ROBERT GORDON UNIVERSITY ABERDEEN

INFORMATICS INSTITUTE OF TECHNOLOGY

BSc (Hons) Artificial Intelligence and Data Science

Module: CM1603 Database Systems

Individual Coursework Report

Module Leader: Ms. Dileeka Alwis

RGU Student ID : 2330912

IIT Student ID : 20230437

Student Name : Kasthuri Arachchi Gihanga Sandothmi

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Task 1 (Database Report)

Section 1: Extended Entity Relationship Diagram

Entities

- Item
- Supplier
- Order
- Customer
- Payment
- Book (Sub Entity)
- Stationary (Sub Entity)
- Company (Sub Entity)
- Individual (Sub Entity)
- BankTransfer (Sub Entity)
- OnlinePayment (Sub Entity)

Superclass and Subclasses

Superclass	Subclasses
Item	Book, Stationary
Supplier	Company, Individual
Payment	BankTransfer, OnlinePayment

Primary Key

- Item – ItemCode
- Supplier – SupplierID
- Order – OrderID
- Customer – CustomerID
- Payment – PaymentID

Non-Key Attributes

- Item – Price, StockLevel, ReorderLevel
- Supplier – Name
- Order – OrderDate, DeliveryDate, DeliveryAddress, Quantity
- Customer – Name, Email, Address
- Payment – Amount, Date
- Book – ISBN, Title, Genre, Category, Author, Publisher, YearOfPublication
- Stationary – Type, Brand
- Company – ContactPerson
- Individual – NIC
- BankTransfer – BankName, AccountNumber
- OnlinePayment – PaymentMethod

Relationships Between Entities

Binary Relationships:

- Supplier and Item
  - Supplier *supplies* Item.
- Customer and Payment
  - Customer *makes* Payment.

Ternary Relationships:

- Item, Customer, and Order
  - Customer *places* the Order for the Item.
- Customer, Order, and Payment
  - Customer *confirms* the order with a Payment.

Multiplicity Constraints

Binary Relationships:

- One Item may be supplied by many Suppliers while One Supplier supplies many Items. (m : n)
- One Payment can made by only one Customer while one Customer makes many Payments. (1: m)

Ternary Relationships:

- One Item can be placed by many Customers while one Customer can place many items. (m : n)
- One Order can be placed by only one Customer while one Customer can place many Orders. (1 : m)
- One Item can be placed to many Orders while one Order can be placed for many Items. (1 : m)
- One Payment can be made by only one Customer while one Customer can make many Payments. (1: m)
- One Order can be confirmed by only one Payment while one Payment can confirm many Orders. (1 : m)

Assumptions

- customer, payment
    - One customer can make one or many payments while one payment can be only done by one customer.
- supplier, item
    - One supplier can supply one or many items while one item can be supplied by one or many suppliers.

- order, item, customer
    - A customer places an order for items.

- order, customer, payment
    - A customer confirms the order with a payment.

- **Extended Entity Relationship Diagram (EERD)**

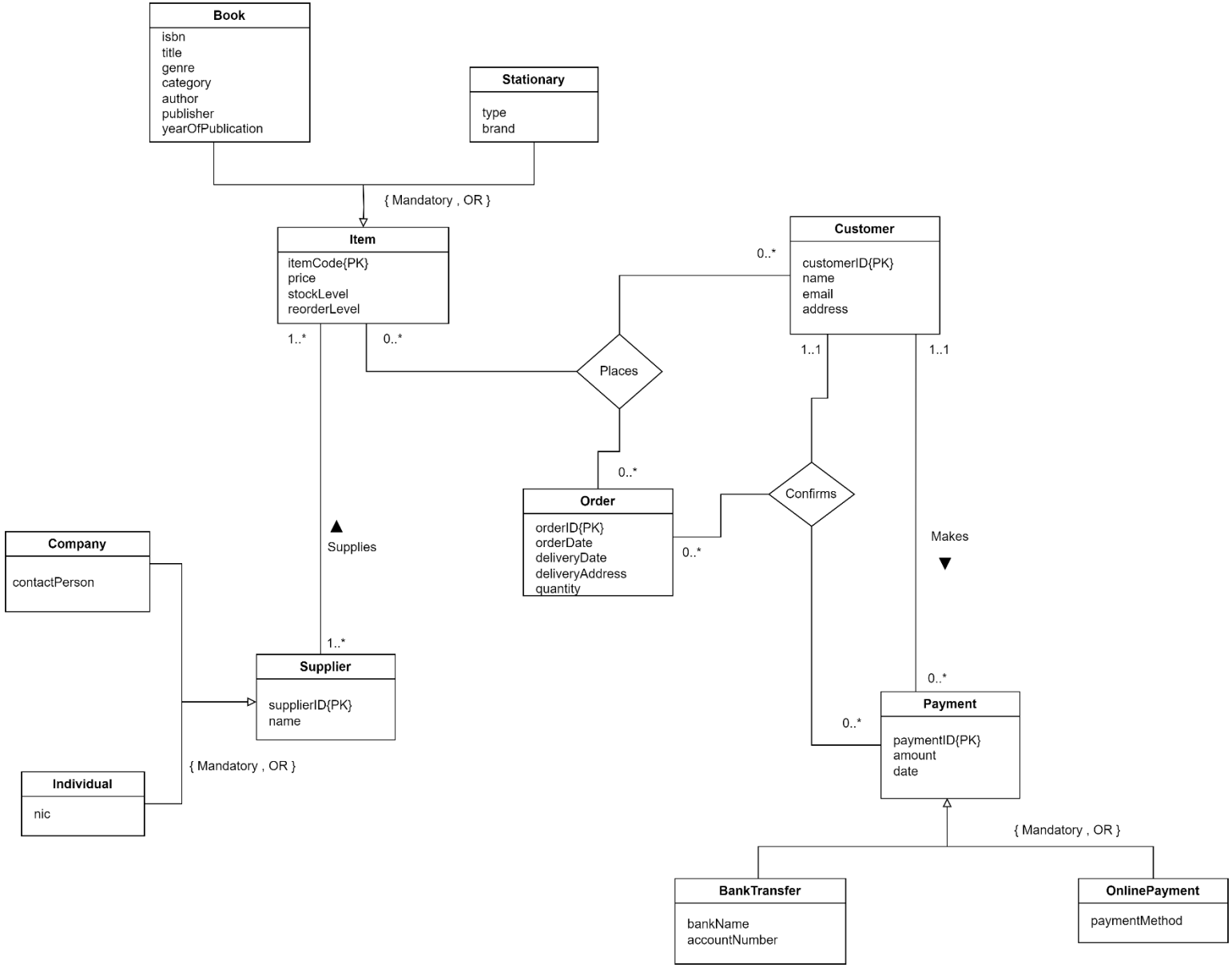


Figure 01 EERD

Section 2: Relational Schema Diagram

Primary Key

- Order – OrderID
- Customer – CustomerID
- CompanySupplier – SupplierID
- IndividualSupplier – SupplierID
- BankTransPayment – PaymentID
- OnlinePayPayment – PaymentID
- BookItem – ItemCode
- StationaryItem – ItemCode
- BookPlacement – (ItemCode, CustomerID, OrderID)
- StationaryPlacement – (ItemCode, CustomerID, OrderID)
- BankConfirmation – (PaymentID, CustomerID, OrderID)
- OnlineConfirmation – (PaymentID, CustomerID, OrderID)
- Book_Company – (ItemCode, SupplierID)
- Book_Individual – (ItemCode, SupplierID)
- Stationary_Company – (ItemCode, SupplierID)
- Stationary_Individual – (ItemCode, SupplierID)

Foreign Keys

- BankTransPayment – CustomerID
- OnlinePayPayment – CustomerID
- Book_Company – ItemCode, SupplierID
- Book_Individual – ItemCode, SupplierID
- Stationary_Company – ItemCode, SupplierID
- Stationary_Individual – ItemCode, SupplierID
- StationaryPlacement – ItemID, CustomerID, OrderID
- BookPlacement – ItemID, CustomerID, OrderID
- BankConfirmation - PaymentID, CustomerID, OrderID
- OnlineConfirmation - PaymentID, CustomerID, OrderID

Non-Key Attributes

- Order – OrderDate, DeliveryDate, DeliveryAddress, Quantity
- Customer – Name, Email, Address
- CompanySupplier – Name, ContactPerson
- IndividualSupplier – Name, NIC
- BankTransPayment –Amount, Date, BankName, AccountNumber
- OnlinePayPayment –Amount, Date, PaymentMethod
- BookItem – Price, StockLevel, ReorderLevel, ISBN, Title, Genre, Category, Author, Publisher, YearOfPublication
- StationaryItem – Price, StockLevel, ReorderLevel, Type, Brand

Relations Between Entities

- Book_Company is for BookItem.
- Book_Company is for CompanySupplier.
- Book_Individual is for BookItem.
- Book_Individual is for IndividualSupplier.
- Stationary_Individual is for StationaryItem.
- Stationary_Individual is for IndividualSupplier.
- Stationary_Company is for StationaryItem.
- Staionary_Company is for CompanySupplier.
- BookItem is placed for a BookPlacement.
- Customer places the BookPlacement.
- Order is placed for BookPlacement.
- StationaryItem is placed for the StationaryPlacement.
- Customer places the StationaryPlacement.
- Order is placed for the StationaryPlacement.
- Order is confirmed with the BankConfirmation.
- Customer confirms with the BankConfirmation.
- BankTransPayment is confirmed the BankConfirmation.
- Order is confirmed with the OnlineConfirmation.
- Customer confirms with the OnlineConfirmation.
- OnlinePayPayment is confirmed the OnlineConfirmation.
- Customer makes BankTransPayment.
- Customer makes OnlinePayPayment.

Assumptions

- Due to {Mandatory, OR} under the Supplier table, the Supplier table was removed and two new tables which is called as 'CompanySupplier' and 'IndividualSupplier' was created. The primary key (supplierID) and other non-key attributes which were in the Supplier table before, added to the newly created two tables.
- Due to {Mandatory, OR} under Item table, the Item table was removed and two new tables which is called as 'BookItem' and 'StationaryItem' was created. The primary key (itemCode) and other non-key attributes which were in the Item table before, added to the newly created two tables.
- Due to { Mandatory, OR} under Payment table, the Payment table was removed and two new tables which is called as 'BankTransPayment' and 'OnlinePayPayment' was created. The primary key (paymentID) and other non-key attributes which were in the Payment table before, added to the newly created two tables.
- Two process tables were created because of mapping the ternary relations.
    - StationaryPlacement table is for the ternary relationship between StationaryItem, Order, and Customer tables and BookPlacement table is for the ternary relationship between BookItem, Customer and Order tables.
    - BankConfirmation table is for the ternary relationship between Order, BankTransPayment, and Customer tables and OnlineConfirmation Is for the ternary relationship between OnlinePayPayment, Order, and Customer tables.
- Because of the many to many relationship between (BookItem and CompanySupplier), (BookItem and IndividualSupplier), (StatinaryItem and ConpanySupplier), and (StationaryItem and IndividualSupplier) headed to create four process tables.

- **Relational Schema Diagram**

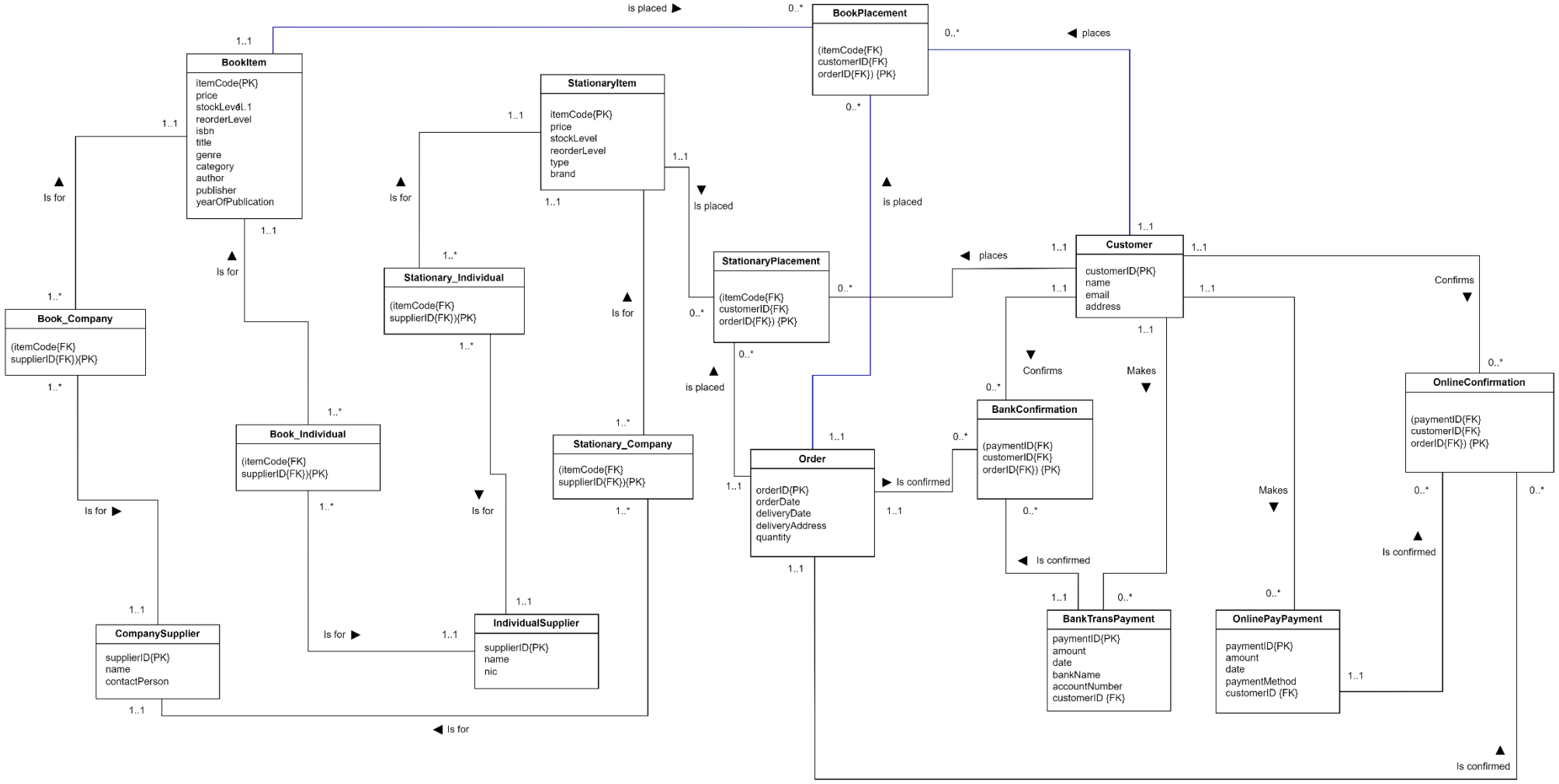


Figure 02 Relational Schema Diagram

Section 3: Creation and Population of Data

Creating Database

```
1 CREATE DATABASE BookHaven;
```

Figure 03 Code for creating DB

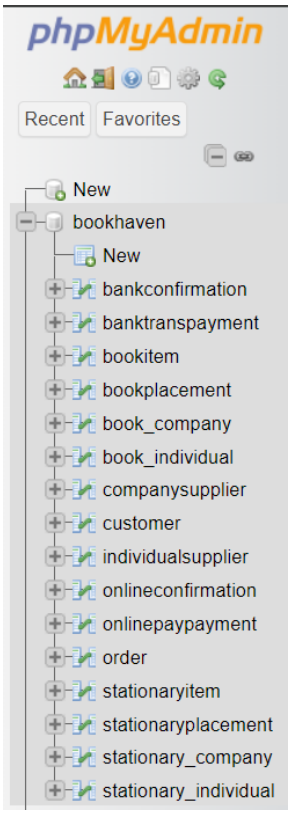


Figure 04 Creating DB

Customer Table

```sql
CREATE TABLE Customer
(
    customerID INT(15) NOT NULL,
    name VARCHAR(100) UNIQUE NOT NULL,
    email VARCHAR(30) UNIQUE NOT NULL,
    address VARCHAR(200) NOT NULL,
    CONSTRAINT cust_pk PRIMARY KEY (customerID)
);
```

Figure 05 Code for Customer table

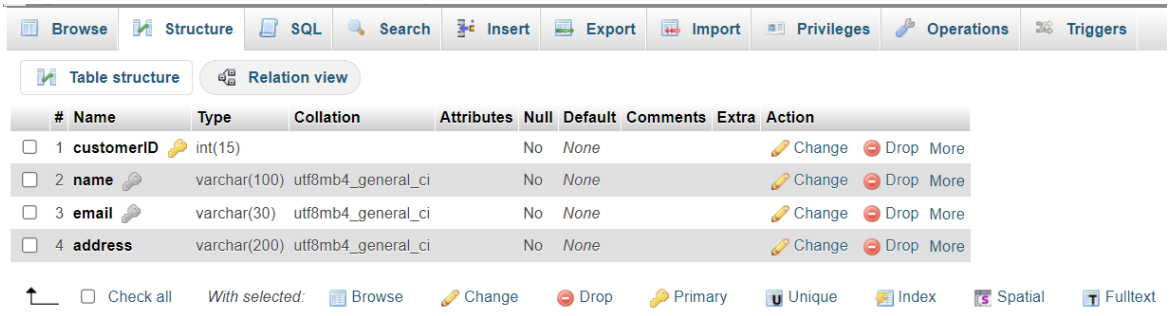


Figure 06 Customer table

```sql
INSERT INTO customer (customerID, name, email, address)
VALUES
(2023023, 'John David', 'john.daw@ymail.com', '14 Main St, NewYork'),
(2023045, 'Michael White', 'mich.wh@ymail.com', '655 Maple St, Florida'),
(2023145, 'Guwen Janet', 'guwen.j@ymail.com', '5 2nd lane, Ontario'),
(2022357, 'Benet Hello', 'bene.he@ymail.com', '25 Arina Drive, NewYork'),
(2021001, 'Babara Watson', 'babara@ymail.com', '14/3 10th Street, Cortez'),
(2022348, 'James Corden', 'jamy@ymail.com', '2 JK St, Florida'),
(2023648, 'J. M. Place', 'place@ymail.com', 'Main Street, Ontario'),
(2023845, 'M. S. Jones', 'jones@ymail.com', '9 Back St, Cortex'),
(2021475, 'Bob Canel', 'bob@ymail.com', '3 Nervous St, NewYork'),
(2022358, 'Jones Bones', 'jonas@ymail.com', '45 Extra Road, Washington DC');
```

Figure 07 insert data into Customer table

	customerID	name	email	address
Edit Copy Delete	2021001	Babara Watson	babara@ymail.com	14/3 10th Street, Cortez
Edit Copy Delete	2021475	Bob Canel	bob@ymail.com	3 Nervous St, NewYork
Edit Copy Delete	2022348	James Corden	jamy@ymail.com	2 JK St, Florida
Edit Copy Delete	2022357	Benet Hello	bene.he@ymail.com	25 Arina Drive, NewYork
Edit Copy Delete	2022358	Jones Bones	jonas@ymail.com	45 Extra Road, Washington DC
Edit Copy Delete	2023023	John David	john.daw@ymail.com	14 Main St, NewYork
Edit Copy Delete	2023045	Michael White	mich.wh@ymail.com	655 Maple St, Florida
Edit Copy Delete	2023145	Guwen Janet	guwen.j@ymail.com	5 2nd lane, Ontario
Edit Copy Delete	2023648	J. M. Place	place@ymail.com	Main Street, Ontario
Edit Copy Delete	2023845	M. S. Jones	jones@ymail.com	9 Back St, Cortex

Figure 08 data entered Customer table

CompanySupplier Table

```sql
CREATE TABLE CompanySupplier
(
    supplierID INT(15) NOT NULL,
    name VARCHAR(100) UNIQUE NOT NULL,
    contactPerson VARCHAR(50) NOT NULL,
    CONSTRAINT supp_pk PRIMARY KEY (supplierID)
);
```

Figure 09 Code for CompanySupplier Table

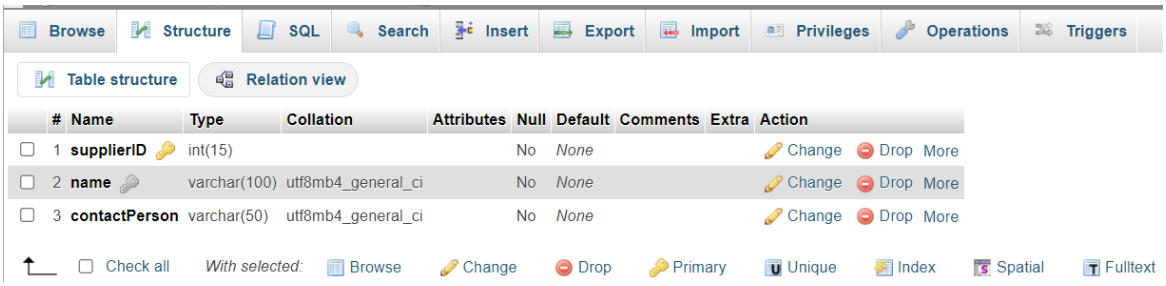


Figure 10 CompanySupplier Table

```sql
INSERT INTO CompanySupplier (supplierID, name, contactPerson)
VALUES
(135, 'Edward Publishers', 'John Publisher'),
(103, 'GK Office Solutions', 'Sofia Manager'),
(87, 'Nine Hearts Art and Crafts', 'Kevin DesignManager'),
(101, 'Exam Guide Publishers', 'Ava SellsManager'),
(55, 'SS School Suppliers', 'Ethan SellsManager'),
(23, 'NM Book Suppliers', 'Manura SellsManager'),
(46, 'YHM Publishers', 'Vinuka Manager'),
(88, 'MH Solutions', 'Sathija ExecutiveOfficer'),
(99, 'Hello World Suppliers', 'Praveen Deeler'),
(100, 'Heaven Publishers', 'Nayomi Manager');
```

Figure 11 insert data into CompanySupplier table

	supplierID	name	contactPerson
Edit Copy Delete	23	NM Book Suppliers	Manura SellsManager
Edit Copy Delete	46	YHM Publishers	Vinuka Manager
Edit Copy Delete	55	SS School Suppliers	Ethan SellsManager
Edit Copy Delete	87	Nine Hearts Art and Crafts	Kevin DesignManager
Edit Copy Delete	88	MH Solutions	Sathija ExecutiveOfficer
Edit Copy Delete	99	Hello World Suppliers	Praveen Deeler
Edit Copy Delete	100	Heaven Publishers	Nayomi Manager
Edit Copy Delete	101	Exam Guide Publishers	Ava SellsManager
Edit Copy Delete	103	GK Office Solutions	Sofia Manager
Edit Copy Delete	135	Edward Publishers	John Publisher

Figure 12 data entered CompanySupplier table

IndividualSupplier Table

```sql
CREATE TABLE IndividualSupplier
(
    supplierID INT(15) NOT NULL,
    name VARCHAR(100) UNIQUE NOT NULL,
    NIC CHAR(12) UNIQUE NOT NULL,
    CONSTRAINT supp_pk1 PRIMARY KEY (supplierID)
);
```

Figure13 Code for IndividualSupplier table

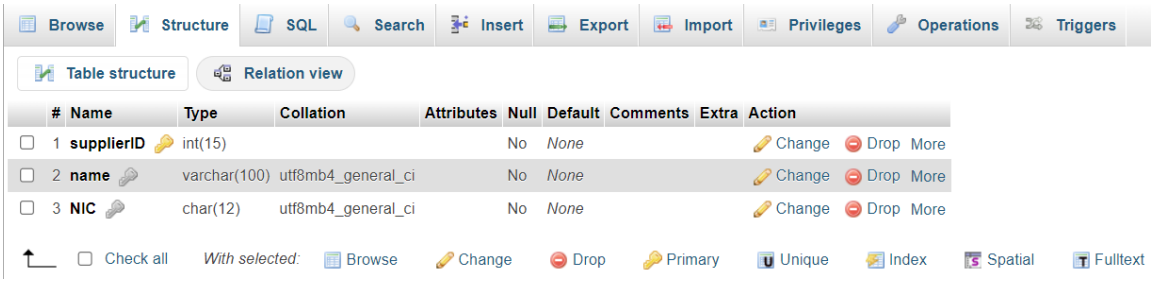


Figure 14 IndividualSupplier table

```sql
INSERT INTO IndividualSupplier (supplierID, name, NIC)
VALUES
(151, 'Jen Doe', 'AB4579537861'),
(161, 'Olivia Gray', 'CD2548697315'),
(171, 'Pegras Orendo', 'EX1497364286'),
(189, 'Robert Mathew', 'ZV3589764286'),
(162, 'Emma Pattinson', 'YM8463759216'),
(200, 'Camila Cabello', 'BC4563289517'),
(201, 'Jenny Kim', 'PK2658934865'),
(202, 'Kevin Blah', 'JK6258934567'),
(205, 'Jani Hei', 'AS4536925761'),
(208, 'Nandya Feros', 'IU2486753214');
```

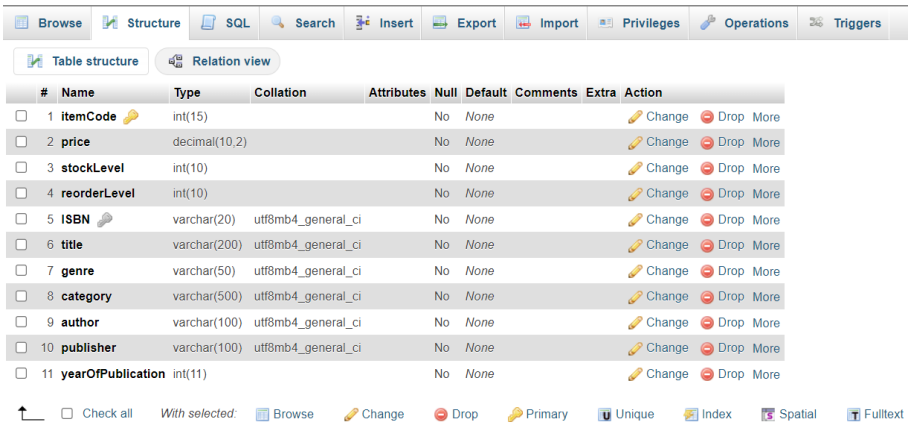
Figure 15 insert data into IndividualSupplier table

Figure 16 data entered IndividualSupplier table

BookItem Table

```sql
CREATE TABLE BookItem
(
    itemCode INT(15) NOT NULL,
    price DECIMAL(10,2) NOT NULL,
    stockLevel INT(10) NOT NULL,
    reorderLevel INT(10) NOT NULL,
    ISBN VARCHAR(20) UNIQUE NOT NULL,
    title VARCHAR(200) NOT NULL,
    genre VARCHAR(50) NOT NULL,
    category VARCHAR(500) NOT NULL,
    author VARCHAR(100) NOT NULL,
    publisher VARCHAR(100) NOT NULL,
    yearOfPublication INT NOT NULL,
    CONSTRAINT book_item_pk PRIMARY KEY (itemCode)
);
```

Figure 17 code for BookItem Table



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	itemCode	int(15)			No	None			Change Drop More
2	price	decimal(10,2)			No	None			Change Drop More
3	stockLevel	int(10)			No	None			Change Drop More
4	reorderLevel	int(10)			No	None			Change Drop More
5	ISBN	varchar(20)	utf8mb4_general_ci		No	None			Change Drop More
6	title	varchar(200)	utf8mb4_general_ci		No	None			Change Drop More
7	genre	varchar(50)	utf8mb4_general_ci		No	None			Change Drop More
8	category	varchar(500)	utf8mb4_general_ci		No	None			Change Drop More
9	author	varchar(100)	utf8mb4_general_ci		No	None			Change Drop More
10	publisher	varchar(100)	utf8mb4_general_ci		No	None			Change Drop More
11	yearOfPublication	int(11)			No	None			Change Drop More

Figure 18 BookItem table

```sql
INSERT INTO BookItem (itemCode, price, stockLevel, reorderLevel, ISBN, title, genre, category, author, publisher, yearOfPublication)
VALUES
(51500, 15.00, 50, 10, '978-1-234567-89-0', 'The Great Novel', 'Fiction', 'Novel', 'John Depp', 'Edward Publishers', 2020),
(33505, 8.90, 25, 6, '13-978-0133970777', 'Fundamentals of Database Systems', 'DBMS', 'Database', 'Ramez Elmasri', 'Pearson', 2022),
(66207, 29.50, 15, 3, '978-1-239567-89-6', 'Our History', 'Educational-History', 'Documentary', 'David Miller', 'JK Publisher', 2016),
(26433, 10.20, 50, 20, '978-1-348957-89-9', 'G.C.E ALs Past Papers', 'Educational', 'Exam Preparation', 'Pornesio Parapio', 'Exam Guide Publishers',
2022),
(16155, 20.70, 45, 9, '13-648-35781-64298', 'Database Systems: Concepts, Design, and Applications', 'DBMS', 'Database', 'Ramez Elmasri', 'Springer',
2022),
(23456,  10.00, 30, 10, '654-8-768954-56-9', 'My crush Yuvi', 'Romantic', 'Novel', 'Aanya Dorson', 'YH Publishers', 2023),
(35987, 11.00, 10, 3, '958-6-756985-95-7', 'Zoology', 'Biology', 'Documentary', 'J.J.Stew', 'JJ Publishers', 2021),
(43157, 2.00, 20, 5, '65-586-6347596214', 'My Drawing Book', 'Educational', 'Education', 'M.L.Limin', 'Blah Blah Publishers', 2022),
(25146, 5.00, 50, 10, '23-456-7593214568', 'Jesus', 'Catholic', 'Documentary', 'B. B. Martin', 'DM Publishers', 2020),
(45689, 20.00, 40, 10, '28-845-6571546832', 'Introduction to Database Systems', 'DBMS', 'Database', 'Ramez Elmasri', 'Pearson', 2022);
```

Figure 19 insert data into BookItem table

	itemCode	price	stockLevel	reorderLevel	ISBN	title	genre	category	author	publisher	yearOfPublication
Edit Copy Delete	16155	20.70	45	9	13-648-35781-64298	Database Systems: Concepts, Design, and Applicatio...	DBMS	Database	Ramez Elmasri	Springer	2022
Edit Copy Delete	23456	10.00	30	10	654-8-768954-56-9	My crush Yuvi	Romantic	Novel	Aanya Dorson	YH Publishers	2023
Edit Copy Delete	25146	5.00	50	10	23-456-7593214568	Jesus	Catholic	Documentary	B. B. Martin	DM Publishers	2020
Edit Copy Delete	26433	10.20	50	20	978-1-348957-89-9	G.C.E ALs Past Papers	Educational	Exam Preparation	Pornesio Parapio	Exam Guide Publishers	2022
Edit Copy Delete	33505	8.90	25	6	13-978-0133970777	Fundamentals of Database Systems	DBMS	Database	Ramez Elmasri	Pearson	2022
Edit Copy Delete	35987	11.00	10	3	958-6-756985-95-7	Zoology	Biology	Documentary	J.J.Stew	JJ Publishers	2021
Edit Copy Delete	43157	2.00	20	5	65-586-6347596214	My Drawing Book	Educational	Education	M.L.Limin	Blah Blah Publishers	2022
Edit Copy Delete	45689	20.00	40	10	28-845-6571546832	Introduction to Database Systems	DBMS	Database	Ramez Elmasri	Pearson	2022
Edit Copy Delete	51500	15.00	50	10	978-1-234567-89-0	The Great Novel	Fiction	Novel	John Depp	Edward Publishers	2020
Edit Copy Delete	66207	29.50	15	3	978-1-239567-89-6	Our History	Educational-History	Documentary	David Miller	JK Publisher	2016

Figure 20 data entered BookItem table

StationaryItem Table

```
CREATE TABLE StationaryItem
(
    itemCode INT(15) NOT NULL,
    price DECIMAL(10,2) NOT NULL,
    stockLevel INT(10) NOT NULL,
    reorderLevel INT(10) NOT NULL,
    type VARCHAR(50) NOT NULL,
    brand VARCHAR(50),
    CONSTRAINT stat_item_pk PRIMARY KEY (itemCode)
);
```

Figure 21 code for StationaryItem table

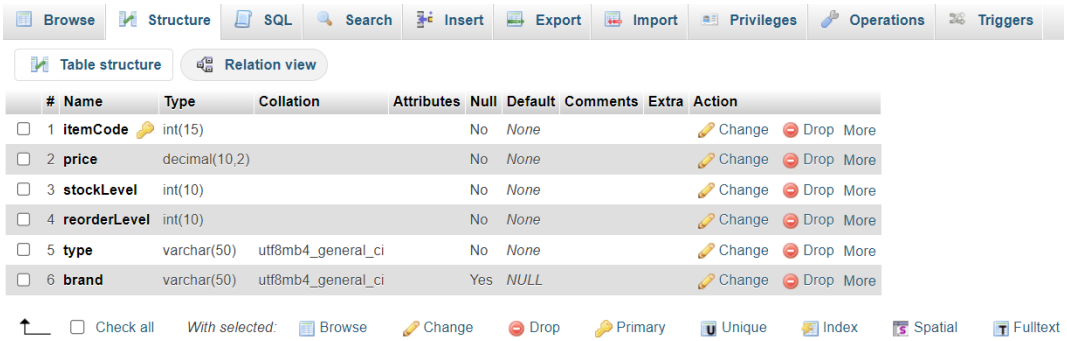


Figure 22 StationaryItem table

```
INSERT INTO StationaryItem (itemCode, price, stockLevel, reorderLevel, type, brand)
VALUES
(1001, 3.00, 50, 10, 'Pen', 'Atlas'),
(1005, 5.50, 30,5, 'NoteBook', 'Athena'),
(1205, 1.00, 100, 50, 'Eraser', 'BB'),
(1145, 4.10, 15, 3, 'Paint Brushers', 'Nine Hearts'),
(1265, 6.00, 25, 6, 'Marker', 'Ten'),
(1256, 5.00, 25, 5, 'Ruler', 'Ten'),
(1285, 10.00, 50, 5, 'Pencil case', 'The fullstop'),
(1295, 2.00, 100, 50, 'Sticky note', 'Maped'),
(1296, 30.00, 50, 5, 'School bag', 'Atlas'),
(1300, 3.00, 100, 10, 'Pencil', 'Atlas');
```

Figure 23 insert data into StationaryItem table

	itemCode	price	stockLevel	reorderLevel	type	brand
Edit Copy Delete	1001	3.00	50	10	Pen	Atlas
Edit Copy Delete	1005	5.50	30	5	NoteBook	Athena
Edit Copy Delete	1145	4.10	15	3	Paint Brushers	Nine Hearts
Edit Copy Delete	1205	1.00	100	50	Eraser	BB
Edit Copy Delete	1256	5.00	25	5	Ruler	Ten
Edit Copy Delete	1265	6.00	25	6	Marker	Ten
Edit Copy Delete	1285	10.00	50	5	Pencil case	The fullstop
Edit Copy Delete	1295	2.00	100	50	Sticky note	Maped
Edit Copy Delete	1296	30.00	50	5	School bag	Atlas
Edit Copy Delete	1300	3.00	100	10	Pencil	Atlas

Figure 24 data entered StationaryItem table

BankTransPayment

```sql
CREATE TABLE BankTransPayment
(
    paymentId INT(15) NOT NULL,
    amount DECIMAL(10,2) NOT NULL,
    date DATE,
    bankName VARCHAR(50) NOT NULL,
    accountNumber VARCHAR(20) NOT NULL,
    customerID INT(15) NOT NULL,
    CONSTRAINT bank_pay_pk PRIMARY KEY (paymentID),
    CONSTRAINT cust_fk1 FOREIGN KEY (customerID) REFERENCES Customer (customerID)
);
```

Figure 25 code for BankTransPayment table

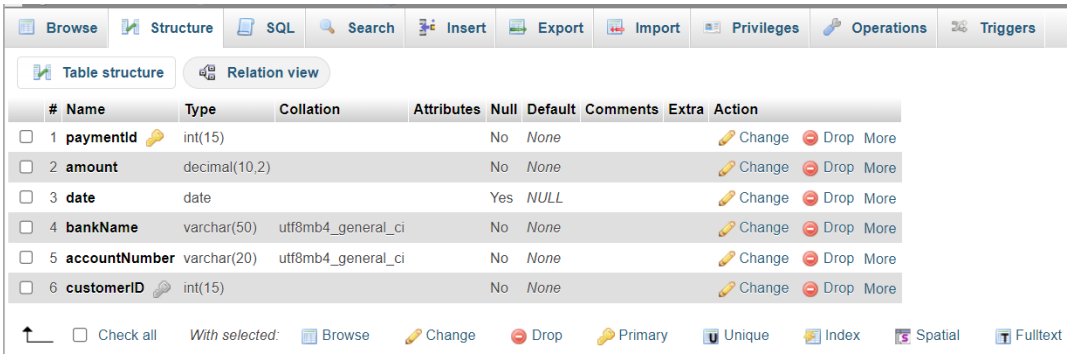


Figure 26 BankTransPayment table

```sql
INSERT INTO BankTransPayment (paymentId, amount, date, bankName, accountNumber, customerID)
VALUES
(3451, 30.60, '2023-08-05', 'Central Bank', '1234567890', 2023145),
(3455, 75.50, '2023-09-10', 'PLK Bank', '9876543210', 2022357),
(3463, 120.00, '2023-09-15', 'HDD Bank', '5556547895', 2021001),
(3468, 30.00, '2023-09-20', 'Central Bank', '1354786233', 2023023),
(3470, 40.00, '2023-10-25', 'SK Bank', '4444333322', 2023023),
(3471, 100.00, '2023-09-03', 'JK Bank', '2345687591', 2022348),
(3473, 10.00, '2023-10-06', 'JJK Bank', '3654289516', 2021475);
```

Figure 27 insert data into BankTransPayment table

	paymentId	amount	date	bankName	accountNumber	customerID
Edit Copy Delete	3451	30.60	2023-08-05	Central Bank	1234567890	2023145
Edit Copy Delete	3455	75.50	2023-09-10	PLK Bank	9876543210	2022357
Edit Copy Delete	3463	120.00	2023-09-15	HDD Bank	5556547895	2021001
Edit Copy Delete	3468	30.00	2023-09-20	Central Bank	1354786233	2023023
Edit Copy Delete	3470	40.00	2023-10-25	SK Bank	4444333322	2023023
Edit Copy Delete	3471	100.00	2023-09-03	JK Bank	2345687591	2022348
Edit Copy Delete	3473	10.00	2023-10-06	JJK Bank	3654289516	2021475

Figure 28 data entered BankTransPayment table

OnlinePayPayment Table

```sql
CREATE TABLE OnlinePayPayment
(
    paymentId INT(15) NOT NULL,
    amount DECIMAL(10,2) NOT NULL,
    date DATE,
    paymentMethod VARCHAR(30) NOT NULL,
    customerID INT(15) NOT NULL,
    CONSTRAINT onl_pay_pk PRIMARY KEY (paymentID),
    CONSTRAINT cust_fk2 FOREIGN KEY (customerID) REFERENCES Customer (customerID)
);
```

Figure 29 code for OnlinePayPayment table

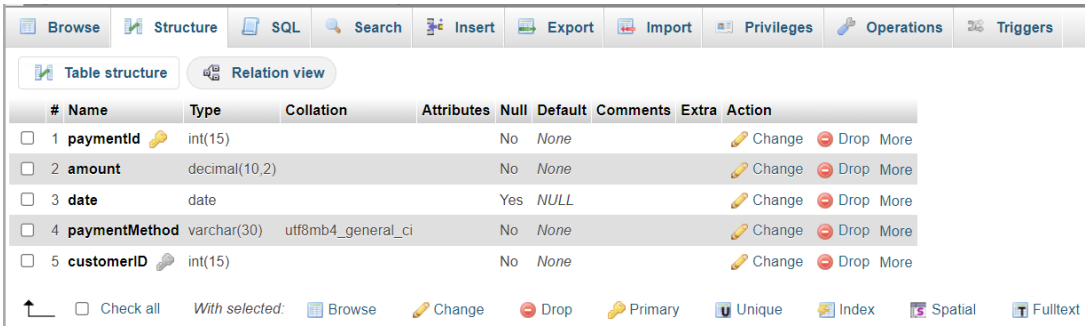


Figure 30 OnlinePayPayment table

```sql
INSERT INTO OnlinePayPayment (paymentId, amount, date, paymentMethod, customerID)
VALUES
(11034, 120.00, '2023-09-05', 'Credit Card', 2023023),
(11042, 25.25, '2023-09-10', 'PayPal', 2023045),
(11083, 75.50, '2023-10-15', 'Google Pay', 2022357),
(12004, 30.75, '2023-10-20', 'Credit Card', 2021001),
(12008, 20.50, '2023-10-25', 'Debit Card', 2023145),
(12010, 25.00, '2023-10-27', 'Debit Card', 2023845),
(12015, 200.00, '2023-11-01', 'Credit Card', 2023648);
```

Figure 31 insert data into OnlinePayPayment table

	paymentId	amount	date	paymentMethod	customerID
Edit Copy Delete	11034	120.00	2023-09-05	Credit Card	2023023
Edit Copy Delete	11042	25.25	2023-09-10	PayPal	2023045
Edit Copy Delete	11083	75.50	2023-10-15	Google Pay	2022357
Edit Copy Delete	12004	30.75	2023-10-20	Credit Card	2021001
Edit Copy Delete	12008	20.50	2023-10-25	Debit Card	2023145
Edit Copy Delete	12010	25.00	2023-10-27	Debit Card	2023845
Edit Copy Delete	12015	200.00	2023-11-01	Credit Card	2023648

Figure 32 data entered OnlinePayPayment table

Order Table

```sql
CREATE TABLE `Order`
(
    orderID INT(15) NOT NULL,
    orderDate DATE,
    deliveryDate DATE,
    deliveryAddress VARCHAR(200) NOT NULL,
    quantity INT(10),
    CONSTRAINT ord_pk PRIMARY KEY (orderID)
);
```

Figure 33 code for Order table

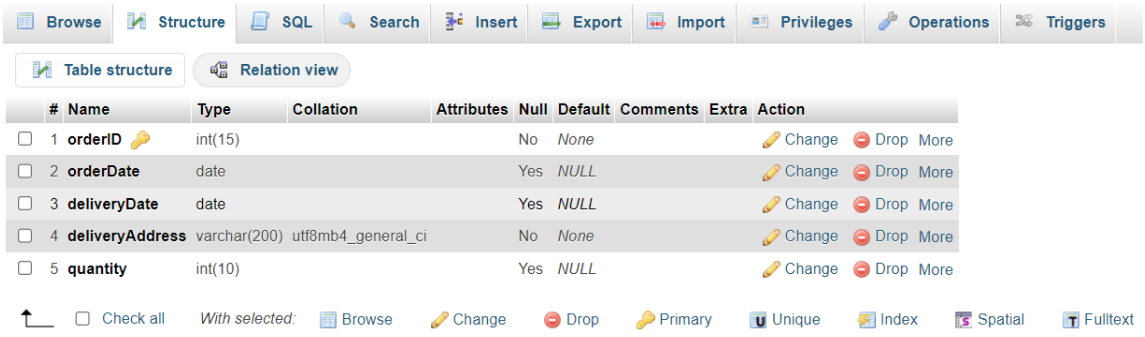


Figure 34 Order table

```sql
INSERT INTO `Order` (orderID, orderDate, deliveryDate, deliveryAddress, quantity)
VALUES
(16546, '2023-07-10', '2023-07-13', '89 Ward Place, Colorado.', 1),
(16675, '2023-08-05', '2023-08-07', '5 2nd Lane, Ontario.', 3),
(16698, '2023-09-05', '2023-09-08', '14 Main St, New York.', 40),
(16728, '2023-09-20', '2023-09-23', '14 Main St, New York.', 2),
(16755, '2023-10-25', '2023-10-27', '5 2nd Lane, Ontario.', 5),
(16756, '2023-10-25', '2023-10-27', '14 Main St, New York.', 40),
(16805, '2023-11-01', '2023-11-05', '456 JK St, California.', 10),
(16903, '2023-09-03', '2023-09-05', '2 JK St, Florida', 10),
(16905, '2023-10-06', '2023-10-08', '3 Nervous St, NewYork', 1),
(16910, '2023-10-27', '2023-10-29', '9 Back St, Cortex', 5),
(16933, '2023-11-01', '2023-11-03', 'Main Street, Ontario', 100),
(16950, '2023-11-03', '2023-11-05', '14/3 10th Street, Cortez', 6);
```

Figure 35 insert data into Order table

	orderID	orderDate	deliveryDate	deliveryAddress	quantity
Edit Copy Delete	16546	2023-07-10	2023-07-13	89 Ward Place, Colorado.	1
Edit Copy Delete	16675	2023-08-05	2023-08-07	5 2nd Lane, Ontario.	3
Edit Copy Delete	16698	2023-09-05	2023-09-08	14 Main St, New York.	40
Edit Copy Delete	16728	2023-09-20	2023-09-23	14 Main St, New York.	2
Edit Copy Delete	16755	2023-10-25	2023-10-27	5 2nd Lane, Ontario.	5
Edit Copy Delete	16756	2023-10-25	2023-10-27	14 Main St, New York.	40
Edit Copy Delete	16805	2023-11-01	2023-11-05	456 JK St, California.	10
Edit Copy Delete	16903	2023-09-03	2023-09-05	2 JK St, Florida	10
Edit Copy Delete	16905	2023-10-06	2023-10-08	3 Nervous St, NewYork	1
Edit Copy Delete	16910	2023-10-27	2023-10-29	9 Back St, Cortex	5
Edit Copy Delete	16933	2023-11-01	2023-11-03	Main Street, Ontario	100
Edit Copy Delete	16950	2023-11-03	2023-11-05	14/3 10th Street, Cortez	6

Figure 36 data entered Order table

StationaryPlacement Table

```
CREATE TABLE StationaryPlacement
(
    itemCode INT(15),
    customerID INT(15),
    orderID INT(15),
    CONSTRAINT ord_de_pk PRIMARY KEY (itemCode, customerID, orderID),
    CONSTRAINT stat_item_fk2 FOREIGN KEY (itemCode) REFERENCES StationaryItem (itemCode),
    CONSTRAINT cust_fk3 FOREIGN KEY (customerID) REFERENCES Customer (customerID),
    CONSTRAINT ord_fk1 FOREIGN KEY (orderID) REFERENCES `Order` (orderID)
);
```

Figure 37 code for StationaryPlacement table

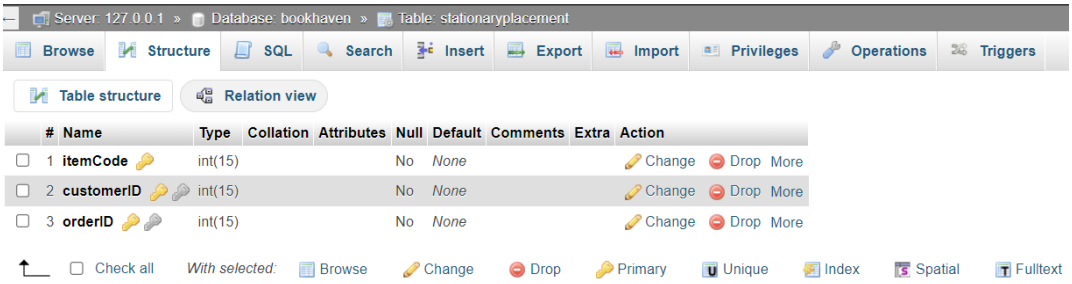


Figure 38 StationaryPlacement table

```
INSERT INTO StationaryPlacement (itemCode, customerID, orderID)
VALUES
(1001, 2023023, 16698),
(1005, 2022357, 16805),
(1205, 2023023, 16756),
(1145, 2023145, 16755),
(1285, 2022348, 16903);
```

Figure 39 data insert into StationaryPlacement table

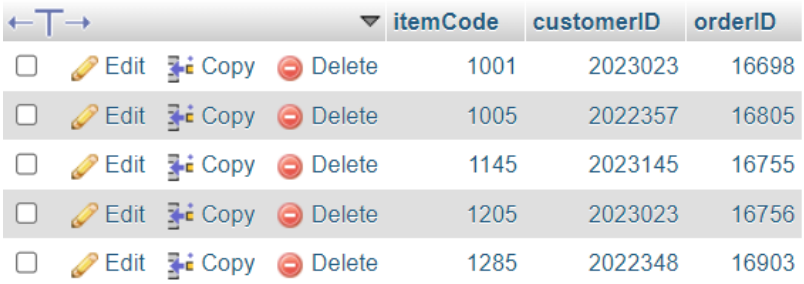


Figure 40 data entered StationaryPlacement table

BookPlacement Table

```sql
CREATE TABLE BookPlacement
(
    itemCode INT(15),
    customerID INT(15),
    orderID INT(15),
    CONSTRAINT ord_de_pk PRIMARY KEY (itemCode, customerID, orderID),
    CONSTRAINT book_item_fk2 FOREIGN KEY (itemCode) REFERENCES BookItem (itemCode),
    CONSTRAINT cust_fk8 FOREIGN KEY (customerID) REFERENCES Customer (customerID),
    CONSTRAINT ord_fk8 FOREIGN KEY (orderID) REFERENCES `Order` (orderID)
);
```

Figure 41 code for BookPlacement table

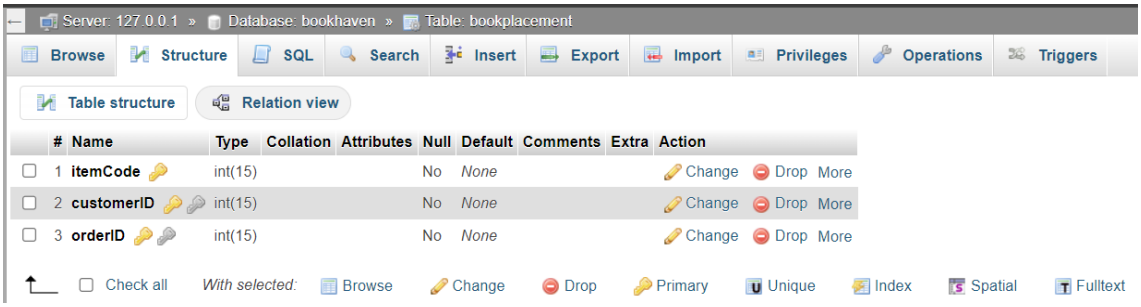


Figure 42 BookPlacement table

```sql
INSERT INTO BookPlacement (itemCode, customerID, orderID)
VALUES
(16155, 2023045, 16546),
(26433, 2023145, 16675),
(51500, 2023023, 16728),
(23456, 2021475, 16905),
(43157, 2023648, 16933);
```

Figure 43 data insert into BookPlacement table

	itemCode	customerID	orderID
Edit Copy Delete	16155	2023045	16546
Edit Copy Delete	23456	2021475	16905
Edit Copy Delete	26433	2023145	16675
Edit Copy Delete	43157	2023648	16933
Edit Copy Delete	51500	2023023	16728

Figure 44 data entered BookPlacement table

BankConfirmation Table

```
CREATE TABLE BankConfirmation
(
    paymentID INT(15),
    customerID INT(15),
    orderID INT(15),
    CONSTRAINT pay_con_pk PRIMARY KEY (paymentID, customerID, orderID),
    CONSTRAINT onl_pay_fk4 FOREIGN KEY (paymentID) REFERENCES BankTransPayment (paymentID),
    CONSTRAINT cust_fk4 FOREIGN KEY (customerID) REFERENCES Customer (customerID),
    CONSTRAINT ord_fk2 FOREIGN KEY (orderID) REFERENCES `Order` (orderID)
);
```

Figure 45 code for BankConfirmation table

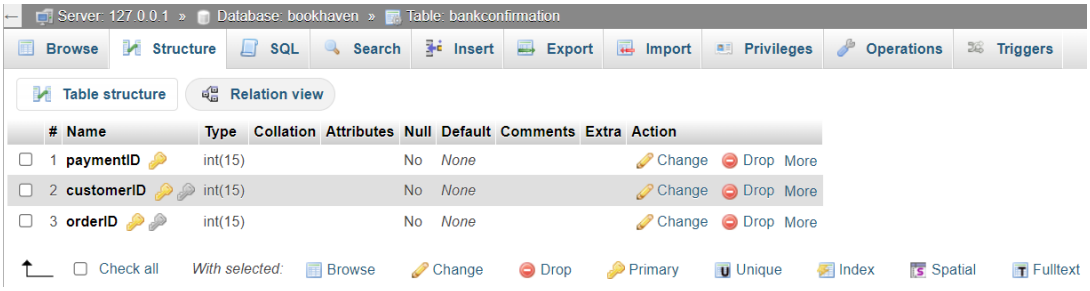


Figure 46 BankConfirmation table

```
INSERT INTO BankConfirmation (paymentID, customerID, orderID)
VALUES
(3451, 2023145, 16675),
(3468, 2023023, 16728),
(3470, 2023023, 16756),
(3471, 2022348, 16903),
(3473, 2021475, 16905);
```

Figure 47 insert data into BankConfirmation table

	paymentID	customerID	orderID
Edit Copy Delete	3451	2023145	16675
Edit Copy Delete	3468	2023023	16728
Edit Copy Delete	3470	2023023	16756
Edit Copy Delete	3471	2022348	16903
Edit Copy Delete	3473	2021475	16905

Figure 48 data entered BankConfirmation table

OnlineConfirmation Table

```
CREATE TABLE OnlineConfirmation
(
    paymentID INT(15),
    customerID INT(15),
    orderID INT(15),
    CONSTRAINT pay_con_pk2 PRIMARY KEY (paymentID, customerID, orderID),
    CONSTRAINT onl_pay_fk9 FOREIGN KEY (paymentID) REFERENCES OnlinePayPayment (paymentID),
    CONSTRAINT cust_fk9 FOREIGN KEY (customerID) REFERENCES Customer (customerID),
    CONSTRAINT ord_fk9 FOREIGN KEY (orderID) REFERENCES `Order` (orderID)
);
```

Figure 49 code for OnlineConfirmation table

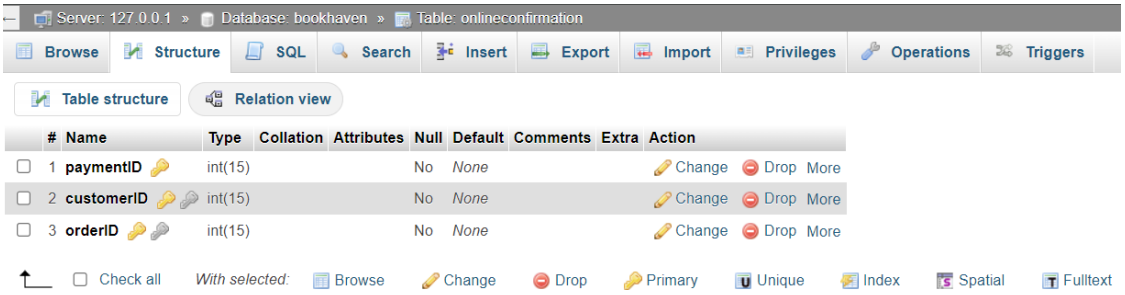


Figure 50 OnlineConfirmation table

```
INSERT INTO OnlineConfirmation (paymentID, customerID, orderID)
VALUES
(12004, 2021001, 16950),
(11034, 2023023, 16698),
(12008, 2023145, 16755),
(12010, 2023845, 16910),
(12015, 2023648, 16933);
```

Figure 51 insert data into OnlineConfirmation table

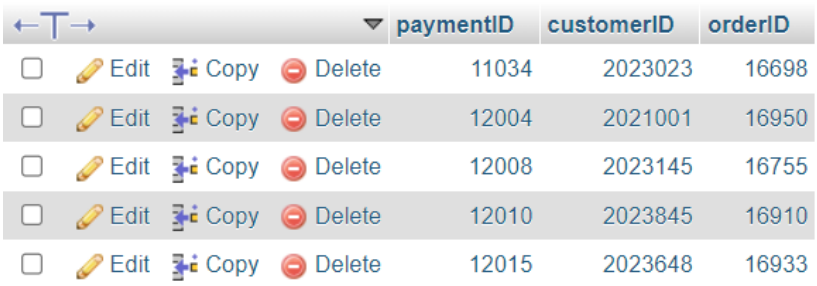


Figure 52 data entered OnlineConfirmation table

Book_Company Table

```sql
CREATE TABLE Book_Company
(
    itemCode INT(15),
    supplierID INT(15),
    CONSTRAINT book_company_pk PRIMARY KEY (itemCode, supplierID),
    CONSTRAINT book_code1 FOREIGN KEY (itemCode) REFERENCES BookItem (itemCode),
    CONSTRAINT comp_ID1 FOREIGN KEY (supplierID) REFERENCES CompanySupplier (supplierID)
);
```

Figure 53 code for Book_Company table

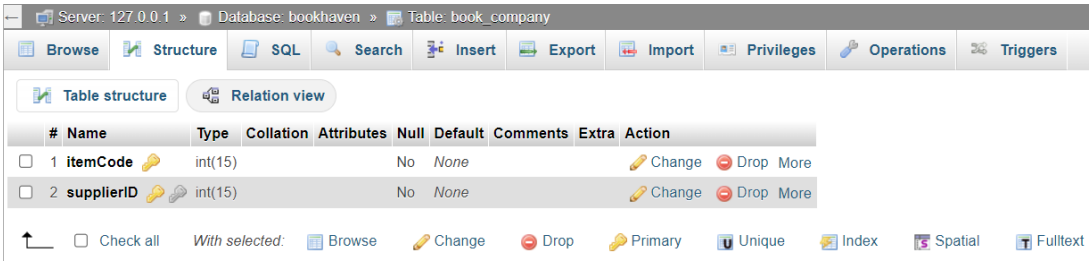


Figure 54 Book_Company table

```sql
INSERT INTO Book_Company (itemCode, supplierId)
VALUES
(51500, 135),
(26433, 101),
(23456, 100),
(33505, 23),
(16155, 46);
```

Figure 55 insert data into Book_Company table

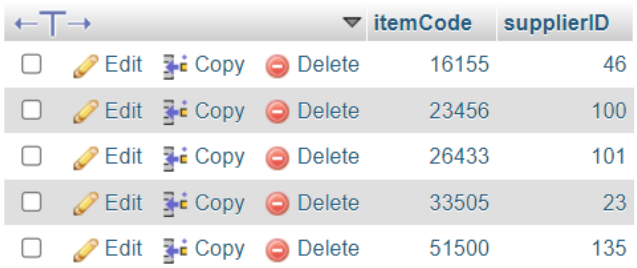


Figure 56 data entered Book_Company table

Book_Individual Table

```
CREATE TABLE Book_Individual
(
    itemCode INT(15),
    supplierID INT(15),
    CONSTRAINT book_individual_pk PRIMARY KEY (itemCode, supplierID),
    CONSTRAINT book_code2 FOREIGN KEY (itemCode) REFERENCES BookItem (itemCode),
    CONSTRAINT indi_ID1 FOREIGN KEY (supplierID) REFERENCES IndividualSupplier (supplierID)
);
```

Figure 57 code for Book_Individual table

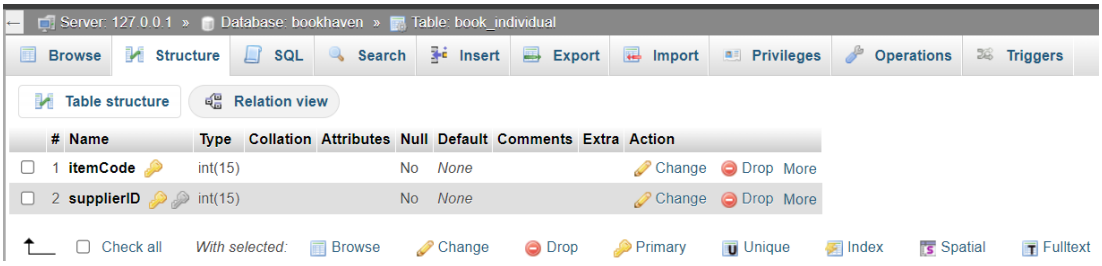


Figure 58 Book_Individual table

```
INSERT INTO Book_Individual (itemCode, supplierId)
VALUES
(43157, 200),
(25146, 202),
(66207, 161),
(35987, 189),
(45689, 162);
```

Figure 59 insert data into Book_Individual table

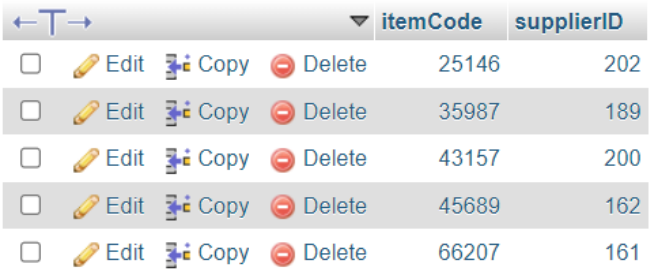


Figure 60 data entered Book_Individual table

Stationary_Individual Table

```
CREATE TABLE stationary_Individual
(
    itemCode INT(15),
    supplierID INT(15),
    CONSTRAINT stat_individual_pk PRIMARY KEY (itemCode, supplierID),
    CONSTRAINT stat_code2 FOREIGN KEY (itemCode) REFERENCES StationaryItem (itemCode),
    CONSTRAINT indi_ID2 FOREIGN KEY (supplierID) REFERENCES IndividualSupplier (supplierID)
);
```

Figure 61 code for Stationary_Individual table

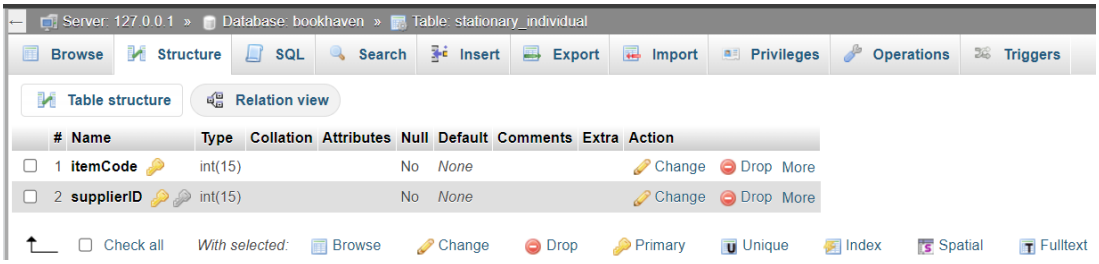


Figure 62 Stationary_Individual table

```
INSERT INTO Stationary_Individual (itemCode, supplierId)
VALUES
(1001, 151),
(1205, 171),
(1256, 201),
(1265, 205),
(1295, 208);
```

Figure 63 insert data into Stationary_Individual table

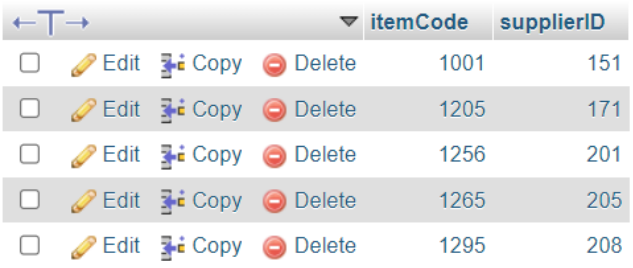


Figure 64 data entered Stationary_Individual table

Stationary_Company Table

```
CREATE TABLE Stationary_Company
(
    itemCode INT(15),
    supplierID INT(15),
    CONSTRAINT stat_company_pk PRIMARY KEY (itemCode, supplierID),
    CONSTRAINT stat_code1 FOREIGN KEY (itemCode) REFERENCES StationaryItem (itemCode),
    CONSTRAINT comp_ID2 FOREIGN KEY (supplierID) REFERENCES CompanySupplier (supplierID)
);
```

Figure 65 code for Stationary_Company table

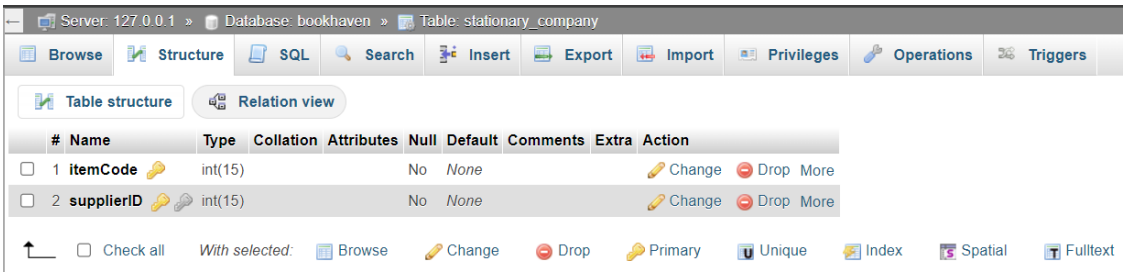


Figure 66 Stationary_Company table

```
INSERT INTO Stationary_Company (itemCode, supplierId)
VALUES
(1285, 99),
(1005, 103),
(1145, 87),
(1296, 88),
(1300, 55);
```

Figure 67 insert data into Stationary_Company table

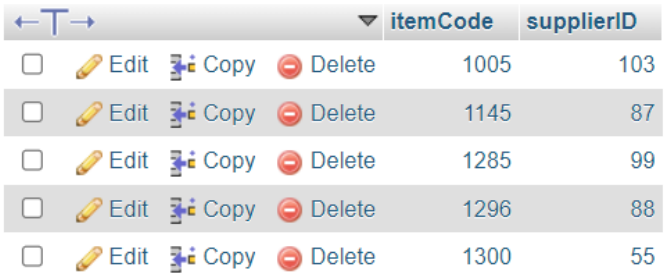


Figure 68 data entered Stationary_Company table

Designer Of all tables

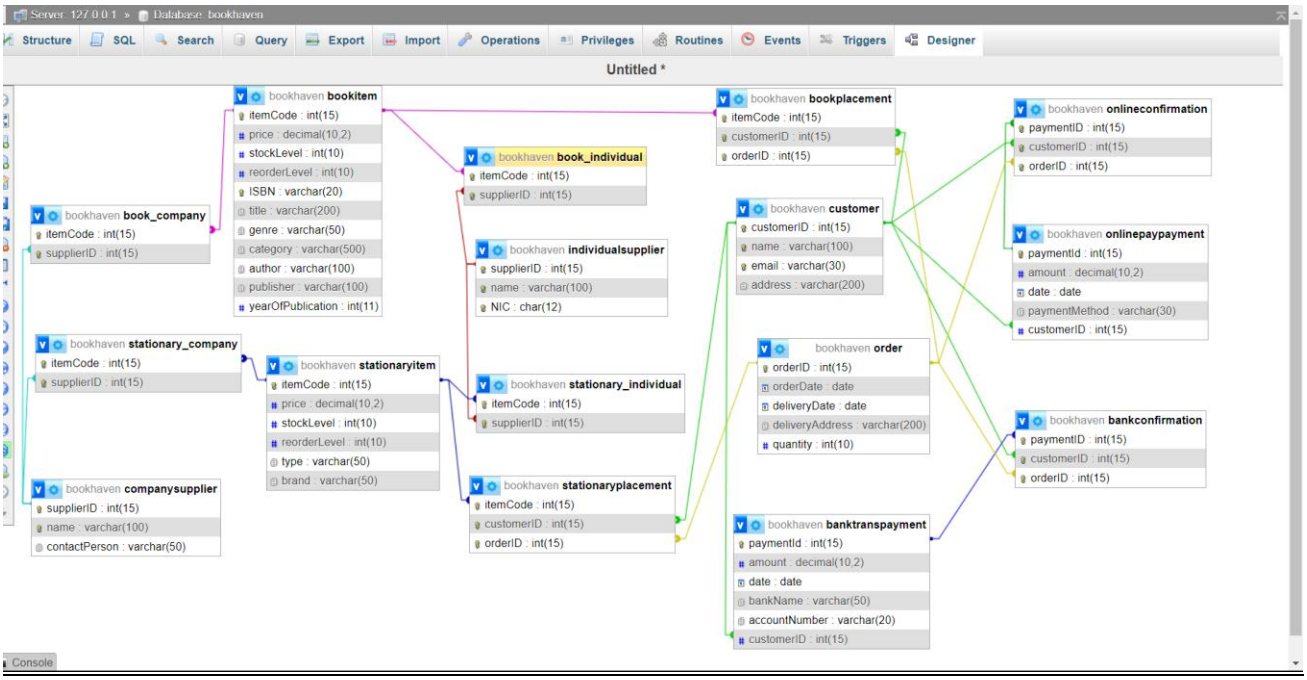


Figure 69 Designer of all tables

Section 4: Data Manipulation with SQL

Part A

```sql
SELECT isbn, title, category, author, publisher
FROM bookitem
WHERE
    (publisher = 'pearson' OR publisher = 'springer')
    AND category like '%Database%'
    AND author = 'Ramez Elmasri';
```

Figure 70 SQL query for Part A

	isbn	title	category	author	publisher
Edit Copy Delete	13-648-35781-64298	Database Systems: Concepts, Design, and Applicatio...	Database	Ramez Elmasri	Springer
Edit Copy Delete	13-978-0133970777	Fundamentals of Database Systems	Database	Ramez Elmasri	Pearson
Edit Copy Delete	28-845-6571546832	Introduction to Database Systems	Database	Ramez Elmasri	Pearson

Figure 71 Output table for Part A

Part B

```sql
SELECT Customer.name, Customer.customerID, Customer.email, Customer.address, COUNT(CustomerOrders.orderID) AS num_orders
FROM customer
JOIN
    (
        SELECT Customer.customerID, `order`.orderID
        FROM customer
        JOIN StationaryPlacement ON  Customer.customerID = StationaryPlacement.customerID
        JOIN `order` ON StationaryPlacement.orderID = `Order`.orderID
        WHERE `Order`.orderDate >= CURRENT_DATE - INTERVAL 6 MONTH
        UNION ALL
        SELECT Customer.customerID, `order`.orderID
        FROM Customer
        JOIN BookPlacement ON Customer.customerID = BookPlacement.customerID
        JOIN `order` ON BookPlacement.orderID = `Order`.orderID
        WHERE `Order`.orderDate >= CURRENT_DATE - INTERVAL 6 MONTH
    ) AS CustomerOrders ON Customer.customerID = CustomerOrders.customerID
GROUP BY Customer.customerID
HAVING num_orders>2;
```

Figure 72 SQL query for Part B

name	customerID	email	address	num_orders
John David	2023023	john.daw@ymail.com	14 Main St, NewYork	3

Figure 73 Output table for Part B