

1. Business Functions:

Objective of the Company: Canada Flowers is an online flower delivery service that has been providing local, national, and international flower delivery services. They offer a wide range of floral and gift items suitable for various occasions and sentiments. Their catalog includes fresh flowers, plants, balloons, chocolates, and gift baskets. They also ensure timely delivery to recipients across Canada.

The screenshot shows the CanadaFlowers.ca website with a blue header bar. The header includes the logo, phone number (1-888-705-9999), account link, and a shopping cart icon with 2 items. Below the header, there's a navigation menu with links like Occasions, Sentiments, Flowers, Gifts, International, RMHC Canada, and Corporate. A search bar is also present. The main content area is titled "Anniversary Flower Delivery by Canada Flowers". It features a sidebar with categories: Anytime, Birthday, Budget, Maternity, Funeral, and Valentine's Day. The "Anytime" section is currently selected. Below the sidebar, there are three large flower arrangements displayed in a grid: "Valentine's Day Flowers" (red roses, lilies, and greenery), "Birthday Flowers" (various colorful flowers in a vase), and "Sympathy Flowers" (white lilies, red roses, and blue hydrangeas). Each arrangement has a brief description and a "View Details" button. At the bottom of the page, there are three customer reviews with stars and names: Sandra S., Brian G., and Robin C., followed by a "Save 10%" promotional banner.

As a customer, you can browse products by categories such as occasions, sentiments, flowers, gifts, corporate, etc. Selecting a category displays a list of products with their image, name, description or item number, and price. Selecting a product provides a detailed description, included flowers, pricing options, and similar products.

The screenshot shows the CanadaFlowers.ca website with a blue header bar. The header includes the logo, phone number (1-888-705-9999), account link, and a shopping cart icon with 2 items. Below the header, there's a navigation menu with links like Occasions, Sentiments, Flowers, Gifts, International, RMHC Canada, and Corporate. A search bar is also present. The main content area is titled "Popularity (Default)". It features a grid of eight flower arrangements: Blushing Love (pink roses), Lush Blush (pink roses), Be My Love (red roses), Happy Anniversary (assorted flowers), Just For Her (basket of flowers), Dozen Red Roses (red roses), Madly In Love (red roses), and Rich In Love (red roses). Each arrangement has a small image, name, item number, and price. At the bottom of the page, there are three customer reviews with stars and names: Michelle D., Karen C., and Ademe B., followed by a "Save 10%" promotional banner.

Canada Flowers > Anniversary Flowers > Blushing Love #AV70AA

Blushing Love



Add to Favorites



This bouquet is sure to please, blushing pinks are complemented with lush greens to complete this stunning bouquet.

Our Freshness Guarantee

- | | |
|---|----------------------|
| <input type="checkbox"/> | \$68 Standard |
| Beautiful flowers.
• alternate photo available | |
| <input checked="" type="checkbox"/> | \$94 Upgraded |
| Recommended. More flowers. Fuller. | |
| <input type="checkbox"/> | \$111 Premium |
| Our very best version.
• alternate photo available | |

Add to Shopping Cart

You Will Earn Up To 68 Reward Points

What's Included



Brought to you by **CanadaFlowers.ca**

You May Also Like ...



Exceptional Roses



Pink & Red Roses



Beautiful Pinks

From there, you can add the product to your shopping cart or favourites. The cart displays all selected products with their details and offers the option to include add-ons such as balloons, teddy, or chocolates at unit pricing.

You currently have 3 items in your shopping cart with a Subtotal of \$357.00

Subscribe Now and Save 10%

We'll let you know about hot deals and exclusive sales events

Email Address

Start Saving!

I consent to receive promotional emails from Canada Flowers



Happy Anniversary
#AV22AA (upgraded)

Price: \$104 CAD
• Balloons x1

Add-ons:

	Balloon	<input type="button" value="1 (\$7)"/>
	Teddy	<input type="button" value="0 (\$0)"/>
	Chocolates	<input type="button" value="0 (\$0)"/>



Teleflora's Madly in Love Bouquet
#AV11TA (upgraded)

Price: \$159 CAD

Add-ons:

	Balloon	<input type="button" value="0 (\$0)"/>
	Teddy	<input type="button" value="0 (\$0)"/>
	Chocolates	<input type="button" value="0 (\$0)"/>



Blushing Love
#AV70AA (upgraded)

Price: \$94 CAD

Add-ons:

	Balloon	<input type="button" value="0 (\$0)"/>
	Teddy	<input type="button" value="0 (\$0)"/>
	Chocolates	<input type="button" value="0 (\$0)"/>

Continue Shopping

Checkout →

From the cart, you can either continue shopping or proceed to checkout. The checkout page displays product details and requires you to fill in delivery information, choose a delivery date, set a reminder before delivery if required, add delivery instructions and include a message on a card. You can also select the occasion for the purchase and apply a 10% promotion code by signing up with your email.

[Checkout](#)

1 2 3

Subscribe Now and Save 10%!
We'll let you know about hot deals and exclusive sales events

Email Address

 I consent to receive promotional emails from Canada Flowers[Start Saving!](#)

Happy Anniversary
#AV22AA (upgraded)

Price: \$104 CAD
• Balloons x1

Add-ons:		
	Balloon	1 (\$7)
	Teddy	0 (\$0)
	Chocolates	0 (\$0)

[Remove](#)**Delivery Address**

Residence

First Name dd Last Name dd

Street Address D. N. D. Road

Unit # (Optional)

City Dresden

British Columbia

Canada

Postal/Zip NOP 1MO

(Phone number must be for the receiver of the order)
Phone # 9999999999 Ext.

Delivery Instructions (Optional)

You have 160 characters left.

[Update Contact in My Address Book?](#)

Delivery Date

February 2025						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

Your delivery date is:
Wednesday, February 5th, 2025

Birthday

Remind Me
3 Days Before Occasion

(Quotable Sentiments)
Card Message adsafa
You have 154 characters left.

Card Signature dsfeafe
e.g. Happy Birthday! Love, Robert

After entering billing and payment details, you can optionally donate to "Ronald McDonald House Charities." Finally, you can review your order summary, apply a promo code, redeem points, or use a gift card if applicable before submitting your order.

Checkout



Subscribe Now and Save 10!
We'll let you know about hot deals and exclusive sales events

Email Address

 I consent to receive promotional emails from Canada Flowers[Start Saving!](#)

Billing Information

Please ensure all billing details are accurate to avoid delays. Your information is kept strictly confidential.

<input type="text"/> First Name Darshan	<input type="text"/> Last Name praveen kumar jaii	<input type="text"/> Street Address 809 military trail
<input type="text"/> Email jaинд5652@gmail.com	<input type="text"/> City Scarborough	
<input type="text"/> Phone # 6476148605	# Ext. +1	<input type="text"/> Ontario
<input type="text"/> Alternate Phone #	# Ext.	<input checked="" type="radio"/> Canada <input type="radio"/> United States <input type="radio"/> Other
<input type="checkbox"/> Receive promotional offers by Email? ?	<input type="text"/> Receive Offers ...	<input type="text"/> Postal/Zip Code M1E 4P6

Let's Make a Difference [?](#)

We're thrilled to announce our partnership with RMHC Canada!
Join us in making a difference — let's donate and support families staying together.



Kevin S. donated 20 minutes ago	\$2
Heather F. donated 32 minutes ago	\$2
Daniel W. P. donated 39 minutes ago	\$2

\$452 of \$7,500

124 donors

- Donate \$2
- Donate \$5
- Donate \$10
- I will not be donating today

"Help us in making an even bigger impact, click here to see how!"

Payment Method



<input type="text"/> Select payment type...

<input type="text"/> Credit Card Number

<input type="text"/> Expiry Month	<input type="text"/> Expiry Year
-----------------------------------	----------------------------------

<input type="text"/> Security Digits

<input type="text"/> Name on Card

Order Summary

Price	\$357.00
Delivery	\$42.00
Subtotal	\$399.00
GST/HST	\$19.95
PST	\$27.93
Total Price	\$446.88

*All prices are in Canadian dollars

You Will Earn 357 Reward Points [?](#)

[Enter Promo Code](#)

+

[Redeem Petal Points](#)

+

[Have Gift Card Code?](#)

+

[Review Order](#)[Submit Order](#)

2. Business Rules And Assumptions:

1. Entities and Attributes Required For Database:

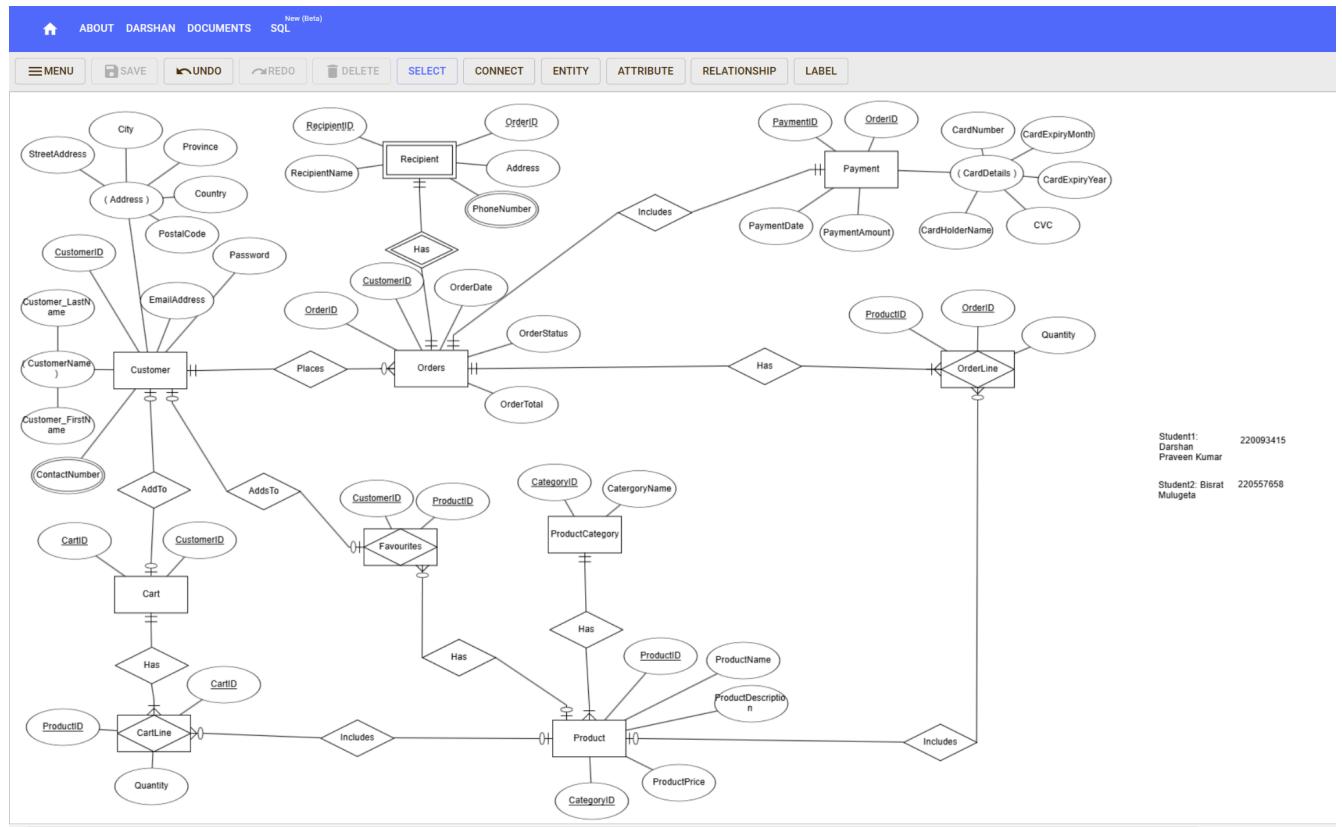
- For each PRODUCT CATEGORY: a unique CategoryID and the Category Name is required.
- For each PRODUCT being sold: a unique Product ID, Product Name, Product Description, Product Price and Category ID as foreign key is required.
- For each CUSTOMER: a unique Customer ID, Customer Name (First name, Last name), Email Address, Password, Contact Number(multivalued) and Customer Address containing Street Address, City, Province, Country and Postal Code is required.
- For each CART: a unique Cart ID and the Customer ID is required as foreign key.
- For each CART LINE: Product ID and Cart ID are required as foreign keys and it also requires a Quantity attribute.
- For each FAVOURITES: CustomerID and ProductID are required as foreign keys.
- For each ORDER: a unique OrderID, CustomerID as foreign key, Order date, Order status and Order total is required.
- For each ORDERLINE: OrderID and ProductID are required as foreign keys and also a Quantity attribute.
- For each PAYMENT: a unique PaymentID, OrderID as foreign key, Payment date, Payment amount and Card details containing Card number, Card expiry month, Card expiry year, CVC and Card holder name.
- For each RECIPIENT: a unique RecipientID, OrderID as foreign key, Recipient name, Address and phone number(multivalued) is required.

2. Relationship Between Attributes:

- Each Product category has one or more products. Each product belongs to exactly one category.
- A Product can be added to multiple favourites or no favourites. Each favourites may have no products or exactly one product.
- A customer can add to one favourites optionally. Only one customer can add it at a time optionally.
- A customer can add to one cart optionally. A product can be added to cart only by one customer optionally.
- A cart has one or many cart lines. Each cart line belongs to exactly one cart only.
- Each cart line includes one product or no product. A product can be a part of many cart lines or no cart line. The purpose of cart line is to hold a product temporarily a user considers purchasing which can later be removed or added easily before finalizing the order.

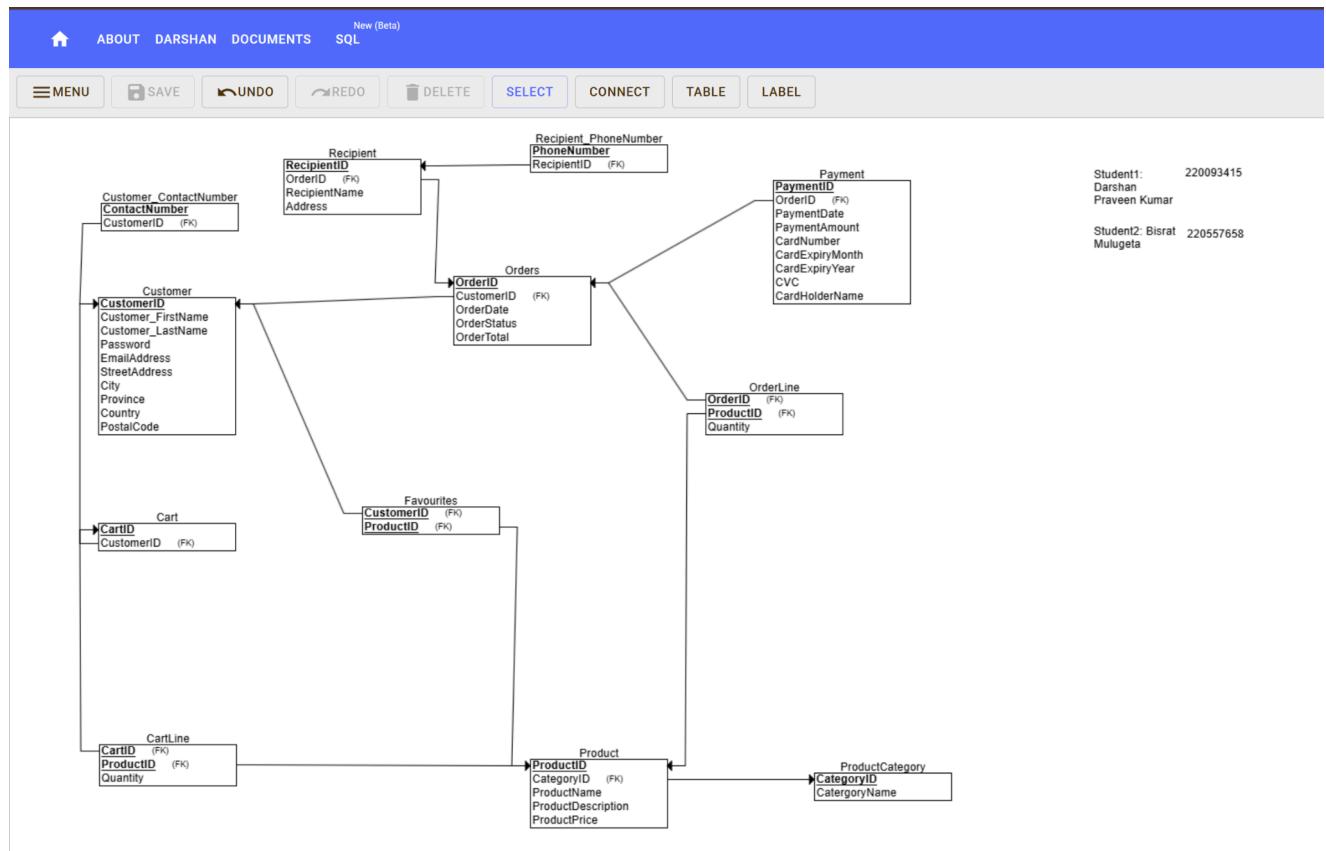
- A customer can place many orders or no orders. Each order can only be placed by exactly one customer.
- An order has one or many order lines. Each order line belongs to exactly one order.
- An order line includes one product or no product. A product can belong to multiple order lines or no order line.
- Each order includes exactly one payment and each payment belongs to exactly one order.
- An order has exactly one recipient and a recipient has exactly one order.

3. ER MODEL:



The ER diagram is also attached as an image file.

4. E-R model to relational tables:



The Relational Schema is also attached as an image file.

Tables With Sample Data:

ProductCategory:

Category_ID(PK)	CategoryName
401	Valentine's Day
402	Maternity
403	Funeral
404	Birthday
405	Anniversary

Product:

ProductID(PK)	ProductName	ProductPrice	ProductDescription	CategoryID(FK)
301	Orchids	34	Fresh and new	401
302	Rose	87	Unique	402
303	Sunflower	78	red as wine	403
304	Orchids	76	Natural from Farm	404
305	Carnations	87	Perfect color	405

Customer:

CustomerID(PK)	FirstName	LastName	EmailAddress	Password	StreetAddress	City	Province	Country	PostalCode
111	LeBron	James	lebron.james@gmail.com	pass123	2 Justice Way	Calgary	AB	Canada	M4W 1A1
112	Serena	Williams	serena.w@gmail.com	secret45	3 Wisdom St	New York	NY	USA	V6Z 2Y7
113	Lionel	Messi	messi.l@gmail.com	pass789df	44 Reflection Ave	Calgary	AB	Canada	T2P 1S4
114	Roger	Federer	roger.f@gmail.com	pass456	1 Ethics St	Vancouver	BC	Canada	K1N 8Y7
115	Megan	Rapinoe	megan.r@gmail.com	pass321	4 Knowledge Dr	London	ON	Canada	H3G 2N1

Customer Contact Number:

- The below table shows that each recipient may have multiple phone numbers.

CustomerID(FK)	ContactNumber
111	1234567890
111	987654321
113	1122334455
114	2233445566
115	3344556677

Cart:

CartID(PK)	CustomerID
201	111
202	112
203	113
204	114
205	115

Cart Line:

CartID(FK)	ProductID(FK)	Quantity
201	301	1
202	302	2
203	303	3
204	304	4
205	305	5

Favourites:

CustomerID(FK)	OrderID(FK)
111	1011
112	1022
113	1033
114	1044
115	1055

Order:

OrderID(PK)	OrderDate	OrderTotal	OrderStatus	CustomerID(FK)
1011	2025-01-01	99	Delivered	111
1022	2025-01-02	999	Delivered	112
1033	2025-01-03	231	Delivered	113
1044	2025-01-04	123	Shipped	114
1055	2025-01-06	9999	Pending	115

Order Line:

Order_ID(FK)	ProductID(FK)	Quantity
1011	301	1
1022	302	2
1033	303	3
1044	304	4
1055	305	5

Payment:

PaymentID(PK)	Payment Date	Payment Amount	CardNumber	CardExpiryMonth	CardExpiryYear	CVC	CardHolderName	OrderID(FK)
1	2024-01-10	81	4228164769594755	9	2026	373	LeBron James	1011
2	2024-01-11	102.97	4308086650476922	3	2030	996	Serena Gomez	1022
3	2024-01-12	193.37	4468838022009719	12	2029	207	Lionel Messie	1033
4	2024-01-13	235.81	4170849707793064	4	2030	530	Roger Federer	1044
5	2024-01-	98.82	4940274178	2	2025	168	Megan Rapinoe	1055

	14		083025					
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Recipient:

RecipientID(PK)	OrderID(FK)	ReceiverName	Recipient_Address
11	1011	Hannah Arendt	222 Justice Way, AB
12	1022	Martha Nussbaum	123 Wisdom St, NY
13	1033	Mary Wollstonecraft	444 Reflection Ave, WA
14	1044	Elizabeth Anscombe	111 Ethics St, BC
15	1055	Iris Murdoch	654 Knowledge Dr, ON

Recipient Phone Number:

- The below table shows each recipient may have multiple phone number

RecipientID(FK)	RecipientNumber
11	1234567890
11	987654321
13	1122334455
14	2233445566
15	3344556677

5.Normalization Check:

Most of the entities are either already in 3NF or have been converted into 3NF during relational table conversion like customer number and recipient number which were moved to a new table. The remaining entities that need to be normalised are as below:

Customer

Customer ID	First Name	Last Name	Email Address	Password	Street Address	City	Province	Country	Postal Code
111	LeBron	James	lebron.james@gmail.com	pass123	2 Justice Way	Calgary	AB	Canada	M4W 1A1
112	Serena	Williams	serena.w@gmail.com	secret45	3 Wisdom St	New York	NY	USA	V6Z 2Y7
113	Lionel	Messi	messi.l@gmail.com	pass789df	44 Reflection Ave	Calgary	AB	Canada	T2P 1S4
114	Roger	Federer	roger.f@gmail.com	pass456	1 Ethics St	Vancouver	BC	Canada	K1N 8Y7
115	Megan	Rapinoe	megan.r@gmail.com	pass321	4 Knowledge Dr	London	ON	Canada	H3G 2N1

The customer table is in First Normal Form (1NF) because:

1. Atomic Values: Each column contains atomic (indivisible) values. For example, columns like FirstName, LastName, EmailAddress, Password, etc., contain single values per cell.
2. Unique Rows: Each row is uniquely identified by the CustomerID column, which acts as the primary key.
3. No Repeating Groups: There are no multiple values in a single column or nested tables within the table.

Since the first table satisfies the above criteria, it is in 1NF.

CustomerID(PK)	FirstName	LastName	EmailAddress	Password
111	LeBron	James	lebron.james@gmail.com	pass123
112	Serena	Williams	serena.w@gmail.com	secret12345
113	Lionel	Messi	messi.l@gmail.com	pass789df
114	Roger	Federer	roger.f@gmail.com	pass456
115	Megan	Rapinoe	megan.r@gmail.com	pass321

CustomerID(FK)	StreetAddress	City	Province	Country	Zip_Code
111	2 Justice Way	Calgary	AB	Canada	M4W 1A1
112	3 Wisdom St	New York	NY	USA	V6Z 2Y7
113	44 Reflection Ave	Calgary	AB	Canada	T2P 1S4
114	1 Ethics St	Vancouver	BC	Canada	K1N 8Y7
115	4 Knowledge Dr	London	ON	Canada	H3G 2N1

The above two tables:

1. Customer Table:
 - Contains CustomerID, FirstName, LastName, EmailAddress, and Password.
2. Address Table:
 - Contains CustomerID as foreign key, StreetAddress, City, Province, Country, and PostalCode.

These two tables are in Second Normal Form (2NF) because:

1. No Partial Dependencies:
 - In the original table, StreetAddress, City, Province, Country, and PostalCode depend on CustomerID but not on other attributes like FirstName or Password.
 - By moving address-related attributes to a separate table (Address Table), each non-key attribute now depends entirely on the primary key (CustomerID) of its respective table.
2. Elimination of Redundancy:
 - Separating the data into two tables reduces redundancy and avoids duplication of address data when customers might have multiple addresses.
3. Maintained Relationships:
 - The two tables are linked through CustomerID, ensuring data integrity and allowing retrieval of full customer information through joins.

Thus, it is in 2NF.

- There is no transitive dependency because none of the non-key attributes depend on other non-key attributes. For example, FirstName, LastName, EmailAddress, and Password all depend directly on CustomerID.
- 3NF satisfied.

The Customer Table is in 3NF.

- Attributes like StreetAddress, City, Province, Country, and PostalCode describe the address and are directly dependent on CustomerID.
- While StreetAddress → City, Province, Country, PostalCode might seem like a transitive dependency, it is not in this case because:

- These attributes are inherently part of the address data and are dependent on the key (CustomerID).
 - StreetAddress is not acting as a determinant within the table (it's not the primary key).
- There are no transitive dependencies, so the address table is in 3NF.

PAYMENT:

PaymentID(PK)	Payment Date	Payment Amount	CardNumber	CardExpiryMonth	CardExpiryYear	CVC	CardHolderName	OrderID(FK)
1	2024-01-10	81	4755	9	2026	373	LeBron James	1011
2	2024-01-11	102.97	6922	3	2030	996	Serena Gomez	1022
3	2024-01-12	193.37	9719	12	2029	207	Lionel Messi	1033
4	2024-01-13	235.81	3064	4	2030	530	Roger Federer	1044

PaymentID(PK)	PaymentDate	PaymentAmount	OrderID(FK)	CardNumber
1	2024-01-10	81	1011	422816476959
2	2024-01-11	102.97	1022	430808665047
3	2024-01-12	193.37	1033	446883802200
4	2024-01-13	235.81	1044	417084970779

CardNumber	CardExpiryMonth	CardExpiryYear	CVC	CardHolderName
4228164769594755	9	2026	373	LeBron James
4308086650476922	3	2030	996	Serena Gomez
4468838022009719	12	2029	207	Lionel Messi
4170849707793064	4	2030	530	Roger Federer

The payment table has also been normalised.