplies the goods together with a delivery advice. The delivery advice is checked against the purchase orders. If the delivery matches the purchase order, it is accepted; otherwise, a query is sent back to the wholesaler. Advice about accepted orders is sent back to the expeditor from the main affice,together with the delivered goods.

Currently a computer system is available to keep track of orders sent to wholesalers.

This system consists of a suite of programs made up of:

* INPUT-reads cards containing details of the wholesaler order as prepared by the expeditor (see case 1 table 3).Edits the cards and creates an ORDER INPUT file.
* PURCHASE-ORDER-GENERATE(POGEN)-generates purchase orders once a week to take advantage of grouping lines from different customer orders into larger purchase orders to obtain volume discounts. A file of generated purchase orders is also created.
* DELIVERY-receives delivery advice from suppliers and correlates it against generated purchase orders.
* READY-prepares advice about customer order lines that been fulfilled by a delivery.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Manufacturer/  Wholesaler | Date | Item-Code | Qty-needed | Customer-order-no | Order-line |

INVOICES FROM WHOLESALERS

Wholesalers send invoices for provided for good. These invoices are received by the accounts department. They are checked against the purchase orders and, if correct, a check is issued. Any discrepancies between the invoice, purchase order and delivery advice must be resolved before a check can be issued to the wholesaler.

DELIVERY TO THE CUSTOMER:

The expeditor forwards the goods to the customer as soon as they received from the store wholesaler. The goods are sent, together with a goods provided advice. At the same time the expeditor checks then a completed order advice, together with this order, is sent to the invoice clerk.

OTHER ACTIVITIES

Customers may ring to enquire about the status of their orders. The enquiry is usually made to the salesperson who then refers it to the order-processing clerk. The order processing clerk attempts to answer the query by referring to the orders register and then searching for the order together with any attachments.

Invoices are sent to a customer as soon as an order is filled. The invoice is prepared by the invoice clerk, who receives the complete order from the expeditor.

The store has a computer-based ordering system. This keeps track of standard lines and automatically generates orders for them (as soon as a reorder point is reached).Updates to the store database are made in batch. Cards are punched for any orders from the expediter and these are used to generate stores issues. An on-line terminal is used to look-up the current stock quantities. The order processing clerks are responsible for compiling monthly reports on sales volumes by item and area.

QUANTITY OF DATA

The quantity of data for this case os given 1 table 4

|  |  |
| --- | --- |
| Data | Quantity |
| Number of orders  Average lines/orders  Average vakue of an order  Percentage of request met by the store  Average time to get item from manufacture  Average number of lost orders  Average time from registration to store issues  Delivery time(expeditor to customer)  Time to issue items from store to expeditor  Average duration for order registration and other processing  Number of order processing points  Number of salespeople | 100/day  3  $250  70%  14 days  15%  2-5 days  2 days  (sometimes longer)  2 days  1-2 days  15  200 |

**6. Deliverables**

1) ER-diagram

2) Normalized tables UPTO 3NF.

**7. References**

http://hstslc007/eltplearning/RDBMSConcepts /index.html

Fundamentals of database systems by Elmasri & Navathe

An introduction to DBMS by C.J.Date

Database management systems by Korth