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Book Heaven Database Management System

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Section 1. Extended Entity Relationship Diagram (EERD)

Identified entities

- Customer
- Delivery
- Payment
 - Online_Payment
 - Bank_Transfer
- Order
- Item
 - Book
 - Stationery
- Supplier

Identified key and non-key attributes

- Mentioned in the [EERD](#).

Identified relationships between entities

- Customer **makes** payment for an order. (Ternary)
- Order has delivery.
- Order contained item.
- Supplier supplies item.

Identified multiplicity constraints

- Mentioned in the [EERD](#).

EERD with Attributes

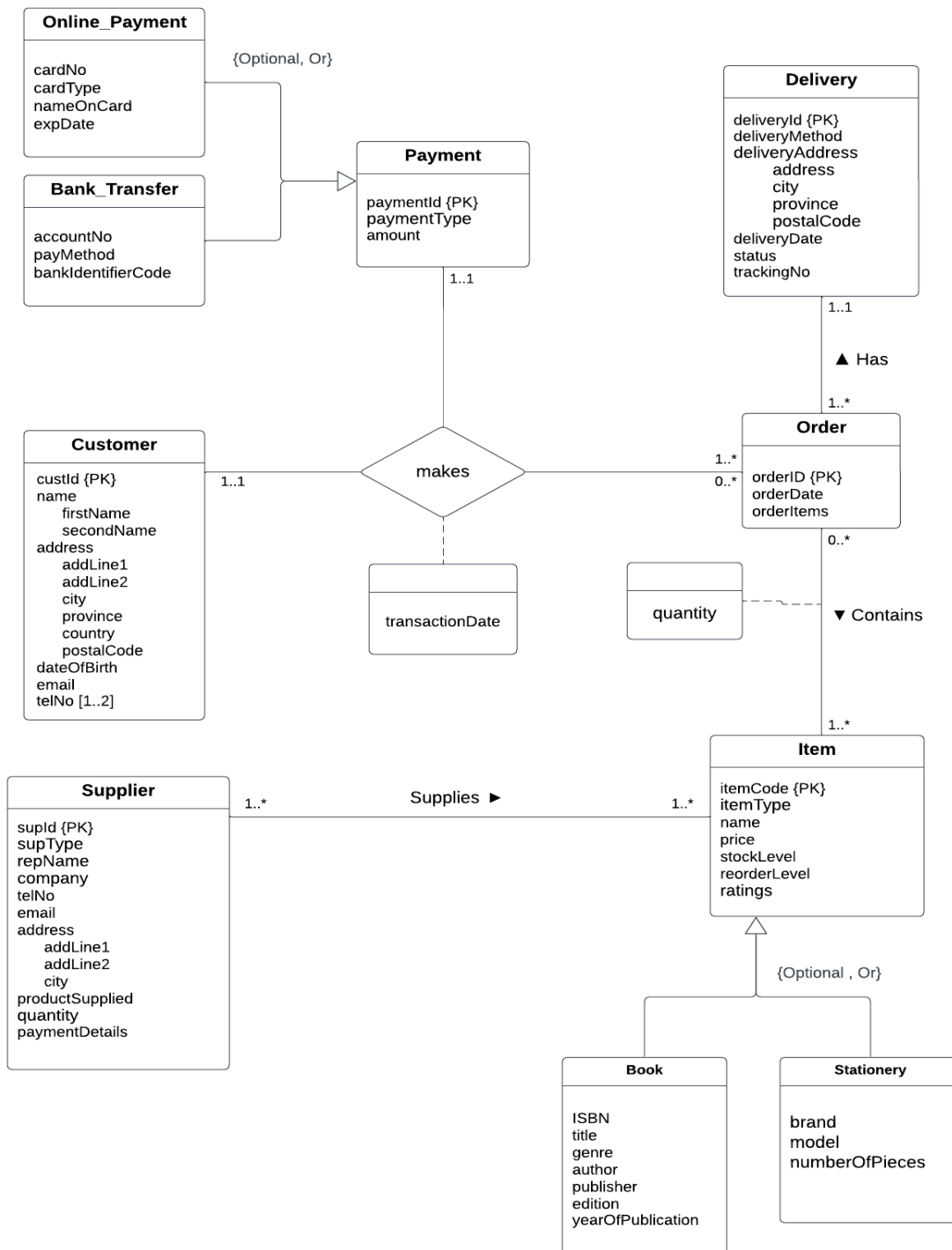


Figure 1 EERD

Assumptions for EERD

1. Each customer **must** make a payment for an order, and a customer can make **only one** payment for an order.
2. A payment **must** be made by a customer, and one payment can **only** be made by **one** customer.
3. An order **must** have a payment, and one order can have **only one** payment.
4. A payment **must** be made for an order, and one payment can **only** be made for **one** order.
5. A customer **may** place an order, and each customer can place **many** orders.
6. An order **must** be made by a customer, and one order can have **only one** customer.
7. An order **must** have a delivery, and one order can have **only one** delivery.
8. A delivery **must** contain an order, and one delivery can have **many** orders.
9. An order **must** contain an item, and one order can contain **many** items.
10. An item **may** be contained in an order, and one item can be contained in **many** orders.
11. A supplier **must** supply an item, and one supplier can supply **many** items.
12. An item **must** be supplied by a supplier, and one item can be supplied by **many** suppliers.
13. A payment **can** be made by online payment or bank transfer. (Redeemable gift vouchers and coupons can be used as a payment method.)
14. An item **can** be either a book or stationery. (BookHaven aims to offer more than books and stationery. BookHaven sells gift vouchers, discount coupons, digital gift cards, and subscription plans to provide a flexible shopping experience for customers.)
15. 'transactionDate' and 'quantity' are relationship attributes.
16. Customer entity, Order entity, and payment entity have a ternary relationship.
17. Each book and stationery have a unique identifier called itemCode.
18. Each customer is assigned a unique custId.
19. Every order is assigned a unique orderId.
20. Every payment has a unique paymentId.
21. Every delivery has a unique deliveryId.
22. Each supplier has a unique identifier called supId.
23. Each order can contain multiple items with associated quantities.

Section 2. Relational Schema Diagram

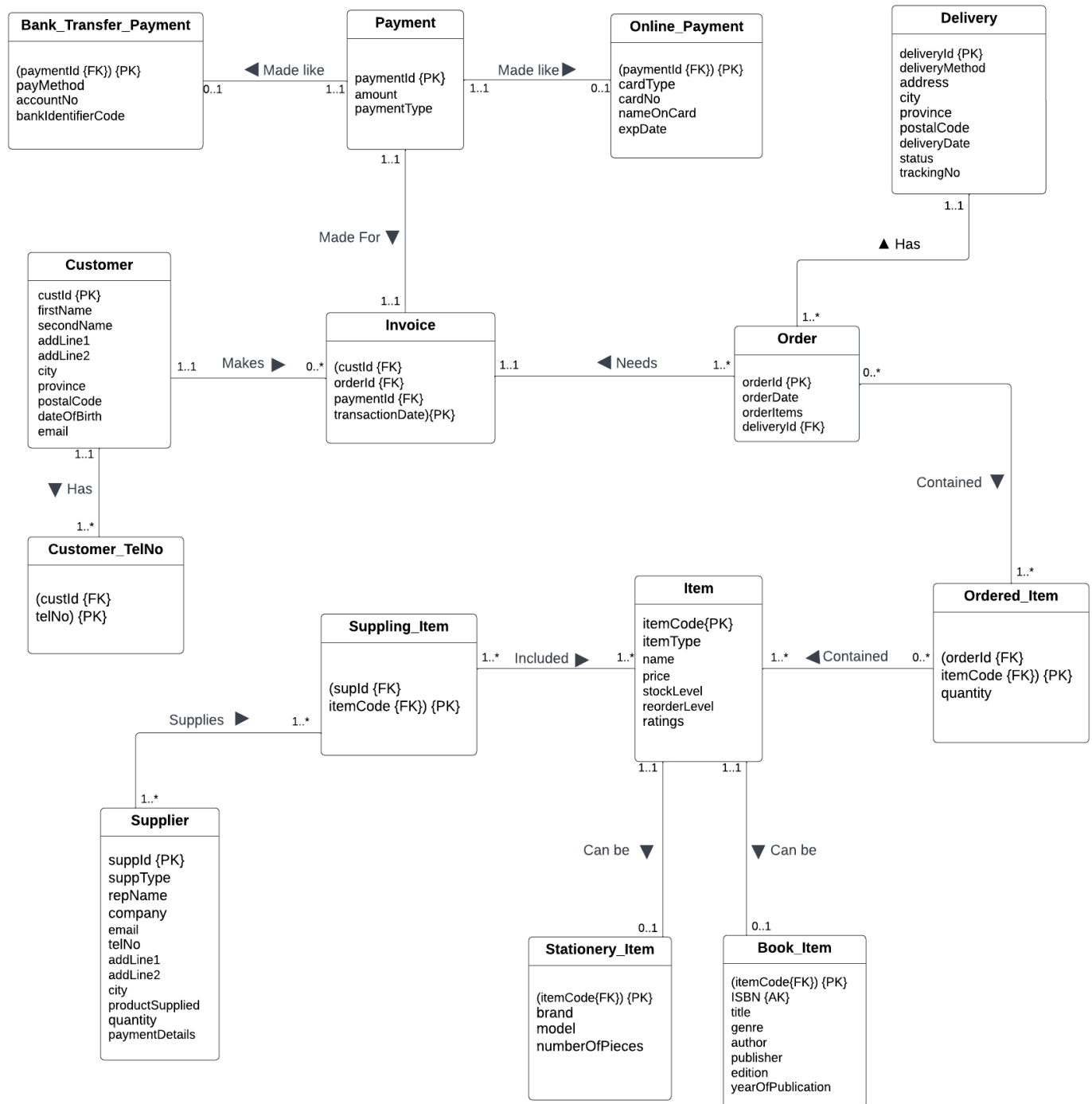


Figure 2 Relational Schema Diagram

Assumptions of Relational Schema Diagram

1. A payment **can be** a bank transfer payment, online payment, **etc.**
2. A bank transfer payment or an online payment **must** be a payment option.
3. A customer **may** make an invoice for an order and one customer can make **many** invoices.
4. One invoice can have **only one** customer.
5. An order **must** have an invoice and **only** have **one** invoice.
6. A customer **must** have a telNo and one customer can have **many** telNos.
7. One telNo **must** have a customer, and one telNo can have **only one** customer.
8. A supplier **must** supply supplying items, and one supplier can supply **many** supplying items.
9. One supplying item **must** be supplied by a supplier, and the same supplying item can be supplied by **many** suppliers.
10. An item **must** be a supplied item, and one item can be supplied by **many** suppliers.
11. An ordered item **must** be an item in the item table, and ordered items can be **many** items in the item table according to the relevant **quantities**.
12. One item **may** be an ordered item, and one item can be ordered item **many** times.
13. An order **must** contain ordered items, and one order can have **many** ordered items.
14. One ordered item **may** be contained in an order, and one ordered item can be contained in **many** orders.
15. An item **can be** a stationery item, book item, **etc.**
16. A stationery item or a book item **must** be an item in the item table.

Section 3. Table Creation and Population of Data

Table Creation

```
1 CREATE DATABASE bookHaven;
```

Figure 3 Create Database

```
1 USE bookhaven;  
2
```

Figure 4 Use database

```
1 CREATE TABLE Customer  
2 (  
3     custId integer (5),  
4     firstName varchar (15) NOT NULL,  
5     secondName varchar (15) NOT NULL,  
6     addLine1 varchar (30) NOT NULL,  
7     addLine2 varchar (30),  
8     city varchar (10) NOT NULL,  
9     province varchar (10) NOT NULL,  
10    postalCode varchar (10) NOT NULL,  
11    dateOfBirth date ,  
12    email varchar(100) UNIQUE NOT NULL,  
13    CONSTRAINT c_custid_pk PRIMARY KEY (custId)  
14 );
```

Figure 5 Customer Table Creation SQL Query



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	custId 	int(5)			No	None		
2	firstName	varchar(15)	utf8mb4_general_ci		No	None		
3	secondName	varchar(15)	utf8mb4_general_ci		No	None		
4	addLine1	varchar(15)	utf8mb4_general_ci		No	None		
5	addLine2	varchar(15)	utf8mb4_general_ci		Yes	NULL		
6	city	varchar(10)	utf8mb4_general_ci		No	None		
7	province	varchar(10)	utf8mb4_general_ci		No	None		
8	postalCode	varchar(10)	utf8mb4_general_ci		No	None		
9	dateOfBirth	date			Yes	NULL		
10	email 	varchar(100)	utf8mb4_general_ci		No	None		

Figure 6 Customer Table Structure

```

1 CREATE TABLE delivery
2 (
3     deliveryId      integer,
4     deliveryMethod  varchar (50)      NOT NULL,
5     address         varchar (100)    NOT NULL,
6     city            varchar (10)     NOT NULL,
7     province        varchar (10)     NOT NULL,
8     postalCode      varchar (10)     NOT NULL,
9     deliveryDate    date              NOT NULL,
10    deliveryStatus   varchar (30),
11    trackingNo       integer (4),
12    CONSTRAINT d_did_pk PRIMARY KEY (deliveryId)
13 );

```

Figure 7 Create Delivery Table SQL Query


#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	deliveryId 	int(11)			No	None		
2	deliveryMethod	varchar(50)	utf8mb4_general_ci		No	None		
3	address	varchar(100)	utf8mb4_general_ci		No	None		
4	city	varchar(10)	utf8mb4_general_ci		No	None		
5	province	varchar(10)	utf8mb4_general_ci		No	None		
6	postalCode	varchar(10)	utf8mb4_general_ci		No	None		
7	deliveryDate	date			No	None		
8	deliveryStatus	varchar(30)	utf8mb4_general_ci		Yes	NULL		
9	trackingNo	int(4)			Yes	NULL		

Figure 8 Delivery Table Structure

```

1 CREATE TABLE Payment
2 (
3     paymentId      int(5),
4     amount         decimal(8,2)    NOT NULL,
5     paymentType     varchar(30)     NOT NULL,
6     CONSTRAINT p_ic_pk PRIMARY KEY (paymentId)
7 );

```

Figure 9 Create Payment Table SQL Query


#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	paymentId 	int(5)			No	None		
2	amount	decimal(8,2)			No	None		
3	paymentType	varchar(30)	utf8mb4_general_ci		No	None		

Figure 10 Payment Table Structure

```

1 CREATE TABLE Bank_Transfer_Payment
2 (
3     paymentId          int (5),
4     payMethod          varchar(30),
5     accountNo          varchar(20) NOT NULL,
6     bankIdentifierCode varchar(15),
7     CONSTRAINT btp_pid_pk PRIMARY KEY (paymentId),
8     CONSTRAINT btp_pid_fk FOREIGN KEY (paymentId) REFERENCES payment(paymentId)
9 );

```

Figure 11 Create Bank_Transfer_Payment Table SQL Query


#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	paymentId 	int(5)			No	None		
2	payMethod	varchar(30)	utf8mb4_general_ci		Yes	NULL		
3	accountNo	varchar(20)	utf8mb4_general_ci		No	None		
4	bankIdentifierCode	varchar(15)	utf8mb4_general_ci		Yes	NULL		

Figure 12 Bank_Transfer_Payment Table Structure

```

1 CREATE TABLE Online_Payment
2 (
3     paymentId    int (5),
4     cardType     varchar(25),
5     cardNo       varchar(20) NOT NULL,
6     nameOnCard   varchar(25) NOT NULL,
7     expDate      varchar(8)  NOT NULL,
8     CONSTRAINT op_payid_pk PRIMARY KEY (paymentId),
9     CONSTRAINT op_pid_fk  FOREIGN KEY (paymentId) REFERENCES payment(paymentId)
10 );
11

```

Figure 13 Create Online_Payment Table SQL Query


#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	paymentId 	int(5)			No	None		
2	cardType	varchar(25)	utf8mb4_general_ci		Yes	NULL		
3	cardNo	varchar(20)	utf8mb4_general_ci		No	None		
4	nameOnCard	varchar(25)	utf8mb4_general_ci		No	None		
5	expDate	varchar(8)	utf8mb4_general_ci		No	None		

Figure 14 Online_Payment Table Structure

```

1 CREATE TABLE Item
2 (
3     itemCode      int(5),
4     name          varchar (150)  NOT NULL,
5     price         decimal (8,2)  NOT NULL,
6     stockLevel    int (6),
7     reorderLevel  int (6),
8     ratings       varchar (5),
9     itemType      varchar(30)    NOT NULL,
10    CONSTRAINT i_ic_pk      PRIMARY KEY (itemCode)
11 );

```

Figure 15 Create Item Table SQL Query


#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	itemCode 	int(5)			No	None		
2	name	varchar(150)	utf8mb4_general_ci		No	None		
3	price	decimal(8,2)			No	None		
4	stockLevel	int(6)			Yes	NULL		
5	reorderLevel	int(6)			Yes	NULL		
6	ratings	varchar(5)	utf8mb4_general_ci		Yes	NULL		
7	itemType	varchar(30)	utf8mb4_general_ci		No	None		

Figure 16 Item Table Structure

```

1 CREATE TABLE Book_Item
2 (
3     itemCode      int (5),
4     ISBN          varchar (25)  UNIQUE NOT NULL,
5     title         varchar (150) NOT NULL,
6     genre         varchar (50),
7     author        varchar (60)  NOT NULL,
8     publisher     varchar (30)  NOT NULL,
9     edition       varchar (10),
10    yearOfPublication  varchar(6) NOT NULL,
11    CONSTRAINT bi_ic_pk PRIMARY KEY (itemCode),
12    CONSTRAINT bi_ic_fk FOREIGN KEY (itemCode) REFERENCES item(itemCode)
13 );

```

Figure 17 Create Book_Item Table SQL Query



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	itemCode 	int(5)			No	None		
2	ISBN 	varchar(25)	utf8mb4_general_ci		No	None		
3	title	varchar(150)	utf8mb4_general_ci		No	None		
4	genre	varchar(50)	utf8mb4_general_ci		Yes	NULL		
5	author	varchar(60)	utf8mb4_general_ci		No	None		
6	publisher	varchar(30)	utf8mb4_general_ci		No	None		
7	edition	varchar(10)	utf8mb4_general_ci		Yes	NULL		
8	yearOfPublication	varchar(6)	utf8mb4_general_ci		No	None		

Figure 18 Book_Item Table Structure

```

1 CREATE TABLE Stationery_Item
2 (
3     itemCode      int(5),
4     brand         varchar(20),
5     model         varchar(20),
6     numberOfPieces int(5),
7     CONSTRAINT si_ic_pk PRIMARY KEY (itemCode),
8     CONSTRAINT si_ic_fk FOREIGN KEY (itemCode) REFERENCES item(itemCode)
9 );

```

Figure 19 Create Stationery_Item Table SQL Query


#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	itemCode 	int(5)			No	None		
2	brand	varchar(20)	utf8mb4_general_ci		Yes	NULL		
3	model	varchar(20)	utf8mb4_general_ci		Yes	NULL		
4	numberOfPieces	int(5)			Yes	NULL		

Figure 20 Stationery_Item Table Structure

```

1 CREATE TABLE Supplier
2 (
3     supId          int(5),
4     supType        ENUM('Individual', 'Company') NOT NULL,
5     email          varchar(50) UNIQUE NOT NULL,
6     repName        varchar(40) NOT NULL,
7     company        varchar(50),
8     addLine1       varchar(20) NOT NULL,
9     addLine2       varchar(20),
10    city           varchar(15) NOT NULL,
11    productSupplied varchar(30) NOT NULL,
12    quantity        int(8),
13    paymentDetails  varchar(30),
14    telNo          varchar(15) NOT NULL,
15    CONSTRAINT s_sid_pk PRIMARY KEY (supId)
16 );

```

Figure 21 Create Supplier Table SQL Query

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	supId 🔑	int(5)			No	None		
2	supType	enum('Individual', 'Company')	utf8mb4_general_ci		No	None		
3	email 🔑	varchar(50)	utf8mb4_general_ci		No	None		
4	repName	varchar(40)	utf8mb4_general_ci		No	None		
5	company	varchar(50)	utf8mb4_general_ci		Yes	NULL		
6	addLine1	varchar(20)	utf8mb4_general_ci		No	None		
7	addLine2	varchar(20)	utf8mb4_general_ci		Yes	NULL		
8	city	varchar(15)	utf8mb4_general_ci		No	None		
9	productSupplied	varchar(30)	utf8mb4_general_ci		No	None		
10	quantity	int(8)			Yes	NULL		
11	paymentDetails	varchar(30)	utf8mb4_general_ci		Yes	NULL		
12	telNo	varchar(15)	utf8mb4_general_ci		No	None		

Figure 22 Supplier Table Structure


```

1 CREATE TABLE Customer_TelNo
2 (
3     custId integer (5),
4     telNo char(15),
5     telNo2 char(15),
6     CONSTRAINT ct_cid_telno_pk PRIMARY KEY (custId, telNo),
7     CONSTRAINT ct_cid_fk FOREIGN KEY (custId) REFERENCES customer(custId)
8 );

```

Figure 23 Create Customer_Telno Table SQL Query



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	custId 	int(5)			No	None		
2	telNo 	char(15)	utf8mb4_general_ci		No	None		
3	telNo2	char(15)	utf8mb4_general_ci		Yes	NULL		

Figure 24 Customer_Telno Table Structure

```

1 CREATE TABLE `Order`
2 (
3     orderId int(5),
4     orderDate date NOT NULL,
5     orderItems varchar(100),
6     deliveryId int(5),
7     CONSTRAINT o_oid_pk PRIMARY KEY (orderid),
8     CONSTRAINT o_did_fk FOREIGN KEY (deliveryId) REFERENCES delivery(deliveryId)
9 );

```

Figure 25 Create `Order` Table SQL Query



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	orderId 	int(5)			No	None		
2	orderDate	date			No	None		
3	orderItems	varchar(100)	utf8mb4_general_ci		Yes	NULL		
4	deliveryId 	int(5)			Yes	NULL		

Figure 26 Order` Table Structure

```

1 CREATE TABLE ordered_item
2 (
3     orderId    int(5),
4     itemCode   int(5),
5     quantity   int(8) NOT NULL,
6     CONSTRAINT oi_oid_ic_pk    PRIMARY KEY (orderId, itemCode),
7     CONSTRAINT oi_oid_fk      FOREIGN KEY (orderId) REFERENCES `order`(orderId),
8     CONSTRAINT oi_ic_fk       FOREIGN KEY (itemCode) REFERENCES item(itemCode)
9 );

```

Figure 27 Create Ordered_Item Table SQL Query




#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	orderId 	int(5)			No	None		
2	itemCode  	int(5)			No	None		
3	quantity	int(8)			No	None		

Figure 28 Ordered_Item Table Structure

```

1 CREATE TABLE Invoice
2 (
3     custId      int(5),
4     orderId     int(5),
5     paymentId   int(5),
6     transactionDate date NOT NULL,
7     CONSTRAINT in_cid_oid_pid_td_pk    PRIMARY KEY (custId, orderId, paymentId, transactionDate),
8     CONSTRAINT in_cid_fk               FOREIGN KEY (custId) REFERENCES customer(custId),
9     CONSTRAINT in_oid_fk               FOREIGN KEY (orderId) REFERENCES `order`(orderId),
10    CONSTRAINT in_pid_fk               FOREIGN KEY (paymentId) REFERENCES payment(paymentId)
11 );

```

Figure 29 Create Invoice Table SQL Query







#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	custId 	int(5)			No	None		
2	orderId  	int(5)			No	None		
3	paymentId  	int(5)			No	None		
4	transactionDate 	date			No	None		

Figure 30 invoice Table Structure

```

1 CREATE TABLE Suppling_Item
2 (
3     supId      int(5),
4     itemCode   int(5),
5     CONSTRAINT si_sid_ic_pk    PRIMARY KEY (supId, itemCode),
6     CONSTRAINT si_sid_fk      FOREIGN KEY (supId) REFERENCES supplier(supId),
7     CONSTRAINT sui_ic_fk      FOREIGN KEY (itemCode) REFERENCES item(itemCode)
8 );

```

Figure 31 Create Suppling_Item Table SQL Query




#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	supId 	int(5)			No	None		
2	itemCode  	int(5)			No	None		

Figure 32 Suppling_Item Table Structure

Database Diagram

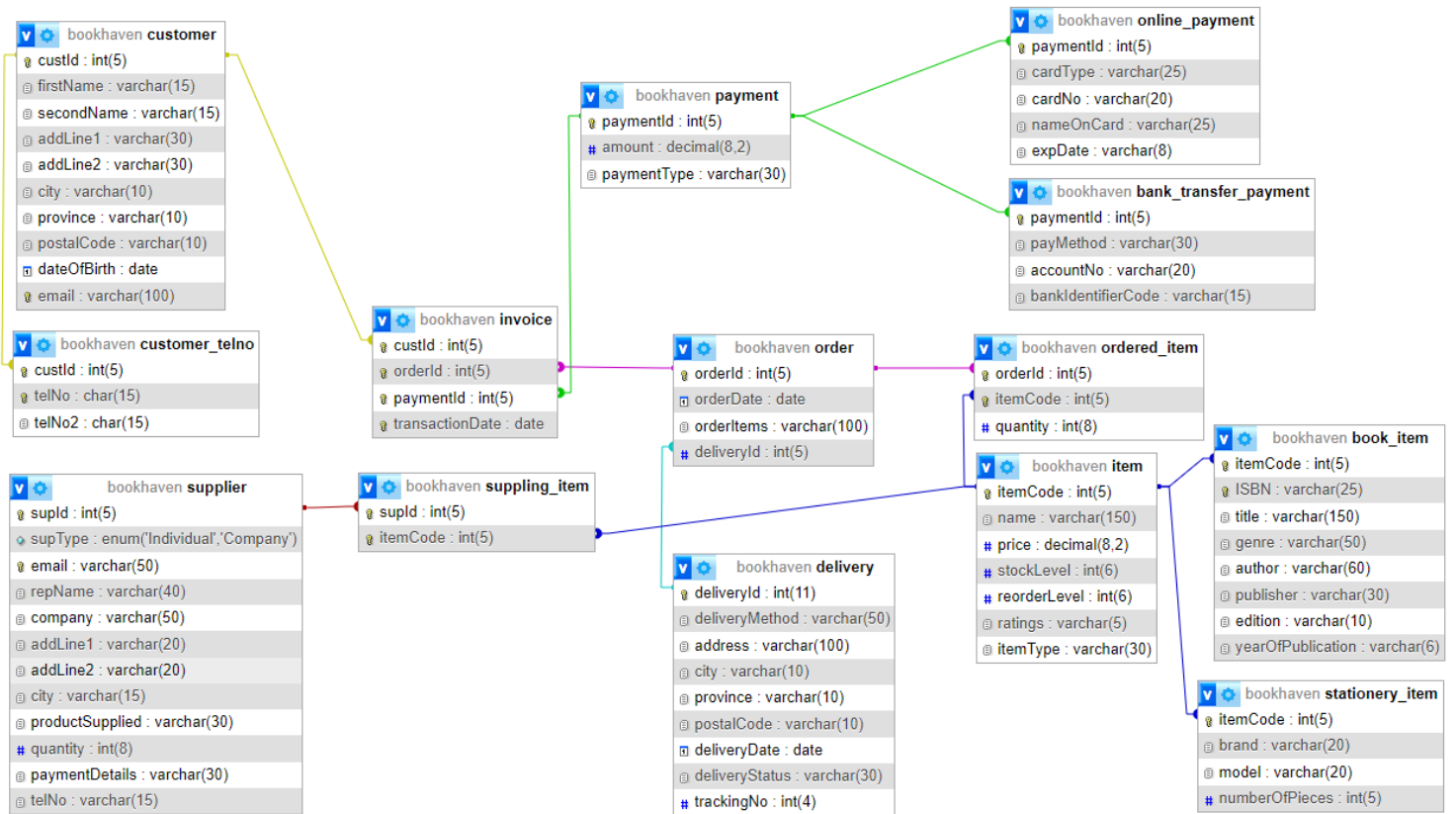


Figure 34 Database Diagram

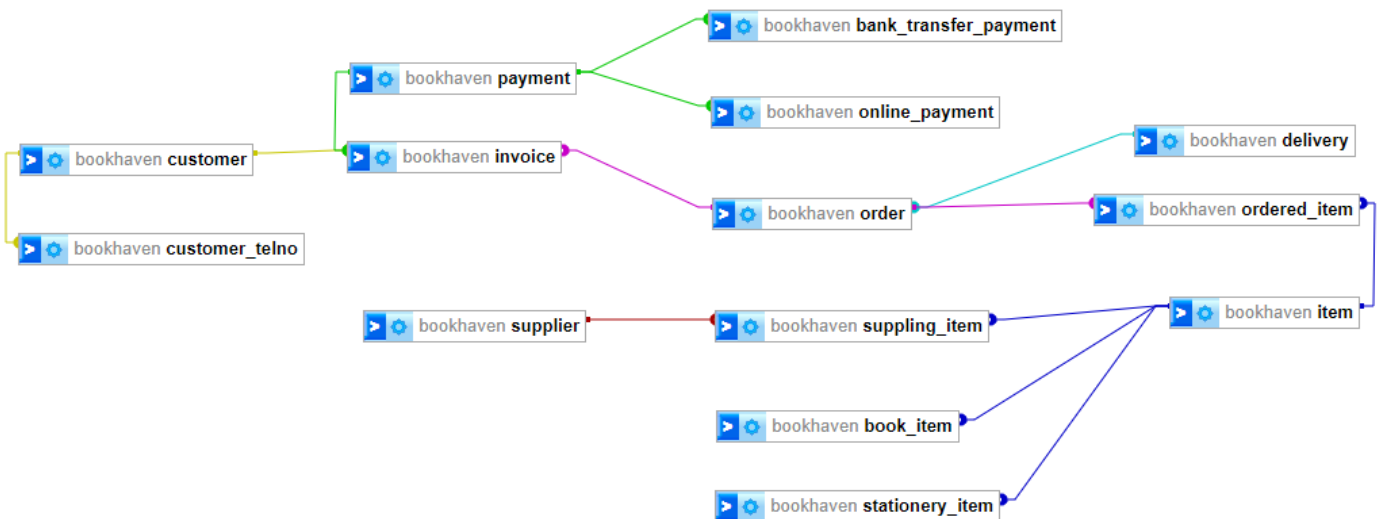


Figure 33 Database Diagram without Columns

SQL queries for inserting sample data into tables

```
1 -- Populate the customer table
2 INSERT INTO customer
3 (custId, firstName, secondName, addLine1, addLine2, city, province, postalCode, dateOfBirth, email)
4 VALUES
5 (11, 'John', 'Perera', '89 Main Street', 'Kotahena', 'Colombo', 'Western', '12345', '1985-05-15', 'john.pe@gmail.com'),
6 (12, 'Jane', 'Rajapaksha', '456 Cinamon Avenue', NULL, 'Kandy', 'Central', '54301', '1998-08-22', 'jane.sm@icloud.com'),
7 (13, 'Ranil', 'Williams', '789 Jess Lane', 'Silva MW', 'Galle', 'Southern', '60890', '1978-12-10', 'ranil.williams@gmail.com'),
8 (14, 'Sunil', 'Johnson', '101 Lane', 'Church Road', 'Negombo', 'Western', '99765', '2002-03-28', 'sunil.johnson@yahoo.com'),
9 (15, 'Roy', 'Drax', '202 Maple Street', NULL, 'Jaffna', 'Northern', '56709', '2005-07-18', 'roydrax@gmail.com');
```

Figure 35 Example 01 Inserting data into customer table

```
1 -- Populate the delivery table
2 INSERT INTO delivery
3 (deliveryId, deliveryMethod, address, city, province, postalCode, deliveryDate, deliveryStatus, trackingNo)
4 VALUES
5 (101, 'Standard', '123 Middle Street', 'Colombo', 'Western', '12345', '2023-10-02', 'Shipped', 987654),
6 (102, 'Express', '456 Lily Avenue', 'Kandy', 'Central', '54301', '2023-10-05', 'Delivered', 876543),
7 (103, 'Standard', '789 Pine Lane', 'Galle', 'Southern', '60890', '2023-10-14', 'In Transit', 765432),
8 (104, 'Express', '101 Lane', 'Negombo', 'Western', '99765', '2023-10-16', 'Delivered', 654321),
9 (105, 'Standard', '202 Maple Street', 'Jaffna', 'Northern', '56709', '2023-10-20', 'Pending', 543210),
10 (106, 'Express', '456 Lily Avenue', 'Kandy', 'Central', '54301', '2023-10-25', 'Delivered', 789658),
11 (107, 'Express', '456 Lily Avenue', 'Kandy', 'Central', '54301', '2023-10-28', 'Delivered', 874567),
12 (108, 'Standard', '789 Pine Lane', 'Galle', 'Southern', '60890', '2023-11-02', 'Delivered', 456789),
13 (109, 'Express', '101 Lane', 'Negombo', 'Western', '99765', '2023-11-07', 'Delivered', 654301),
14 (110, 'Express', '101 Lane', 'Negombo', 'Western', '99765', '2023-11-11', 'Pending', 650321),
15 (111, 'Express', '101 Lane', 'Negombo', 'Western', '99765', '2023-11-11', 'Pending', 654901),
16 (112, 'Standard', '123 Middle Street', 'Colombo', 'Western', '12345', '2023-11-15', 'Pending', 987344);
```

Figure 36 Example 02 Inserting data into delivery table

```
1 -- Populate the item table
2 INSERT INTO item
3 (itemCode, itemType, name, price, stockLevel, reorderLevel, ratings)
4 VALUES
5 (101, 'Book', 'Harry Potter and the Sorcerer's Stone', 5000.00, 150, 30, '4.9'),
6 (102, 'Book', 'Diary of a Wimpy Kid', 2700.00, 200, 40, '4.5'),
7 (103, 'Book', 'The Fault in Our Stars', 4250.00, 120, 25, '4.8'),
8 (104, 'Book', 'The Martian', 7000.00, 100, 20, '4.7'),
9 (105, 'Book', 'Artemis', 5000.00, 80, 15, '4.6'),
10 (106, 'Book', 'Head First Python', 4500.00, 60, 12, NULL),
11 (107, 'Book', 'Fundamentals of Database Systems', 5500.00, 90, 18, '4.8'),
12 (108, 'Book', 'Database Management Systems', 6200.00, 80, 15, '4.6'),
13 (109, 'Book', 'MySQL for Dummies', 3200.00, 120, 25, '4.5'),
14 (110, 'Book', 'Introduction to Data Mining', 4800.00, 100, 20, '4.7'),
15 (1, 'Stationery', 'Blue Ballpoint Pen', 10.00, 200, 50, '4.2'),
16 (2, 'Stationery', 'Pencil Set', 60.00, 150, 30, '4.0'),
17 (3, 'Stationery', 'Highlighter', 500.00, 100, 20, '4.5'),
18 (4, 'Stationery', 'Notebook', 450.00, 80, 15, '4.8'),
19 (5, 'Stationery', 'Eraser Pack', 500.00, 300, 50, '4.4'),
20 (6, 'Stationery', 'Colored Pencil Set', 1500.00, 120, 25, '4.6'),
21 (200, 'Voucher', 'Rs 1000 Voucher', '1000.00', 20, 30, '4.7'),
22 (201, 'Voucher', 'Rs 5000 Voucher', '5000.00', 10, 15, '4.9');
```

Figure 37 Example 03 Inserting data into item table

```

1 -- Populate the supplier table
2 INSERT INTO supplier
3 (supId, supType, repName , company, email, addLine1, addLine2, city, productSupplied, quantity, paymentDetails, telNo)
4 VALUES
5     (201,'Individual','Jo Cummins',NULL, 'jo.cumm@gmail.com', '15 Mid Street', NULL, 'Colombo', 'Books', 100, 'Bank Transfer','077
6     9520597'),
7     (202,'Individual','Ann Karunarathna',NULL, 'ann.karu@gmail.com', '456 Lake Lane', NULL, 'Kandy', 'Books', 80, 'Credit Card',
8     '072 3456798'),
9     (203,'Individual','Kasun Perera',NULL, 'kasu.dd@icloud.com', '789 Apple Park', 'Mid lane', 'Galle', 'Stationery', 150, 'Cash
10    On Delivery', '078 8555843'),
11    (204,'Individual','Pat Cummins',NULL, 'patCumm@icloud.com', '101 Flower Road', 'Maawawa', 'Negombo', 'Stationery', 120, 'Bank
12    Transfer','079 0967898'),
13    (205,'Individual','Roy Fernando',NULL, 'royfdo@gmail.com', '202 Silva Street', NULL, 'Jaffna', 'Books', 200, 'Credit
14    Card','076 5784930'),
15    (50, 'Company','Mic Peter','Royal Publishers','RoyalBooks@gmail.com', '567 Mid Street', 'Sunil Mw', 'Colombo', 'Books',
16    100, 'Bank Transfer','077 1234567'),
17    (51, 'Company','Stan Smith','Kandy Suppliers','kandysupp@gmail.com', '345 perera street', NULL, 'Kandy', 'Books', 80, 'Credit
18    Card','071 1712333'),
19    (52, 'Company','Nimal Bimsara','Quick Supplies','gallesuppk@icloud.com', '276 Cactus Lane', 'Jo street', 'Galle',
20    'Stationery', 150, 'Cash On Delivery', '072 3384455'),
21    (53, 'Company','Megan Johnson','Stationery Paradise','supplierchane@hji.net', '101 Ala para', NULL, 'Negombo', 'Stationery',
22    120, 'Bank Transfer','076 9876543'),
23    (54, 'Company','Ryan Davis','Royal Books','royalsupp@gmail.com', '202 Maple Street', NULL, 'Kandana', 'Books', 200, 'Credit
24    Card','070 8768432');

```

Figure 38 Example 04 Inserting data into supplier table

```

1 -- Populate the payment table
2 INSERT INTO payment
3 (paymentId , paymentType, amount)
4 VALUES
5     (20, 'Bank', 6400.00),
6     (21, 'Bank', 10.00),
7     (22, 'Online', 4800.00),
8     (23, 'Bank', 5250.00),
9     (24, 'Online', 1500.00),
10    (25, 'Online', 4500.00),
11    (26, 'Online', 7760.00),
12    (27, 'Online', 2700.00),
13    (28, 'Online', 4700.00),
14    (29, 'Bank', 1500.00),
15    (30, 'Online', 200.00),
16    (31, 'Bank', 11000.00);

```

Figure 39 Example 05 Inserting data into payment table

```

1 -- Populate the book_item table
2 INSERT INTO
3 book_item (itemCode, ISBN, title, genre, author, publisher, edition, yearOfPublication)
4 VALUES
5     (101, '978-0-7475-3269-6', 'Harry Potter and the Sorcerer's Stone', 'Fantasy', 'J.K. Rowling', 'Bloomsbury', '1st', '1997'),
6     (102, '978-0-8109-8391-5', 'Diary of a Wimpy Kid', 'Children's', 'Jeff Kinney', 'Amulet Books', '1st', '2007'),
7     (103, '978-1-59474-606-2', 'The Fault in Our Stars', 'Romance', 'John Green', 'Dutton Books', '1st', '2012'),
8     (104, '978-0-553-41802-6', 'The Martian', 'Science Fiction', 'Andy Weir', 'Crown Publishers', '1st', '2011'),
9     (105, '978-0-553-44812-2', 'Artemis', 'Science Fiction', 'Andy Weir', 'Crown Publishing Group', '1st', '2017'),
10    (106, '978-1-4493-9159-2', 'Head First Python', 'Programming', 'Paul Barry', 'O'Reilly Media', '2nd', '2022'),
11    (107, '978-0-13-397077-7', 'Fundamentals of Database Systems', 'Database Management', 'Ramez Elmasri', 'Pearson', '7th', '2015'),
12    (108, '978-0-13-480274-9', 'Database Management Systems', 'Database Management', 'Ramez Elmasri', 'Pearson', '3rd', '2019'),
13    (109, '978-1-118-98058-3', 'MySQL for Dummies', 'Database Management', 'John Paul Mueller', 'Springer', '8th', '2017'),
14    (110, '978-0-321-32136-7', 'Introduction to Data Mining', 'Database Management', 'Pang-Ning Tan', 'Springer', '2nd', '2006');

```

Figure 40 Example 06 Inserting data into book_item table

```

1 -- Populate the stationery_item table
2 INSERT INTO stationery_item
3 (itemCode, brand, model, numberOfPieces)
4 VALUES
5     (1, 'BIC', 'Cristal Xtra Smooth', 1),
6     (2, 'Dixon', 'Ticonderoga', 12),
7     (3, 'Sharpie', 'Clear View', 3),
8     (4, 'Promate', 'Spiral Bound', 1),
9     (5, 'Paper Mate', 'Pink Pearl', 3),
10    (6, 'Atles', 'Pre-sharpened', 24);

```

Figure 41 Example 07 Inserting data into Stationery_Item table

```

1 -- Populate the order table
2 INSERT INTO `order`
3 (orderId, orderDate, orderItems, deliveryId)
4 VALUES
5     (300, '2022-09-15', 'Book & Stationery', 101),
6     (301, '2023-09-21', 'Stationery', 102),
7     (302, '2023-09-28', 'Book', 103),
8     (303, '2023-09-01', 'Book & Stationery', 104),
9     (304, '2023-09-05', 'Stationery', 105),
10    (305, '2023-09-30', 'Book', 106),
11    (306, '2023-09-08', 'Book & Stationery', 107),
12    (307, '2023-10-15', 'Book', 108),
13    (308, '2023-10-02', 'Book & Stationery', 109),
14    (309, '2023-10-15', 'Stationery', 110),
15    (310, '2023-10-28', 'Stationery', 111),
16    (311, '2023-10-15', 'Book', 112);

```

Figure 42 Example 08 Inserting data into Order table

```

1 -- Populate the customer_telno table
2 INSERT INTO Customer_TelNo
3 (custId, telNo, telNo2)
4 VALUES
5     (11, '+94 77 1286567', '+94 76 9879843'),
6     (12, '+94 71 1812233', NULL),
7     (13, '+94 72 3534455', '+94 72 5555577'),
8     (14, '+94 76 9676543', NULL),
9     (15, '+94 70 8865432', '+94 71 2341278');

```

Figure 43 Example 09 Inserting data customer_telno table

```

1 -- Populate the bank_transfer_payment table
2 INSERT INTO bank_transfer_payment
3 (paymentId, payMethod, accountNo, bankIdentifierCode)
4 VALUES
5     (20, 'Cash Deposit', '123456789', 'BIC123ABC'),
6     (21, 'Bank Draft', '234567890', 'BIC234DEF'),
7     (23, 'Check', '456789012', 'BIC456JKL'),
8     (29, 'Cash Deposit', '012345678', 'BIC012BCD'),
9     (31, 'Check', '234567890', 'BIC234DEF');
10

```

Figure 44 Example 10 Inserting data into Bank_Transfer_Payment table

```

1 -- Populate the online_payment table
2 INSERT INTO online_payment
3 (paymentId, cardType, cardNo, nameOnCard, expDate)
4 VALUES
5     (30, 'Visa', '4111111181111111', 'John Doily', '12/26'),
6     (22, 'Master', '5105105105105100', 'Anton Smith', '09/27'),
7     (24, 'AmerExp', '378282246310005', 'Bobby Lashly', '06/24'),
8     (25, 'Discover', '6011111111111117', 'Alice Perera', '03/25'),
9     (26, 'Visa', '6759649826438453', 'Chris Dabare', '11/26'),
10    (27, 'Visa', '3566171111911113', 'Ann Wilson', '08/27'),
11    (28, 'Master', '30569309025904', 'Pat Lee', '05/26');

```

Figure 45 Example 11 Inserting data into Online_Payment table


```

1  -- Populate the ordered_item table
2  INSERT INTO ordered_item
3  (orderId, itemCode, quantity)
4  VALUES
5      (300,107,1),    (300,4,2),
6      (301,1,1),    (302,110,1),
7      (303,103,1),    (303,3,2),
8      (304,6,1),    (305,106,1),
9      (306,101,1),    (306,102,1),
10     (306,2,1),    (307,102,1),
11     (308,103,1),    (308,4,1),
12     (309,5,3),    (310,1,20),
13     (311,107,2);
14

```

Figure 46 Example 12 Inserting data into Ordered_Item table

```

1  -- Populate the suppling_item table
2  INSERT INTO suppling_item
3  (supId, itemCode)
4  VALUES
5      (50, 101),
6      (51, 102),
7      (52, 1),
8      (53, 2),
9      (54, 103),
10     (54, 109),
11     (54, 110),
12     (50, 107),
13     (51, 108),
14     (52, 5),
15     (53, 6),
16     (201, 104),
17     (202, 105),
18     (203, 3),
19     (204, 4),
20     (205, 106),
21     (201, 200),
22     (205, 201);
23

```

Figure 47 Example 13 Inserting data into Suppling_Item table

```
1 -- Populate the invoice table
2 INSERT INTO invoice
3 (custId, orderId, paymentId, transactionDate)
4 VALUES
5     (11, 300, 20, '2022-09-15'),
6     (15, 301, 21, '2023-09-21'),
7     (13, 302, 22, '2023-09-28'),
8     (12, 303, 23, '2023-09-01'),
9     (14, 304, 24, '2023-09-05'),
10    (15, 305, 25, '2023-09-30'),
11    (15, 306, 26, '2023-09-08'),
12    (13, 307, 27, '2023-10-15'),
13    (12, 308, 29, '2023-10-02'),
14    (12, 309, 29, '2023-10-15'),
15    (12, 310, 30, '2023-10-28'),
16    (11, 311, 31, '2023-10-15');
```

Figure 48 Example 14 Inserting data into Invoice table

All Tables with Sample Data

custId	firstName	secondName	addLine1	addLine2	city	province	postalCode	dateOfBirth	email
11	John	Perera	89 Main Street	Kotahena	Colombo	Western	12345	1985-05-15	john.pe@gmail.com
12	Jane	Rajapaksha	456 Cinamon Avenue	NULL	Kandy	Central	54301	1998-08-22	jane.sm@icloud.com
13	Ranil	Williams	789 Jess Lane	Silva MW	Galle	Southern	60890	1978-12-10	ranil.williams@gmail.com
14	Sunil	Johnson	101 Lane	Church Road	Negombo	Western	99765	2002-03-28	sunil.johnson@yahoo.com
15	Roy	Drax	202 Maple Street	NULL	Jaffna	Northern	56709	2005-07-18	roydrax@gmail.com

Figure 49 Customer Table with Sample Data

deliveryId	deliveryMethod	address	city	province	postalCode	deliveryDate	deliveryStatus	trackingNo
101	Standard	123 Middle Street	Colombo	Western	12345	2023-10-02	Shipped	987654
102	Express	456 Lily Avenue	Kandy	Central	54301	2023-10-05	Delivered	876543
103	Standard	789 Pine Lane	Galle	Southern	60890	2023-10-14	In Transit	765432
104	Express	101 Lane	Negombo	Western	99765	2023-10-16	Delivered	654321
105	Standard	202 Maple Street	Jaffna	Northern	56709	2023-10-20	Pending	543210
106	Express	456 Lily Avenue	Kandy	Central	54301	2023-10-25	Delivered	789658
107	Express	456 Lily Avenue	Kandy	Central	54301	2023-10-28	Delivered	874567
108	Standard	789 Pine Lane	Galle	Southern	60890	2023-11-02	Delivered	456789
109	Express	101 Lane	Negombo	Western	99765	2023-11-07	Delivered	654301
110	Express	101 Lane	Negombo	Western	99765	2023-11-11	Pending	650321
111	Express	101 Lane	Negombo	Western	99765	2023-11-11	Pending	654901
112	Standard	123 Middle Street	Colombo	Western	12345	2023-11-15	Pending	987344

Figure 50 Delivery Table with Sample Data

paymentId	amount	paymentType
20	6400.00	Bank
21	10.00	Bank
22	4800.00	Online
23	5250.00	Bank
24	1500.00	Online
25	4500.00	Online
26	7760.00	Online
27	2700.00	Online
28	4700.00	Online
29	1500.00	Bank
30	200.00	Online
31	11000.00	Bank

Figure 51 Payment Table with Sample Data

paymentId	payMethod	accountNo	bankIdentifierCode
20	Cash Deposit	123456789	BIC123ABC
21	Bank Draft	234567890	BIC234DEF
23	Check	456789012	BIC456JKL
29	Cash Deposit	012345678	BIC012BCD
31	Check	234567890	BIC234DEF

Figure 52 Bank_Transfer_Payment Table with Sample Data

itemCode	name	price	stockLevel	reorderLevel	ratings	itemType
1	Blue Ballpoint Pen	10.00	200	50	4.2	Stationery
2	Pencil Set	60.00	150	30	4.0	Stationery
3	Highlighter	500.00	100	20	4.5	Stationery
4	Notebook	450.00	80	15	4.8	Stationery
5	Eraser Pack	500.00	300	50	4.4	Stationery
6	Colored Pencil Set	1500.00	120	25	4.6	Stationery
101	Harry Potter and the Sorcerer's Stone	5000.00	150	30	4.9	Book
102	Diary of a Wimpy Kid	2700.00	200	40	4.5	Book
103	The Fault in Our Stars	4250.00	120	25	4.8	Book
104	The Martian	7000.00	100	20	4.7	Book
105	Artemis	5000.00	80	15	4.6	Book
106	Head First Python	4500.00	60	12	NULL	Book
107	Fundamentals of Database Systems	5500.00	90	18	4.8	Book
108	Database Management Systems	6200.00	80	15	4.6	Book
109	MySQL for Dummies	3200.00	120	25	4.5	Book
110	Introduction to Data Mining	4800.00	100	20	4.7	Book
200	Rs 1000 Voucher	1000.00	20	30	4.7	Voucher
201	Rs 5000 Voucher	5000.00	10	15	4.9	Voucher

Figure 53 Item Table with Sample Data

paymentId	cardType	cardNo	nameOnCard	expDate
22	Master	5105105105105100	Anton Smith	09/27
24	AmerExp	378282246310005	Bobby Lashly	06/24
25	Discover	6011111111111117	Alice Perera	03/25
26	Visa	6759649826438453	Chris Dabare	11/26
27	Visa	3566171111911113	Ann Wilson	08/27
28	Master	30569309025904	Pat Lee	05/26
30	Visa	4111111181111111	John Doily	12/26

Figure 54 Online_Payment Table with Sample Data

supId	supType	email	repName	company	addLine1	addLine2	city	productSupplied	quantity	paymentDetails	telNo
50	Company	RoyalBooks@gmail.com	Mic Peter	Royal Publishers	567 Mid Street	Sunil MW	Colombo	Books	100	Bank Transfer	077 1234567
51	Company	kandysupp@gmail.com	Stan Smith	Kandy Suppliers	345 perera street	NULL	Kandy	Books	80	Credit Card	071 1712333
52	Company	gallesupku@icloud.com	Nimal Bimsara	Quick Supplies	276 Cactus Lane	Jo street	Galle	Stationery	150	Cash On Delivery	072 3384455
53	Company	supplierchane@hji.net	Megan Johnson	Stationery Paradise	101 Ala para	NULL	Negombo	Stationery	120	Bank Transfer	076 9876543
54	Company	royalsupp@gmail.com	Ryan Davis	Royal Books	202 Maple Street	NULL	Kandana	Books	200	Credit Card	070 8768432
201	Individual	jo.cumm@gmail.com	Jo Cummins	NULL	15 Mid Street	NULL	Colombo	Books	100	Bank Transfer	077 9520597
202	Individual	ann.karu@gmail.com	Ann Karunaratna	NULL	456 Lake Lane	NULL	Kandy	Books	80	Credit Card	072 3456798
203	Individual	kasu.dd@icloud.com	Kasun Perera	NULL	789 Apple Park	Mid lane	Galle	Stationery	150	Cash On Delivery	078 8555843
204	Individual	patCumm@icloud.com	Pat Cummins	NULL	101 Flower Road	Maawawa	Negombo	Stationery	120	Bank Transfer	079 0967898
205	Individual	royfdo@gmail.com	Roy Fernando	NULL	202 Silva Street	NULL	Jaffna	Books	200	Credit Card	076 5784930

Figure 55 Supplier Table with Sample Data

itemCode	ISBN	title	genre	author	publisher	edition	yearOfPublication
101	978-0-7475-3269-6	Harry Potter and the Sorcerer's Stone	Fantasy	J.K. Rowling	Bloomsbury	1st	1997
102	978-0-8109-8391-5	Diary of a Wimpy Kid	Children's	Jeff Kinney	Amulet Books	1st	2007
103	978-1-59474-606-2	The Fault in Our Stars	Romance	John Green	Dutton Books	1st	2012
104	978-0-553-41802-6	The Martian	Science Fiction	Andy Weir	Crown Publishers	1st	2011
105	978-0-553-44812-2	Artemis	Science Fiction	Andy Weir	Crown Publishing Group	1st	2017
106	978-1-4493-9159-2	Head First Python	Programming	Paul Barry	O'Reilly Media	2nd	2022
107	978-0-13-397077-7	Fundamentals of Database Systems	Database Management	Ramez Elmasri	Pearson	7th	2015
108	978-0-13-480274-9	Database Management Systems	Database Management	Ramez Elmasri	Pearson	3rd	2019
109	978-1-118-98058-3	MySQL for Dummies	Database Management	John Paul Mueller	Springer	8th	2017
110	978-0-321-32136-7	Introduction to Data Mining	Database Management	Pang-Ning Tan	Springer	2nd	2006

Figure 56 Book_Item Table with Sample Data

itemCode	brand	model	numberOfPieces
1	BIC	Cristal Xtra Smooth	1
2	Dixon	Ticonderoga	12
3	Sharpie	Clear View	3
4	Promate	Spiral Bound	1
5	Paper Mate	Pink Pearl	3
6	Atles	Pre-sharpened	24

Figure 57 Stationery_Item with Sample Data

custId	telNo	telNo2
11	+94 77 1286567	+94 76 9879843
12	+94 71 1812233	NULL
13	+94 72 3534455	+94 72 5555577
14	+94 76 9676543	NULL
15	+94 70 8865432	+94 71 2341278

Figure 58 Customer_Telno Table with Sample Data

orderId	orderDate	orderItems	deliveryId
300	2022-09-15	Book & Stationery	101
301	2023-09-21	Stationery	102
302	2023-09-28	Book	103
303	2023-09-01	Book & Stationery	104
304	2023-09-05	Stationery	105
305	2023-09-30	Book	106
306	2023-09-08	Book & Stationery	107
307	2023-10-15	Book	108
308	2023-10-02	Book & Stationery	109
309	2023-10-15	Stationery	110
310	2023-10-28	Stationery	111
311	2023-10-15	Book	112

Figure 59 `Order` Table with Sample Data

orderId	itemCode	quantity
300	4	2
300	107	1
301	1	1
302	110	1
303	3	2
303	103	1
304	6	1
305	106	1
306	2	1
306	101	1
306	102	1
307	102	1
308	4	1
308	103	1
309	5	3
310	1	20
311	107	2

Figure 60 Ordered_Item Table with Sample Data

supId	itemCode
50	101
50	107
51	102
51	108
52	1
52	5
53	2
53	6
54	103
54	109
54	110
201	104
201	200
202	105
203	3
204	4
205	106
205	201

Figure 61 Shipping_item table with sample data

custId	orderId	paymentId	transactionDate
11	300	20	2022-09-15
11	311	31	2023-10-15
12	303	23	2023-09-01
12	308	29	2023-10-02
12	309	29	2023-10-15
12	310	30	2023-10-28
13	302	22	2023-09-28
13	307	27	2023-10-15
14	304	24	2023-09-05
15	301	21	2023-09-21
15	305	25	2023-09-30
15	306	26	2023-09-08

Figure 62 Invoice table with sample data

Section 4. Data Manipulation with SQL

a)

DML query

```
SELECT
    ISBN,
    title  AS 'Book Title',
    genre  AS 'Category',
    author AS 'Author'
FROM book_item
WHERE
    (genre = 'Database Management'
AND
    publisher IN ('Pearson', 'Springer'))
OR
    (author = 'Ramez Elmasri');
```

```
1  -- Section 4 Data Manipulation with SQL Part (a)
2
3  SELECT
4      ISBN,
5      title AS 'Book Title',      -- rename title as Book Title
6      genre AS 'Category',      -- rename genre as Category
7      author AS 'Author'      -- rename author as Authour
8  FROM book_item      -- select the book_item table
9  WHERE
10     (genre = 'Database Management'
11     AND
12     publisher IN ('Pearson','Springer'))  -- Choosing from the list
13     OR
14     (author = 'Ramez Elmasri');
15
16  -- genre needs to be "Database Management" , publisher needs to be in the list, author needs to be Ramez Elmasri
17
```

Figure 63 Data Manipulation with SQL a) DML query

Result-set

```
✓ Showing rows 0 - 3 (4 total, Query took 0.0002 seconds.)

-- Section 4 Data Manipulation with SQL Part (a) SELECT ISBN, title AS 'Book Title', -- rename title as Book Title genre AS 'Category', -- rename
genre as Category author AS 'Author' -- rename author as Authour FROM book_item -- select the book_item table WHERE (genre = 'Database Management'
AND publisher IN ('Pearson','Springer')) -- Choosing from the list OR (author = 'Ramez Elmasri');

[ Edit inline ] [ Edit ] [ Create PHP code ]
```

Figure 64 Query Successfully generated

ISBN	Book Title	Category	Author
978-0-13-397077-7	Fundamentals of Database Systems	Database Management	Ramez Elmasri
978-0-13-480274-9	Database Management Systems	Database Management	Ramez Elmasri
978-1-118-98058-3	MySQL for Dummies	Database Management	John Paul Mueller
978-0-321-32136-7	Introduction to Data Mining	Database Management	Pang-Ning Tan

Figure 65 a) Result-set with sample data

b)

DML query

```
SELECT
    CONCAT(firstName,' ',secondName) AS 'Customer\'s Name',
    email,
    T.telNo AS 'Contact Number 1',
    T.telNo2 AS 'Contact Number 2',
    COUNT(I.orderId) AS 'Number of Orders'
FROM customer AS C
    INNER JOIN customer_telno AS T
    ON C.custId = T.custId
    INNER JOIN invoice AS I
    ON C.custId = I.custId
WHERE
    transactionDate >= DATE_SUB(NOW(), INTERVAL 6 MONTH)
GROUP BY
    C.custId
HAVING
    COUNT(I.orderId) > 2 ;
```

```
1 SELECT
2     CONCAT(firstName,' ',secondName) AS 'Customer\'s Name',    -- Join first name and last name and rename it as customer's name
3     email,
4     T.telNo AS 'Contact Number 1',
5     T.telNo2 AS 'Contact Number 2',
6     COUNT(I.orderId) AS 'Number of Orders'                    -- count how many orders placed
7
8 FROM   customer AS C
9     INNER JOIN customer_telno AS T
10    ON C.custId = T.custId
11    INNER JOIN invoice AS I
12    ON C.custId = I.custId
13 WHERE
14     transactionDate >= DATE_SUB(NOW(), INTERVAL 6 MONTH)    -- transaction date need to be within 6 months from today
15 GROUP BY
16     C.custId                -- group by customer ID
17 HAVING
18     COUNT(I.orderId) > 2;    -- order count needs to be greater than 2
19
```

Figure 66 Data Manipulation with SQL b) DML query

Result-set

```
✓ Showing rows 0 - 1 (2 total, Query took 0.0004 seconds.)

-- Section 4 Data Manipulation with SQL Part (b) SELECT CONCAT(firstName,' ',secondName) AS 'Customer\'s Name', -- Join first name and last name and
rename it as customer's name email, T.telNo AS 'Contact Number 1', T.telNo2 AS 'Contact Number 2', COUNT(I.orderId) AS 'Number of Orders' -- count
how many orders placed FROM customer AS C INNER JOIN customer_telno AS T ON C.custId = T.custId INNER JOIN invoice AS I ON C.custId = I.custId WHERE
transactionDate >= DATE_SUB(NOW(), INTERVAL 6 MONTH) -- transaction date need to be within 6 months from today GROUP BY C.custId -- group by
customer ID HAVING COUNT(I.orderId) > 2;

[ Edit inline ] [ Edit ] [ Create PHP code ]
```

Figure 67 Query Successfully generated

Customer's Name	email	Contact Number 1	Contact Number 2	Number of Orders
Jane Rajapaksha	jane.sm@icloud.com	+94 71 1812233	NULL	4
Roy Drax	roydrax@gmail.com	+94 70 8865432	+94 71 2341278	3

Figure 68 b) Result-set with sample data

Section 5. References

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