

# SAMPLE CASE STUDY: PAY JUNCTION

## Background

Pay Junction is a company that performs order processing and manages payment realizations for other organizations.

## Existing System

Pay junction maintains separate files for storing customer details and order details. The Customer Details file consists of records such as customer code, customer name, company name, address, country, phone number, and billing address.

When an order is processed, various parameters that affect the order are filled in a form and then analyzed. The format of the Order Processing form is shown in the following figure.

ORDER PROCESSING	
Order code:	Order Details code:
Customer code:	Order Date:
Product code:	Product Name:
Quantity:	Unit Price:
Discount:	
SHIPMENT DETAILS	
Shipment Name:	Shipping Address:
Shipping Country:	Contact Phone:
Shipping Date:	Shipping Mode ID:
Shipping Mode:	Freight Charges:
Tax:	
Total Value:	

The data related to the order and shipment is transferred from the Order Processing form to the Orders file. The data related to the products ordered is stored in the Products file.

The payments for orders are accepted through cash or credit card. When the customer makes the payment, the Payments file is updated with the data about payment code, order code, payment amount, payment date, payment mode ID, payment mode, and credit card details if the customer pays through a credit card. The credit card details consist of card number, cardholder's name, and card expiry date.

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## Envisioned System

Pay Junction has decided to stop manual data storage and start computerized database management and order processing. This would also enable the company to have quicker communication with the clients.

A small group of database designers have been deployed by Pay Junction to develop a computerized system of order processing and database management. Pay Junction also wants to include the information about an employee who processes an order. This information will include the employee code, name, title, and phone number.

The development team needs to perform the following activities:

1. Identify the various entities involved.
2. Identify the attributes that completely define the entities.
3. Draw an E/R diagram to demonstrate the relationship between the various entities.
4. Map the E/R diagram to the tables.
5. Normalize the tables to 3 NF.
6. Identify the primary and foreign keys in the tables.
7. Draw a diagram to show the relationships between the various tables.

# SAMPLE PROJECT DOCUMENTATION: PAY JUNCTION

## PROJECT ON

*Pay Junction*

Developed by

Name: *Debbie Howe*

Reg. No.: *4701-10-258*

# NIIT

# Pay Junction

(Project Title)

Batch Code :  
Start Date : *June 1, 2007* End Date: *June 10, 2007*  
Name of the Coordinator : *Alex Norton*  
Name of Developer : *Debbie Howe*  
  
Date of Submission : *June 11, 2007*



## CERTIFICATE

This is to certify that this report titled Pay Junction embodies the original work done by Debbie Howe in partial fulfillment of their course requirement at NIIT.

Coordinator:

*Alex Norton*

## **ACKNOWLEDGEMENT**

We have benefited a lot from the feedback and suggestions given to us by Mr. Alex Norton and other faculty members.

## SYSTEM ANALYSIS

**System Summary:** Pay Junction is a company that has been taken up by a leading leather accessories manufacturer for order processing and managing payment realizations. Pay Junction maintains separate files for storing customer details and order details. When an order is processed, various parameters that affect the order are filled in a form and then analyzed. The payments for orders are accepted through cash or credit card.

## ENTITIES

**Number of entities: 5**

**Names of entities:**

1. Customers
2. Orders
3. Products
4. Payments
5. Employees



## ATTRIBUTES

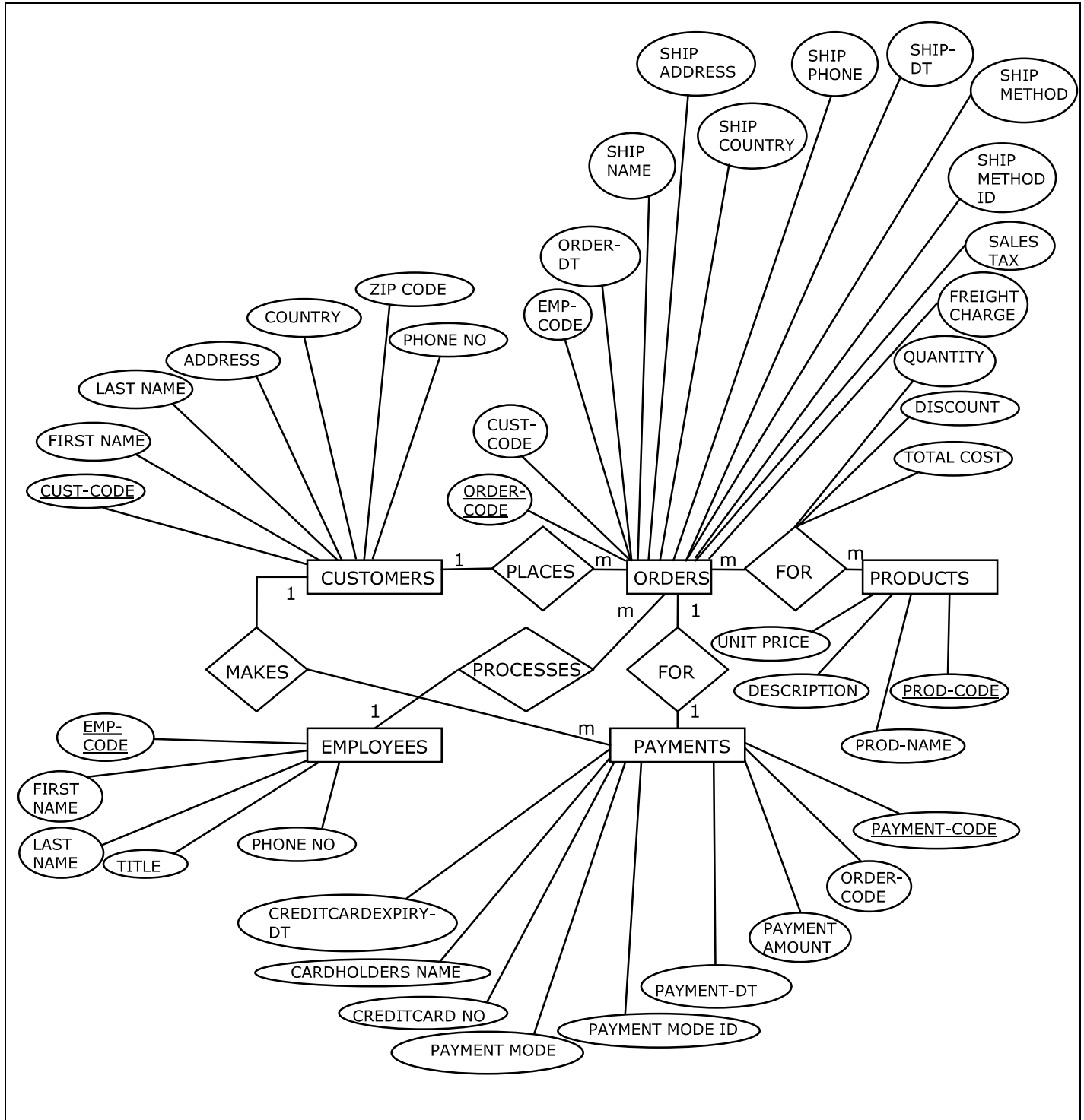
### Attributes:

The various entities and their attributes are listed in the following table.

Entity	Attributes
Customers	Cust-Code First Name Last Name Address Country Zip Code Phone No
Orders	Order-Code Cust-Code Prod-Code Emp-Code Order-Dt Ship Name Ship Address Ship Country Ship Phone Ship-Dt Ship Method Id Ship Method Freight Charge Sales Tax Quantity Discount Total Cost
Products	Prod-Code Prod-Name Description Unit Price
Payments	Payment-Code Order-Code Payment Amount Payment-Dt Payment Mode Id Payment Mode CreditCard No Cardholders Name CreditCardExpiry-Dt

Entity	Attributes
Employees	Emp-Code First Name Last Name Title Phone No

# E/R DIAGRAM



# TABLES

**Number of Tables:** 6

**Structure of Tables:** The table structures are shown here.

**Customers** [Entity]

Customers
Cust-Code
First-Name
Last-Name
Address
Country
Zip-Code
Phone-No

**Orders** [Entity]

Orders
Order-Code
Cust-Code
Emp-Code
Order-Dt
Ship-Name
Ship-Address
Ship-Country
Ship-Phone
Ship-Dt
Ship-Method-ID
Ship-Method
Freight-Charge
Sales-Tax

**Order Details** [Relationship]

Order Details
OrderDetail-ID
Order-Code
Prod-Code
Quantity
Discount
Total-Cost

**Products [Entity]**

Products
Prod-Code
Prod-Name
Description
Unit-Price

**Payments [Entity]**

Payments
Payment- Code
Order-Code
Payment-Amount
Payment-Dt
Payment-Mode- ID
Payment-Mode
Credit Card-No
Card Holders-Name
CreditCardExpiry-Dt

**Employees [Entity]**

Employees
Emp-Code
First-Name
Last-Name
Title
Phone-No

The Order Details table is formed because of a many-to-many relationship between the Orders and Products entities.

## TABLES AFTER 1 NF

The tables are already in 1 NF. The table structures are shown here.

**Customers**

Customers
Cust-Code
First-Name
Last-Name
Address
Country
Zip-Code
Phone-No

**Orders**

Orders
Order-Code
Cust-Code
Emp-Code
Order-Dt
Ship-Name
Ship-Address
Ship-Country
Ship-Phone
Ship-Dt
Ship-Method-ID
Ship-Method
Freight-Charge
Sales-Tax

**Order Details**

Order Details
OrderDetail-ID
Order-Code
Prod-Code
Quantity
Discount
Total-Cost

### Products

Products
Prod-Code
Prod-Name
Description
Unit-Price

### Payments

Payments
Payment- Code
Order-Code
Payment-Amount
Payment-Dt
Payment-Mode- ID
Payment-Mode
Credit Card-No
Card Holders-Name
CreditCardExpiry-Dt

### Employees

Employees
Emp-Code
First-Name
Last-Name
Title
Phone-No

## TABLES AFTER 2 NF

The tables are already in 2 NF as the attributes in each table depend on the primary key. The table structures are shown here.

### Customers

Customers
Cust-Code
First-Name
Last-Name
Address
Country
Zip-Code
Phone-No

### Orders

Orders
Order-Code
Cust-Code
Emp-Code
Order-Dt
Ship-Name
Ship-Address
Ship-Country
Ship-Phone
Ship-Dt
Ship-Method-ID
Ship-Method
Freight-Charge
Sales-Tax

### Order Details

Order Details
OrderDetail-ID
Order-Code
Prod-Code
Quantity
Discount
Total-Cost



### Products

Products
Prod-Code
Prod-Name
Description
Unit-Price

### Payments

Payments
Payment- Code
Order-Code
Payment-Amount
Payment-Dt
Payment-Mode- ID
Payment-Mode
Credit Card-No
Card Holders-Name
CreditCardExpiry-Dt

### Employees

Employees
Emp-Code
First-Name
Last-Name
Title
Phone-No

## TABLES AFTER 3 NF

In the Orders table, the attribute Ship-Method depends on Ship-Method-ID and not on Order-Code. Therefore, for the tables to be in 3 NF, we need to create another table, Shipment Methods. Also, in the Payments table, the attribute Payment-Mode depends on Payment-Mode-ID and not on Payment-Code. Therefore, we need to create a separate table, Payment Modes. In addition, the attributes Cardholders-Name and CreditCardExpiry-Dt depend on CreditCard-No and not on Payment-Code. Therefore, we need to create another table, Credit Cards. The updated table structures are shown here.

**Customers**

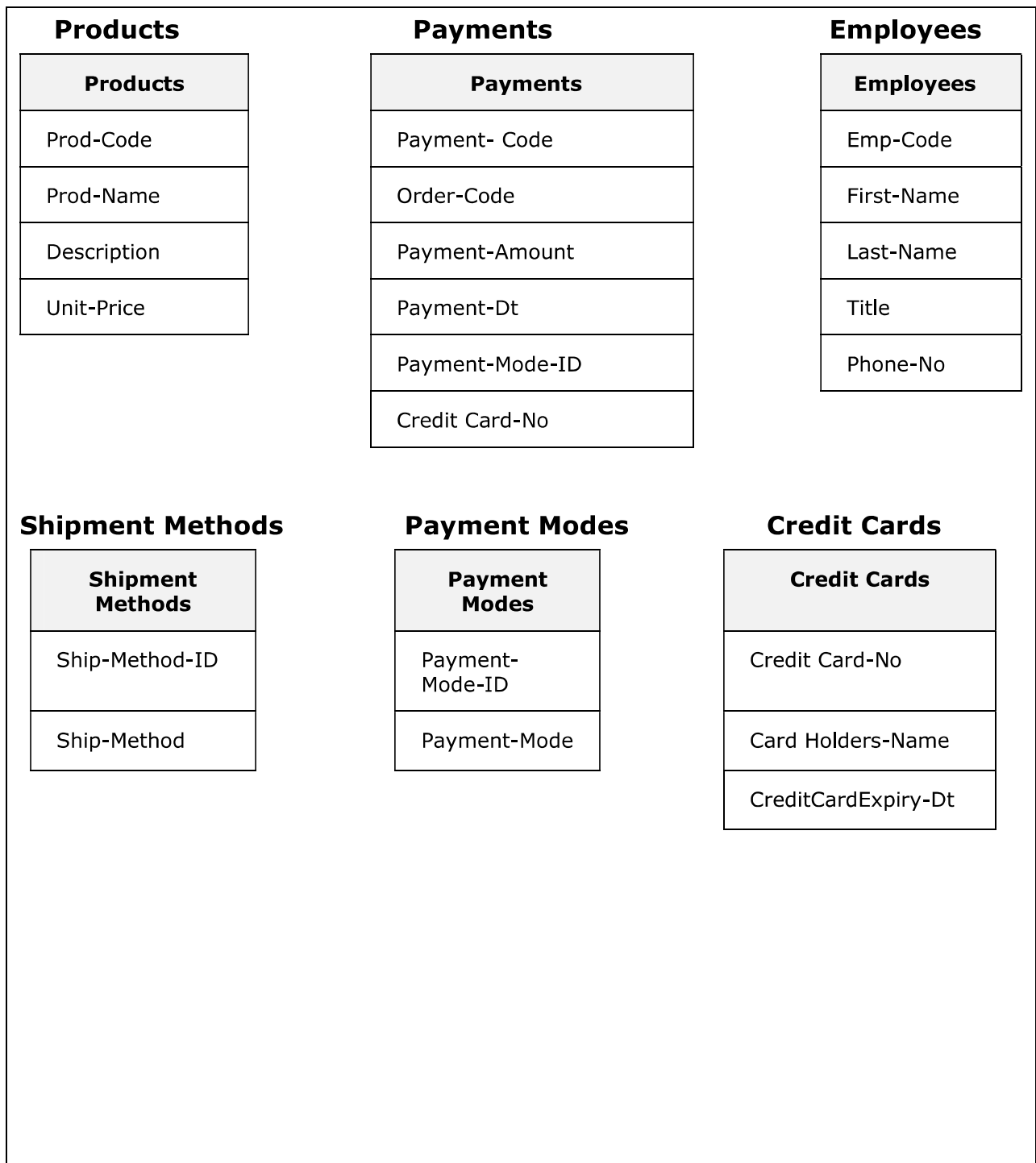
Customers
Cust-Code
First-Name
Last-Name
Address
Country
Zip-Code
Phone-No

**Orders**

Orders
Order-Code
Cust-Code
Emp-Code
Order-Dt
Ship-Name
Ship-Address
Ship-Country
Ship-Phone
Ship-Dt
Ship-Method-ID
Ship-Method
Freight-Charge
Sales-Tax

**Order Details**

Order Details
OrderDetail-ID
Order-Code
Prod-Code
Quantity
Discount
Total-Cost



## TABLES AFTER DENORMALIZATION

When we place the information about credit card in a separate table, the query performance during the generation of payment receipt will get affected due to creation of joins in every payment receipt. Therefore, for optimum performance, we denormalize and place the credit card information back into the Payments table. The updated table structures are shown here.

### Customers

Customers
Cust-Code
First-Name
Last-Name
Address
Country
Zip-Code
Phone-No

### Orders

Orders
Order-Code
Cust-Code
Emp-Code
Order-Dt
Ship-Name
Ship-Address
Ship-Country
Ship-Phone
Ship-Dt
Ship-Method-ID
Ship-Method
Freight-Charge
Sales-Tax

### Order Details

Order Details
OrderDetail-ID
Order-Code
Prod-Code
Quantity
Discount
Total-Cost

### Products

Products
Prod-Code
Prod-Name
Description
Unit-Price

### Payments

Payments
Payment- Code
Order-Code
Payment-Amount
Payment-Dt
Payment-Mode-ID
Credit Card-No

### Employees

Employees
Emp-Code
First-Name
Last-Name
Title
Phone-No

### Shipment Methods

Shipment Methods
Ship-Method-ID
Ship-Method

### Payment Modes

Payment Modes
Payment-Mode-ID
Payment-Mode

## PRIMARY AND FOREIGN KEYS

The Primary and Foreign keys (wherever applicable) for each table are listed with their respective table names:

■ **Customers**

Primary key: Cust-Code

■ **Orders**

Primary key: Order-Code

Foreign keys: Cust-Code, Emp-Code, Ship-Method-ID

■ **Order Details**

Primary key: OrderDetail-ID

Foreign keys: Order-Code, Prod-Code

■ **Shipment Methods**

Primary key: Ship-Method-ID

■ **Products**

Primary key: Prod-Code

■ **Payments**

Primary key: Payment-Code

Foreign keys: Order-Code, Payment-Mode-ID

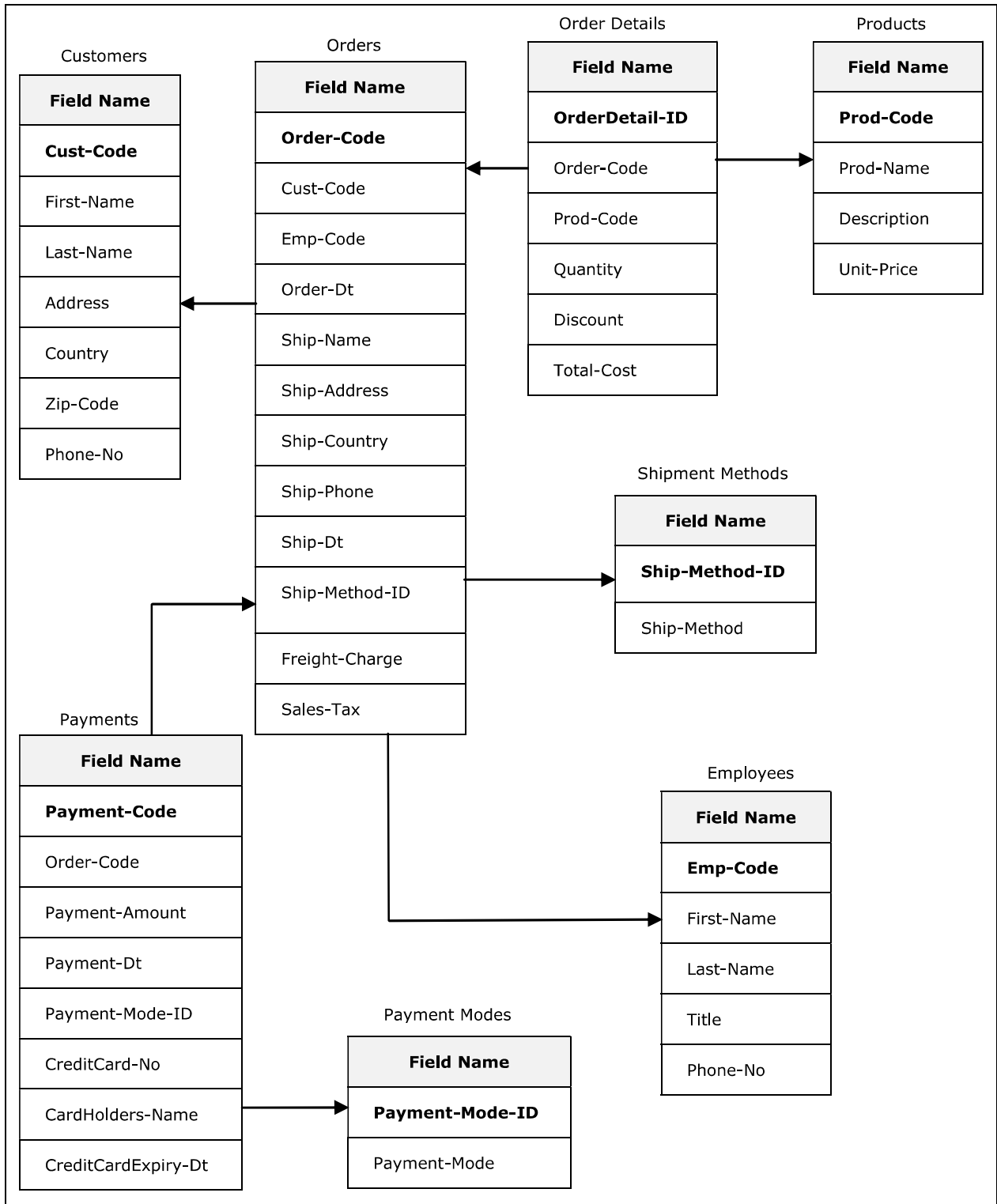
■ **Payment Modes**

Primary key: Payment-Mode-ID

■ **Employees**

Primary key: Emp-Code

## RELATIONSHIPS BETWEEN FINAL TABLES



# BLANK DOCUMENTATION FORMATS

**PROJECT ON**

Developed by

Name:

Reg. No.:

**NIIT**



**(Project Title)**

Batch Code :  
Start Date : End Date:  
Name of the Coordinator :  
Name of Developer :  
  
Date of Submission :



## CERTIFICATE

This is to certify that this report titled \_\_\_\_\_ embodies the original work done by \_\_\_\_\_ in partial fulfillment of their course requirement at NIIT.

Coordinator:

## **ACKNOWLEDGEMENT**

# SYSTEM ANALYSIS

**System Summary:**

## ENTITIES

**Number of entities:**

**Names of entities:**

## ATTRIBUTES

**Attributes:**

## **E/R DIAGRAM**



## **TABLES**

**Number of Tables:**

**Structure of Tables:**



<p><b>TABLES AFTER 1 NF</b></p>
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## TABLES AFTER 2 NF

TABLES AFTER 3 NF
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TABLES AFTER DENORMALIZATION	
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## PRIMARY AND FOREIGN KEYS

## RELATIONSHIPS BETWEEN FINAL TABLES