UNIVERSITY OF RAJSHSHI

Faculty of Engineering

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ASSIGNMENT NAME: Grocery Store Database design

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Course Curriculum for M. Engineering (Evening Programme)

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Database Design : Grocery Store Design

step-01 : The entity sets are as follows:

① Customer
② Employee
③ Sales
④ Order
⑤ Order Details
⑥ Product
⑦ Category
⑧ Supplier
⑨ Payment Method
⑩ Purchase
⑪ Purchase Details

Step-02 : The properties / Attributes of each entity sets are given below:

① Customer : (customer_id, first_name, last_name, Phone_number, email, address)

② Employee : (Employee_id, first_name, last_name, contact_info, role)

③ Sales : (Sales_id, sale_date, total_amount, customer_id, Employee_id, Payment_method_id)

④ Order : (Order_id, order_date, total_amount, customer_id, Payment_method_id)

⑤ Order Details : (order_detail_id, quantity, price_per_unit, total_amount, order_id, Product_id)

⑥ Product : (Product_id, Product_name, description, price, stock_quality, category_id, Supplier_id)

⑦ Supplier : (Supplier_id, Supplier_name, Contact_info, address)

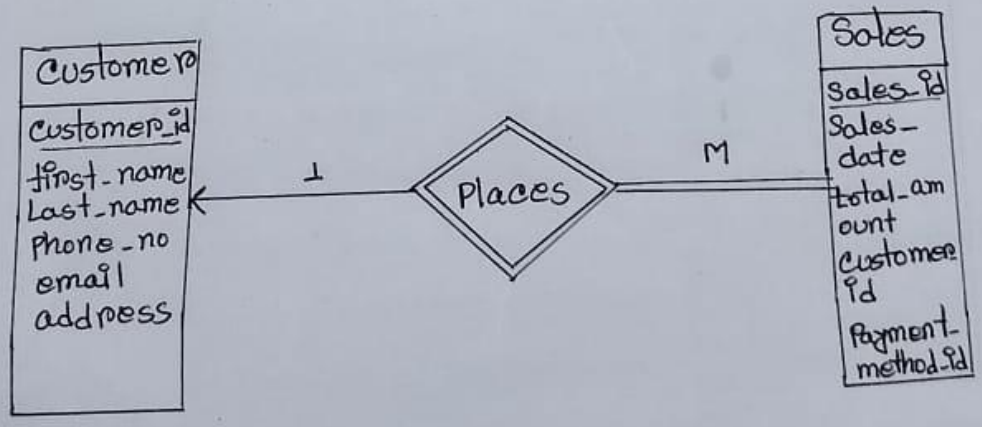
⑧ Category : (Category_id, Category_name)

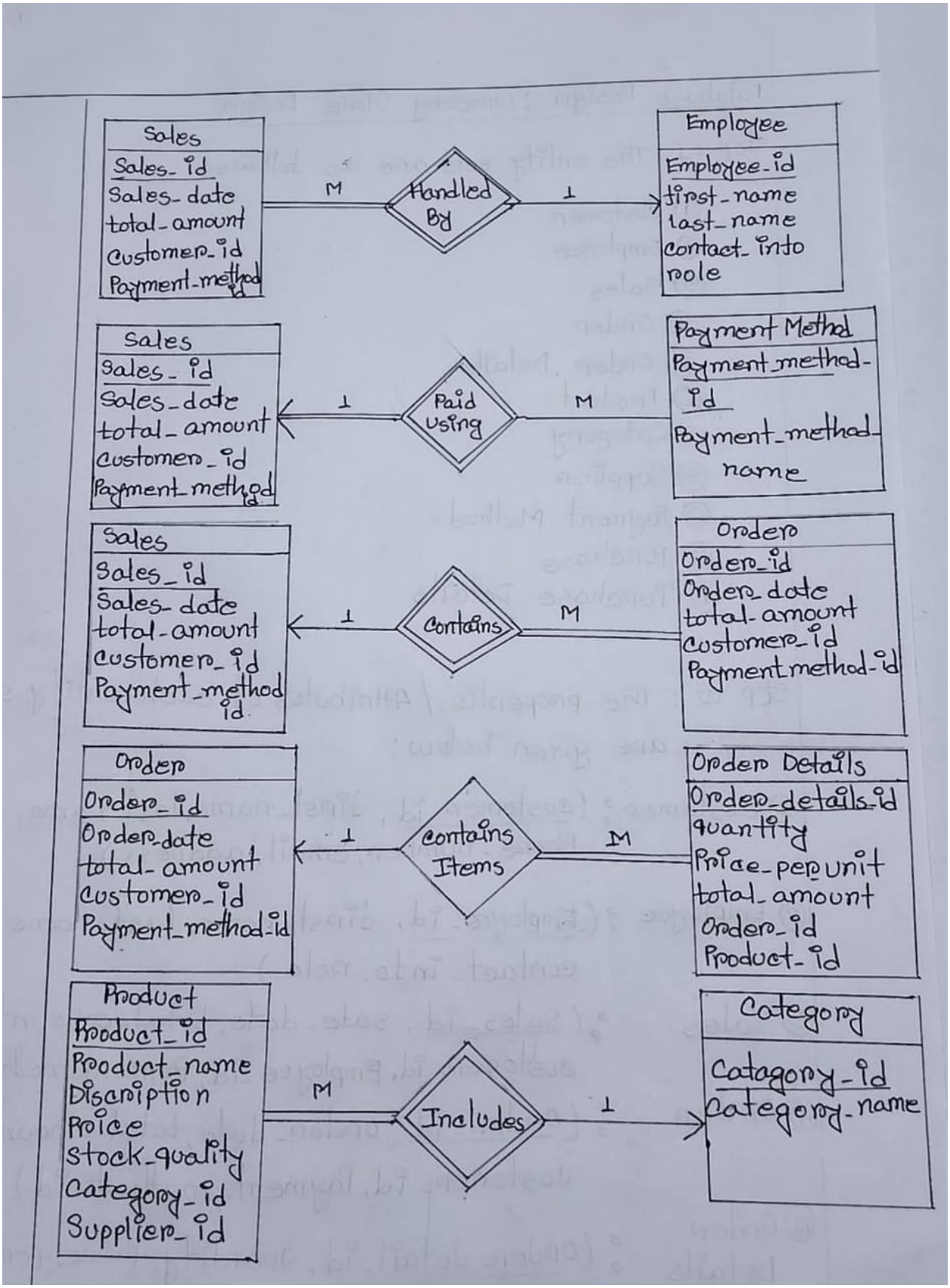
⑨ Payment_Mathod : (Payment_method_id, Payment_method_name)

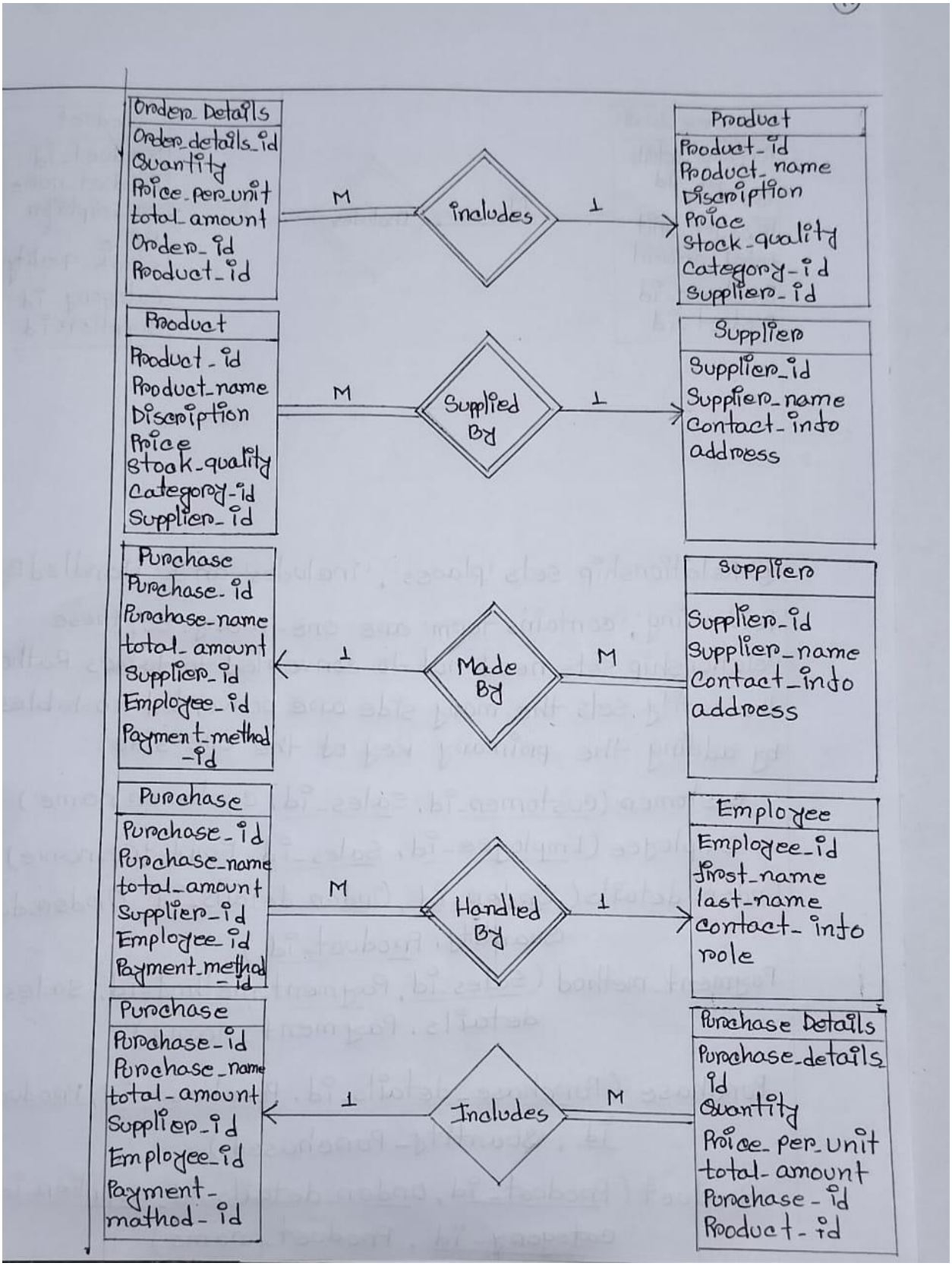
⑩ Purchase : (Purchase_id, Purchase_date, total_amount, supplier_id, employee_id, Payment_method_id)

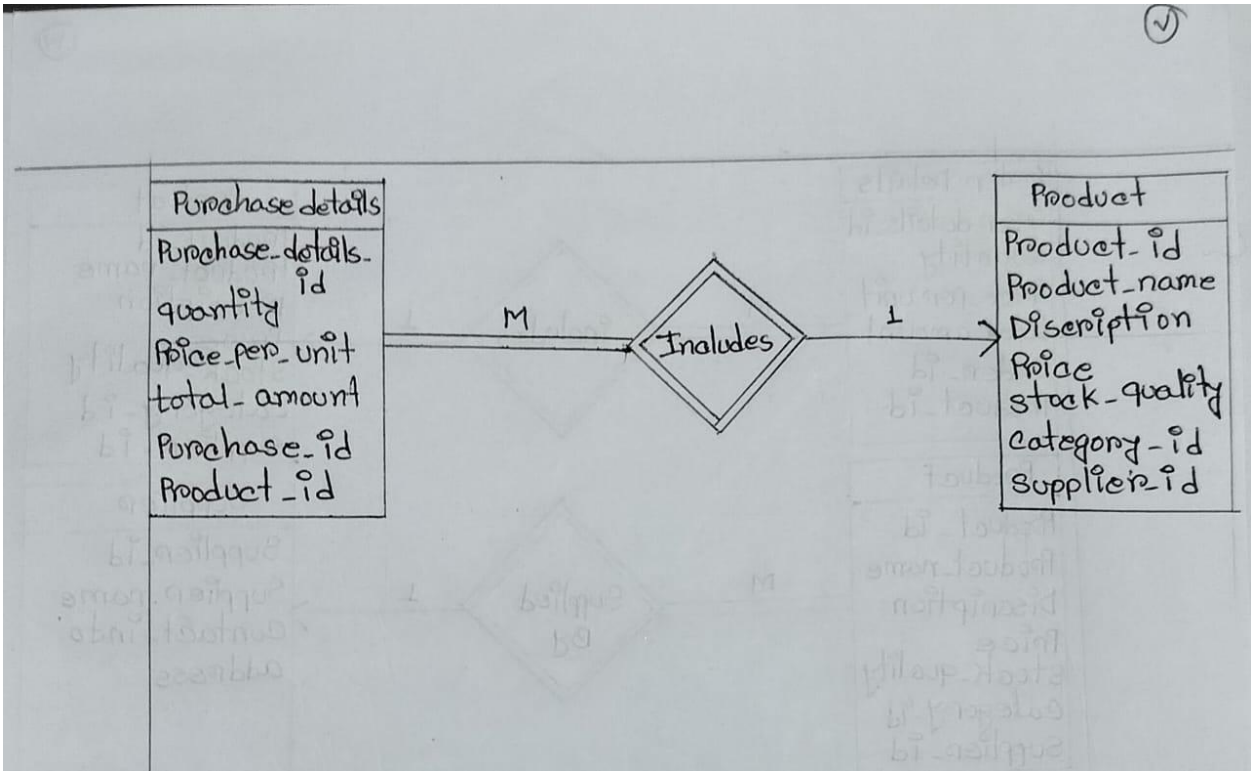
⑪ Purchase_Details : (Purchase_detail_id, quantity, Price_per_unit, total_amount, Purchase_id, Product_id)

Step-03 : There are 12 relations between the entity sets which are given below :

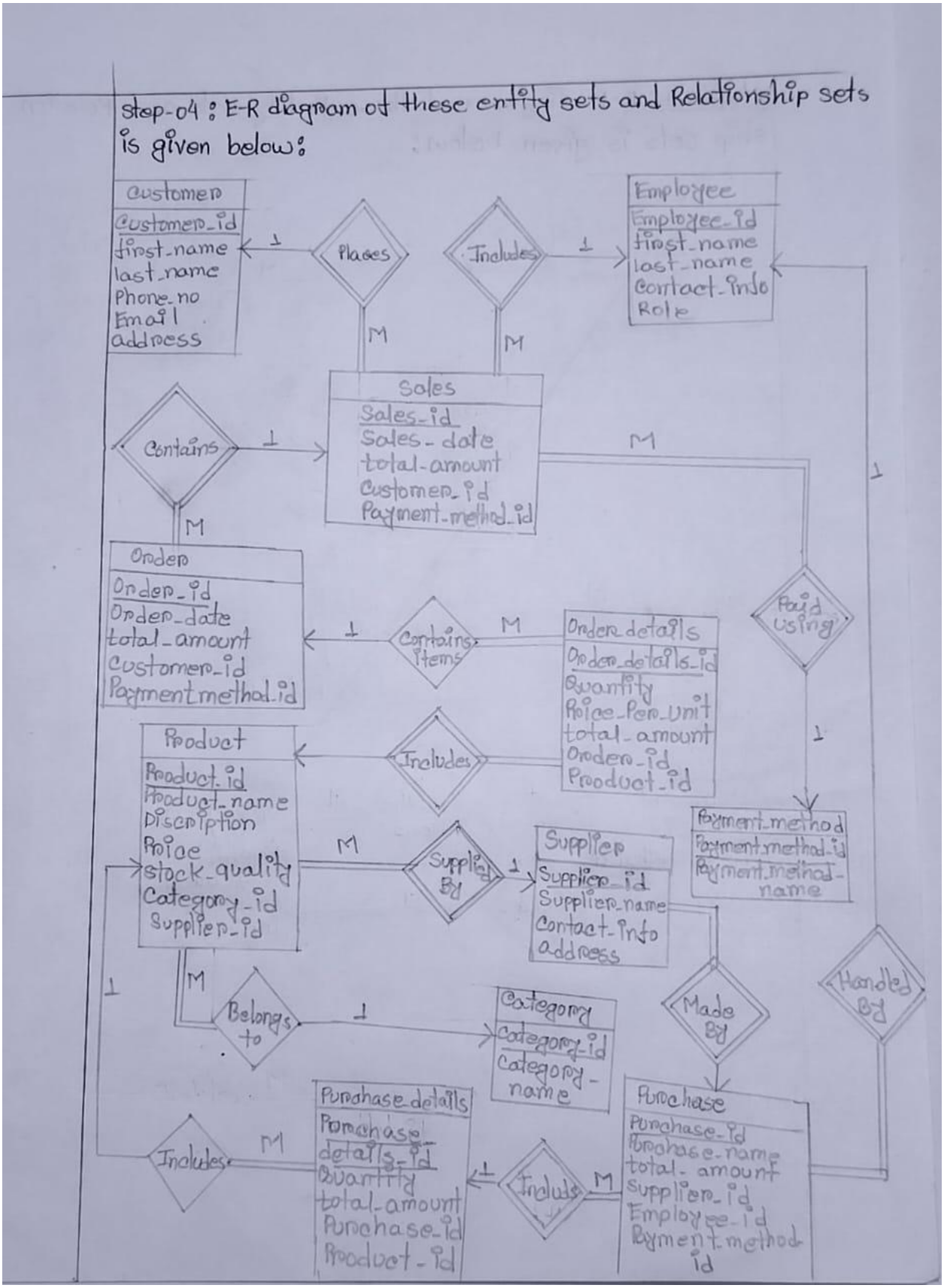



Sales
Sales_id
Sales_date
total_amount
Customer_id
Payment_method_id
M
Handled By
1
Employee
Employee_id
first_name
last_name
contact_info
role
Sales
Sales_id
Sales_date
total_amount
Customer_id
Payment_method_id
1
Paid Using
M
Payment Method
Payment_method_id
Payment_method_name
Sales
Sales_id
Sales_date
total_amount
Customer_id
Payment_method_id
1
Contains
M
Order
Order_id
Order_date
total_amount
Customer_id
Payment_method_id
Order
Order_id
Order_date
total_amount
Customer_id
Payment_method_id
1
Contains Items
M
Order Details
Order_details_id
quantity
Price_per_unit
total_amount
Order_id
Product_id
Product
Product_id
Product_name
Discription
Price
Stock_quality
Category_id
Supplier_id
M
Includes
1
Category
Catagory_id
Category_name


Order Details
Order_details_id
Quantity
Price_per_unit
total_amount
Order_id
Product_id
M
Includes
1
Product
Product_id
Product_name
Discription
Price
Stock_quality
Category_id
Supplier_id
Product
Product_id
Product_name
Discription
Price
Stock_quality
Category_id
Supplier_id
M
Supplied By
1
Supplier
Supplier_id
Supplier_name
Contact_info
address
Purchase
Purchase_id
Purchase_name
total_amount
Supplier_id
Employee_id
Payment_method_id
1
Made By
M
Supplier
Supplier_id
Supplier_name
Contact_info
address
Purchase
Purchase_id
Purchase_name
total_amount
Supplier_id
Employee_id
Payment_method_id
M
Handled By
1
Employee
Employee_id
first_name
last_name
contact_info
role
Purchase
Purchase_id
Purchase_name
total_amount
Supplier_id
Employee_id
Payment_mathod_id
1
Includes
M
Purchase Details
Purchase_details_id
Quantity
Price_per_unit
total_amount
Purchase_id
Product_id


Purchase details
Purchase_details_id
quantity
Price_per_unit
total_amount
Purchase_id
Product_id
M
Includes
1
Product
Product_id
Product_name
Discription
Price
stock_quality
category_id
supplier_id

Step-04 : E-R diagram of these entity sets and Relationship sets is given below:



Step-05: E-R diagram with Notations:

1. Entities: Represented as rectangles.
2. Relationships: Represented as diamonds.
3. Attributes: Represented as ovals.
4. Cardinalities:
   - (I) 1:1 – One to one
   - (II) 1:M – One to Many
   - (III) M:N – Many to Many
5. Participation:
   - (I) Total Participation: Double lines for entities that must participation in the relation (e.g. Order must have at least one Product)
   - (II) Partial Participation: Singles lines for optional Participation.

Step-06: conversion of the diagram into tables by using the reduction rule:

(a) The sales entity set is connected with "employee" via the "Handle By" relationship, with "Employee" being on the "One" side. This means each sale is "handled by" only one "employee" table:

Sales(Sales_id, customer_id, employee_id, Payment_method_id, total_amount)

(b) The entity sets "customers" and "order" are also convert to "customer" and "Order" tables for similar reasons:

Customer(customer_id, Customer_name, customer_phone, customer_address)

Order(Order_id, sales_id, order_date)

(c) Relationship sets "Contains" and "Supplied By" are many-many. So create two tables for contains and Supplied By. The attributes of them will be the primary keys from the corresponding entity sets and describe attribute if any -

Contains (Sales_id, Order_id)
Supplied By (Product_id, Supplied_id)

(d) 'Sales', 'Order' and 'Product' are week entity sets. So the Primary key of the identifying strong entity sets will be part of the week entity sets.

i.e. Sales (Sales_id, customer_id, Employee_id, sales_date, total_amont, Payment_method_id)

Order (Sales_id, Order_id, Order_date, total_amount, customer_id, Payment_method_id)

Product (Order_details_id, Product_id, Product_name, Catagory_id, Price)

© Relationship sets 'places', 'includes' and 'Handled By' 'Paid using', 'contains term' are one-many. So, these relationship sets need not to converted to tables. Rather, the entity sets the many side are converted to tables by adding the primary key of the one side':-

customer (Customer_id, Sales_id, customer_name)

Employee (Employee_id, Sales_id, Employee_name)

Order_details (Order_id, Order_details_id, Order_det. Quantity, Product_id)

Payment_method (Sales_id, Payment_method_id, sales_details, Payment_name)

Purchase (Purchase_details_id, Purchase_id, Product_id, Quantity_Purchased)

Product (Product_id, Order_details_id, Supplier_id, category_id, Product_name)