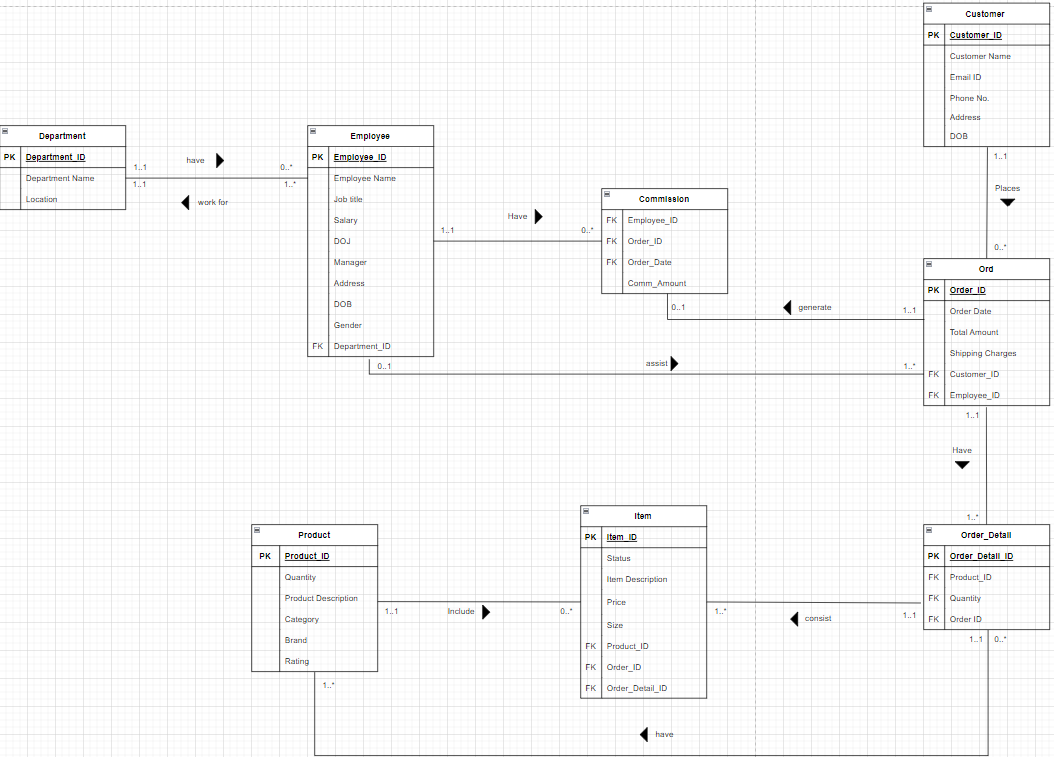
****

|  |  |  |  |
| --- | --- | --- | --- |
| **Entity** | **Primary Key (PK)** | **Foreign Key (FK)** | **Rationale for PK** |
| Department | Department\_ID | N/A | A unique ID for each Department |
| Employee | Employee\_ID | Department\_ID | A unique ID for Each employee. |
| Customer | Customer\_ID | N/A | A unique ID for each Customer |
| Ord | Order\_ID | Customer\_ID, Employee\_ID | A unique ID for each Order |
| Order\_Detail | Order\_Detail\_ID | Product\_ID, Quantity, Order ID | A unique ID for each Order’s individual Item |
| Item | Item \_ID | Product\_ID, Order\_ID, Order\_Detail\_ID | A unique ID for each Item |
| Product | Product\_ID | N/A | A unique ID for each Product |
| Commission | N/A | Employee\_ID, Order\_ID, Order\_Date | Commission ID is not used in any table as an FK. |

|  |  |  |
| --- | --- | --- |
| Entity | Attributes | Rationale for attribute |
| Department | Department\_Name  Location | -To specify where each employee will be assigned to  -To know the location of each department |
| Employee | Employee\_Name  Job\_title  Salary  DOJ  Manager  Address  DOB  Gender | - To know the individual employ’s information  - To know the individual employ’s information  - To know the individual employ’s information  - TO know when the corresponding employee joined  - To know who the employee reports to  - To know the individual employ’s information  - To know the individual employ’s information  - To know the individual employ’s information |
| Customer | Customer Name  Email ID  Phone No.  Address  DOB | - To know the individual customer’s information  - To know the individual customer’s information  - To know the individual customer’s information  - To know the individual customer’s information  - To know the individual customer’s information |
| Order | Order Date  Total Amount  Shipping Charges | -To know when the order placed  -To display the total amount for the order  -To display the shipping charges according to the order |
| Product | Quantity  Product Description  Category  Brand  Rating | -To check of the product’s stock  - To show more information of the product to the customers  -To know the product falls under which category  - To know the product falls under which Brand.  - To show the customers the rating according to the product which helps them decide. |
| Item | Status  Item Description  Price  Size | -To the know the quality of the product  -To inform the customers more about what they are purchasing  -To the price of an item  - To the size of the item |
| Order\_Detail | Product\_ID  Quantity  Order ID | -To show the customer which product they have purchased  - To show what is the quantity of the item they have bought  - To inform the customer about the Order\_ID which will help them identify the order. |

Relationships between entities:

|  |  |  |
| --- | --- | --- |
| Department to Employee | | |
| Cardinality | Participation | Reasons |
| 1...0  1...\* | - A Department may not have employees  - A Department may have many employees | - Not employed for the Newly formed departments  - Department may working on a project |
| Employee to Department | | |
| Cardinality | Participation | Reason |
| 1…1  \*…1 | * One employee may work for only one Department * Many employees may work for only one Department | * Decided according to the Job title. * Within the department the tasks will be shared among the employees |

|  |  |  |
| --- | --- | --- |
| Employee to Commission | | |
| Cardinality | Participation | Reason |
| 1…0  1…\* | -Each employee may not have any commission  -Each employee may have more than one commission. | - The commission are only given to salesman  - Salesman who assisted with more orders get more commission. |

|  |  |  |
| --- | --- | --- |
| Employee to Ord | | |
| Cardinality | Participation | Reasons |
| 0…1  1...\* | - No employees assist with an order  - One employee assist with many order | - The customer didn’t take help from the employee  - One employee helped many customers with their |

|  |  |  |
| --- | --- | --- |
| Ord to Commission | | |
| Cardinality | Participation | Reasons |
| 1…0  1…1 | * One order may generate no commission * One order may generate only one commission | * The employee who helped wasn’t a salesman * The salesman helped with more than one order |

|  |  |  |
| --- | --- | --- |
| Customer to Ord | | |
| Cardinality | Participation | Reasons |
| 1…0  1…\* | - One Customer may not place any order  - One Customer may place more than one order | - Customer was window shopping  - Customer may order many times in the past few days |

|  |  |  |
| --- | --- | --- |
| Ord to Order\_Detail | | |
| Cardinality | Participation | Reasons |
| 1…1  1...\* | - One Order may have only one order details  - One Order many have many order details | - The customer only purchased one item  - The customer purchased more than one item |

|  |  |  |
| --- | --- | --- |
| Order\_Detail to Item | | |
| Cardinality | Participation | Reasons |
| 1…1  1…\* | - One order detail may consist of only one item  - One order detail may consist of many items | * The customer only ordered one item * The customer ordered many items |

|  |  |  |
| --- | --- | --- |
| Order\_Detail to Product | | |
| Cardinality | Participation | Reasons |
| 1…1  1...\* | - One order detail may have only one product  - One order detail may have more than one product. | * The customer only purchased one product * - The customer purchased more than one product |

|  |  |  |
| --- | --- | --- |
| Product to Item | | |
| Cardinality | Participation | Reasons |
| 1…0  1…\* | - One product may include no item  - One product may include more than one item. | * The product may be out of stock * There is more than one individual item of that product |

SQL:

DROP TABLE IF EXISTS Department;

CREATE TABLE Department

(Department\_ID INT ,

Department\_Name VARCHAR(225),

Location VARCHAR(225),

CONSTRAINT pk\_Department\_DepartmentID PRIMARY KEY (Department\_ID));

insert into Department (Department\_ID,Department\_Name,Location) values (1001,'Research','Hammersmith');

insert into Department (Department\_ID,Department\_Name,Location) values (1002,'Sales','Fulham');

insert into Department (Department\_ID,Department\_Name,Location) values (1003,'Accounts','Tottenham Court Road');

insert into Department (Department\_ID,Department\_Name,Location) values (1004,'Shipment','Tottenham Court Road');

-----------

DROP TABLE IF EXISTS Employee;

CREATE TABLE Employee

(Employee\_ID INT,

Employee\_Name VARCHAR(225),

Job\_title VARCHAR(225),

Salary FLOAT,

DOJ DATE,

Manager INT,

Address VARCHAR(225),

DOB DATE,

Gender VARCHAR(25),

Department\_ID INT,

CONSTRAINT pk\_Employee\_EmployeeID PRIMARY KEY (Employee\_ID),

CONSTRAINT fk\_Employee\_DepartmentID FOREIGN KEY (Department\_ID) REFERENCES Department (Department\_ID));

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10001,'James','Salesman',3500,'2021-05-12',10004,' 99 Main Road,Auchleven,AB52 5QE,United Kingdom','1989-04-03','Male',1002);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10002,'Charles','Accountant',5000,'2021-03-15',10010,'15 Sandyhill Rd,Froxfield Green,GU32 4HA,United Kingdom','1980-03-08','Male',1003);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10003,'Jeff','Analyst',6000,'2021-04-16',10004,'68 Monks Way, Toppings, BL7 8BF, United Kingdom','1984-11-14','Male',1001);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10004,'Karl','Manager',8000,'2021-06-21',10005,'54 Middlewich Road, Fiunary, PA34 1TR, United Kingdom','1973-12-16','Male',1001);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10005,'Tommy','President',10000,'2021-11-30',NULL,'37 Stone St, Craigmyle Ho., AB31 3AX, United Kingdom','1999-05-03','Male',NULL);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10006,'Katie','Analyst',6000,'2021-07-14',10004,'75 Broomfield Place, Stonebridge, CV7 5JH, United Kingdom','1974-02-26','Female',1001);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10007,'Stacy','Accountant',5000,'2021-08-02',10010,'92 Southend Avenue, Blackborough End, PE32 6RU, United Kingdom','1978-08-03','Female',1003);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10008,'Nency','Salesman',3500,'2021-09-28',10004,'81 Marlborough Crescent, South Muskham, NG23 9ZL, United Kingdom','1980-03-03','Female',1002);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10009,'Sung Jin Woo','Shipper',2000,'2021-08-17',10010,'30 Temple Way, Wivenhoe, CO7 8NX, United Kingdom','1999-09-03','Male',1004);

Insert into Employee (Employee\_ID,Employee\_Name, Job\_tItle, Salary, DOJ, Manager, Address, DOB, Gender, Department\_ID ) values(10010,'Maria','Manager',8000,'2021-02-25',10005,'32 Wartnaby Road, Aigburth, L17 8RY, United Kingdom','1980-05-03','Female',1004);

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DROP TABLE IF EXISTS Customer;

CREATE TABLE Customer

(Customer\_ID INT,

Customer\_Name VARCHAR(225),

Email\_ID VARCHAR(225),

Phone\_No VARCHAR(25),

Address VARCHAR(225),

DOB DATE,

CONSTRAINT pk\_Customer\_CustomerID PRIMARY KEY (Customer\_ID));

Insert into Customer (Customer\_ID,Customer\_Name,Email\_ID, Phone\_No,Address, DOB ) values(12344,'Talia','Tailia@tailia.com','xx6-xxx-x',' 56 Main Road,Auchleven,AB42 5QE,United Kingdom','2010-08-09');

Insert into Customer (Customer\_ID,Customer\_Name,Email\_ID, Phone\_No,Address, DOB ) values(12345,'Simon','Simon@simon.com','xx7-xxx-x','37 Stone St, Craigmyle Ho., AC31 3AX, United Kingdom','2013-09-07');

Insert into Customer (Customer\_ID,Customer\_Name,Email\_ID, Phone\_No,Address, DOB ) values(12346,'Ethan','ethan@ethan.com','xx8-xxx-x','02 Temple Way, Wivenhoe, CO5 3NX, United Kingdom','1984-12-05');

Insert into Customer (Customer\_ID,Customer\_Name,Email\_ID, Phone\_No,Address, DOB ) values(12347,'Josh','josh@josh.com','xx9-xxx-x','74 Broomfield Place, Stonebridge, CV7 5JH, United Kingdom','1956-11-06');

Insert into Customer (Customer\_ID,Customer\_Name,Email\_ID, Phone\_No,Address, DOB ) values(12348,'Vikram','Vikram@Vikram.com','x10-xxx-x','60 Monks Way, Toppings, BL7 8BF, United Kingdom','2001-05-03');

Insert into Customer (Customer\_ID,Customer\_Name,Email\_ID, Phone\_No,Address, DOB ) values(12349,'Randolph','Randolph@randolph.com','x11-xxx-x','52 Wartnaby Road, Aigburth, L17 8RY, United Kingdom','1974-02-04');

-------

DROP TABLE IF EXISTS Product ;

CREATE TABLE Product

(Product\_ID VARCHAR(225),

Quantity INT,

Product\_Description VARCHAR(360),

Category VARCHAR(225),

Brand VARCHAR(225),

Rating Float,

CONSTRAINT pk\_Product\_ProductID PRIMARY KEY (Product\_ID));

insert into Product (Product\_ID, Quantity, Product\_Description, Category, Brand, Rating) values('P1001',5,'Trackpants for Men','Clothes','Adidas',4.3);

insert into Product (Product\_ID, Quantity, Product\_Description, Category, Brand, Rating) values('P1002',6,'Light Shoes for Women','Shoes','Puma',4.4);

insert into Product (Product\_ID, Quantity, Product\_Description, Category, Brand, Rating) values('P1003',3,'Lucky Watch','Accessories','Kaybu',0);

insert into Product (Product\_ID, Quantity, Product\_Description, Category, Brand, Rating) values('P1004',0,'slim performance Grand','Laptop','Apple',4.8);

insert into Product (Product\_ID, Quantity, Product\_Description, Category, Brand, Rating) values('P1005',2,'Dry try fry','Laptop','Google',4.8);

--------

DROP TABLE IF EXISTS Ord;

CREATE TABLE Ord

(Order\_ID VARCHAR(225),

Order\_Date DATE,

Total\_Amount Float,

Currency\_Code VARCHAR(25),

Shipping\_Charges Float,

Customer\_ID INT,

Employee\_ID INT,

CONSTRAINT pk\_Ord\_OrderID PRIMARY KEY (Order\_ID),

CONSTRAINT fk\_Ord\_CustomerID FOREIGN KEY (Customer\_ID) REFERENCES Customer (Customer\_ID),

CONSTRAINT fk\_Ord\_EmployeeID FOREIGN KEY (Employee\_ID) REFERENCES Employee (Employee\_ID));

insert into Ord (Order\_ID,Order\_Date,Total\_Amount,Currency\_Code,Shipping\_Charges,Customer\_ID,Employee\_ID) values('O1001','2022-12-06',45.00,'GBP',2.00,12344,10001);

insert into Ord (Order\_ID,Order\_Date,Total\_Amount,Currency\_Code,Shipping\_Charges,Customer\_ID,Employee\_ID) values('O1002','2022-12-09',29.00,'GBP',0.00,12346,10001);

insert into Ord (Order\_ID,Order\_Date,Total\_Amount,Currency\_Code,Shipping\_Charges,Customer\_ID,Employee\_ID) values('O1003','2022-12-16',157.00,'GBP',2.00,12346,10010);

insert into Ord (Order\_ID,Order\_Date,Total\_Amount,Currency\_Code,Shipping\_Charges,Customer\_ID,Employee\_ID) values('O1004','2022-12-11',29.00,'GBP',2.00,12349,10003);

insert into Ord (Order\_ID,Order\_Date,Total\_Amount,Currency\_Code,Shipping\_Charges,Customer\_ID,Employee\_ID) values('O1005','2022-09-13',45.00,'GBP',0.00,12348,10008);

-----

DROP TABLE IF EXISTS Order\_Detail ;

CREATE TABLE Order\_Detail

(Order\_Detail\_ID VARCHAR(225),

Quantity INT,

Product\_ID VARCHAR(225),

Order\_ID VARCHAR(225),

CONSTRAINT pk\_OrderDetail\_OrderDetailID PRIMARY KEY (Order\_Detail\_ID),

CONSTRAINT fk\_OrderDetail\_ProductID FOREIGN KEY (Product\_ID) REFERENCES Product (Product\_ID),

CONSTRAINT fk\_OrderDetail\_OrderID FOREIGN KEY (Order\_ID) REFERENCES Ord (Order\_ID));

insert into Order\_Detail (Order\_Detail\_ID, Product\_ID, Quantity, Order\_ID) values('ODI1001','P1003',1,'O1001');

insert into Order\_Detail (Order\_Detail\_ID, Product\_ID, Quantity, Order\_ID) values('ODI1002','P1001',1,'O1002');

insert into Order\_Detail (Order\_Detail\_ID, Product\_ID, Quantity, Order\_ID) values('ODI1003','P1005',1,'O1003');

insert into Order\_Detail (Order\_Detail\_ID, Product\_ID, Quantity, Order\_ID) values('ODI1004','P1001',1,'O1004');

insert into Order\_Detail (Order\_Detail\_ID, Product\_ID, Quantity, Order\_ID) values('ODI1005','P1003',1,'O1005');

--------------

DROP TABLE IF EXISTS Item ;

CREATE TABLE Item

(Item\_ID VARCHAR(225),

Status VARCHAR(225),

Item\_Description VARCHAR(360),

Price Float,

Currency\_Code VARCHAR(25),

Shipping\_Charges Float,

Size Float,

Product\_ID VARCHAR(225),

Order\_ID VARCHAR(225),

Order\_Detail\_ID VARCHAR(225),

CONSTRAINT pk\_Item\_ItemID PRIMARY KEY (Item\_ID),

CONSTRAINT fk\_item\_ProductID FOREIGN KEY (Product\_ID) REFERENCES Product (Product\_ID),

CONSTRAINT fk\_Item\_OrderID FOREIGN KEY (Order\_ID) REFERENCES Ord (Order\_ID),

CONSTRAINT fk\_item\_OrderDetailID FOREIGN KEY (Order\_Detail\_ID) REFERENCES Order\_Detail (Order\_Detail\_ID));

insert into Item (Item\_ID, Status, Item\_Description, Price, Currency\_Code, Size, Product\_ID, Order\_ID, Order\_Detail\_ID) values('I1001','Defective','Watch Made of Leather and precise time',45.00,'GBP',10,'P1003','O1001','ODI1001');

insert into Item (Item\_ID, Status, Item\_Description, Price, Currency\_Code, Size, Product\_ID, Order\_ID, Order\_Detail\_ID) values('I1002','Refurbished','Made of Silk',29.00,'GBP',9.5,'P1001','O1002','ODI1002');

insert into Item (Item\_ID, Status, Item\_Description, Price, Currency\_Code, Size, Product\_ID, Order\_ID, Order\_Detail\_ID) values('I1003','Refurbished','12 RAM and 8 ROM',157.00,'GBP',9,'P1005','O1003','ODI1003');

insert into Item (Item\_ID, Status, Item\_Description, Price, Currency\_Code, Size, Product\_ID, Order\_ID, Order\_Detail\_ID) values('I1004','New','Made of Silk',29.00,'GBP',7,'P1001','O1004','ODI1004');

insert into Item (Item\_ID, Status, Item\_Description, Price, Currency\_Code, Size, Product\_ID, Order\_ID, Order\_Detail\_ID) values('I1005','New','Watch Made of Leather and precise time',45.00,'GBP',10.5,'P1003','O1005','ODI1005');

---------------------

DROP TABLE IF EXISTS Commission ;

CREATE TABLE Commission

(Order\_ID VARCHAR(225),

Employee\_ID INT,

Order\_Date DATE,

Comm\_Amount Float,

CONSTRAINT fk\_Commission\_EmployeeID FOREIGN KEY (Employee\_ID) REFERENCES Employee (Employee\_ID),

CONSTRAINT fk\_Commission\_OrderID FOREIGN KEY (Order\_ID) REFERENCES Ord (Order\_ID));

insert into Commission

SELECT a.Order\_ID,b.Employee\_ID,a.Order\_Date, a.Total\_Amount \* 10/100 FROM Ord a, Employee b

where a.Employee\_ID = b.Employee\_ID

and b.Job\_title = 'Salesman';

*Query:*

-- List of employees based on the Department - 1

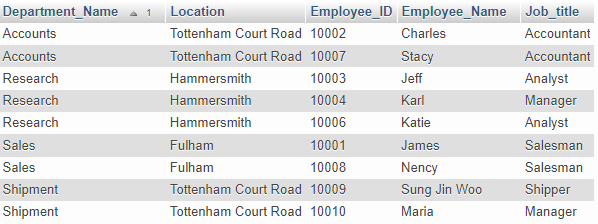
SQL:

Select b.Department\_Name,b.Location,a.Employee\_ID, a.Employee\_Name,a.Job\_title

from Employee a, Department b

where a.Department\_id = b.Department\_ID

order by b.Department\_Name,b.Location



-- List of Employees who helped Customer with order. - 2

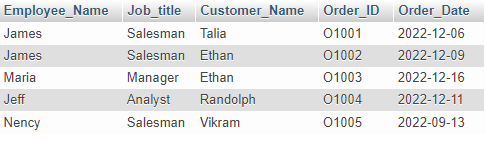
SQL:

SELECT b.Employee\_Name, b.Job\_title,c.Customer\_Name, a.Order\_ID, a.Order\_Date

FROM Ord a, Employee b, Customer c

where a.Employee\_ID = b.Employee\_ID

and a.Customer\_ID = c.Customer\_ID



--List number of customers helped by the employees – 3

SQL:

SELECT b.Employee\_Name, b.Job\_title,count(a.Customer\_Id) Number\_of\_Customers\_helped

FROM Ord a, Employee b

where a.Employee\_ID = b.Employee\_ID

group by b.Employee\_Name, b.Job\_title



---Find the Senior citizen customers to send the promotion email for additional 10% discount. – 4

SQL:

select Customer\_Name,Email\_ID, DOB

from Customer

where (DATEDIFF(CURDATE(),DOB))/365 >= 65;



---List of Products and it’s status - 5

select a.Product\_ID, a.Product\_Description,a.Category, a.Brand,b.Item\_id, b.Item\_description, b.Status,b.Price,b.Currency\_Code

from

Product a, Item b

where a.Product\_ID = b.Product\_ID

order by a.Product\_ID, b.Item\_ID



--Number of Orders placed with total amount spent by each Customers in last 1 month - 6

SQL:

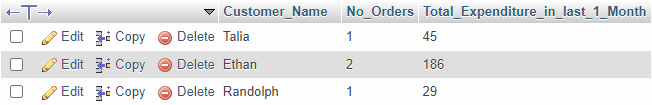
select b.Customer\_Name, count(a.order\_id) No\_Orders ,sum(a.Total\_Amount) Total\_Expenditure\_in\_last\_1\_Month

from Ord a, Customer b

where a.Customer\_ID = b.Customer\_ID

and a.Order\_Date >= Date\_Sub(CURDATE(), INTERVAL 1 Month)

group by b.Customer\_Name;



* Complete information of the order placed in last 6 months - 8

SQL:

select a.Order\_id,f.Customer\_Name, c.Product\_description, c.Brand,c.Category,d.Item\_Description, d.Status,d.Price,a.shipping\_charges, d.Currency\_Code, f.Address, e.Employee\_Name

from Ord a, Order\_Detail b, Product c, Item d, Employee e, Customer f

where a.order\_id= b.order\_id

and b.product\_id = c.product\_id

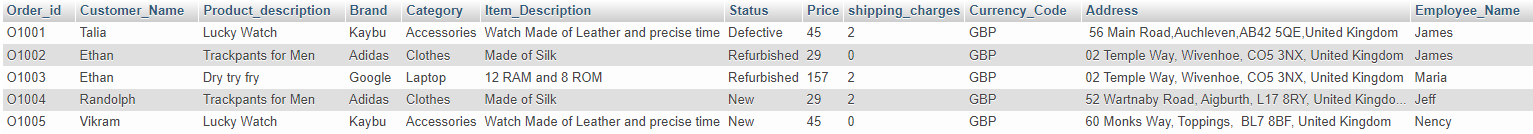
and c.product\_id = d.product\_id

and a.employee\_id = e.Employee\_ID

and a.Customer\_ID = f.Customer\_ID

and d.order\_detail\_id = b.Order\_Detail\_ID

and a.Order\_Date >= Date\_Sub(CURDATE(), INTERVAL 6 Month)



* Commission earned by employees in last one year - 9

SQL:

select Employee\_Name,sum(c.total\_amount) Order\_Total\_Amount, sum(Comm\_Amount) Total\_Commission\_Earned

from Commission a, Employee b, Ord c

where a.Employee\_ID = b.Employee\_ID

and c.Order\_Id = a.Order\_ID

and a.Order\_Date >= Date\_Sub(CURDATE(), INTERVAL 1 Month)

group by Employee\_Name



--- Products purchased by customers in last 1 months – 10

SQL:

select b.Product\_description,b.Brand,c.Item\_description, count(Item\_description) No\_Items\_Sold

from Product b, Item c, Order\_Detail d, Ord a

where a.Order\_id = d.Order\_ID

and b.Product\_id = d.Product\_ID

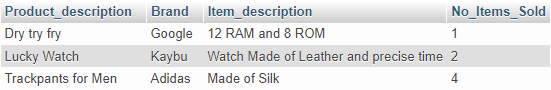
and c.Order\_detail\_Id = c.Order\_Detail\_ID

and b.Product\_ID = c.Product\_ID

and a.Order\_Date >= Date\_Sub(CURDATE(), INTERVAL 1 Month)

group by b.Product\_description,b.Brand,c.Item\_description

order by b.Product\_description,b.Brand,c.Item\_description



References:

Values of Address for entities: Employee and Customer:

[Random Address In United Kingdom | Best Random Tools (bestrandoms.com)](https://www.bestrandoms.com/random-address-in-uk)

SQL Data Types For Entitles:

[SQL Data Types for MySQL, SQL Server, and MS Access (w3schools.com)](https://www.w3schools.com/sql/sql_datatypes.asp#:~:text=The%20data%20type%20of%20a%20column%20defines%20what,stored%20inside%20each%20column%20when%20creating%20a%20table.)

Date and time functions:

[MySQL :: MySQL 5.7 Reference Manual :: 12.7 Date and Time Functions](https://dev.mysql.com/doc/refman/5.7/en/date-and-time-functions.html#function_datediff)