



ITCS216

Fundamentals of Database Systems

Project Phase I: Database Design

Supermarket: Tops

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Supermarket (Tops)

Tops Supermarket, a leading retail chain in Thailand, operates under the umbrella of Central Group, a major conglomerate in the region. Established in 1996, Tops has become a significant player in Thailand's grocery sector, renowned for its diverse range of products, from fresh produce to household goods. The supermarket chain aims to provide high-quality products and exceptional customer service, catering to the evolving needs of modern consumers. Tops is committed to sustainability and community engagement, reflecting its broader goal of creating a positive impact both economically and socially. The business domain encompasses hypermarkets, supermarkets, and convenience stores, allowing Tops to serve a wide demographic across Thailand.



Business process:

Business process: Inventory Management	
Explanation:	Inventory Management will categorize products accordingly. Staff will regularly check the detailed information of each product (e.g., ID, name, manufacturing date, expiration date) and monitor the quantity of inventory within the warehouse. Each product will have their own promotion. Staff will be able to add, remove, and store the product into the inventory. And detailing the supplier to each product.

Business process: Customer Checkout

Explanation:

The checkout process is where customers make payments and receive receipts. This process also includes scanning products and applying discounts. There is a function that customers can refund products and get the money refunded. Another feature is applying membership while making a payment.

Business process: Promotional Campaigns

Explanation:

Tops Supermarket regularly runs promotional campaigns, including discounts, special offers, and membership benefits to attract customers. Marketing teams design and execute these campaigns through various channels such as in-store promotions, social media, and email newsletters. Data analytics is used to target specific customer segments and personalize offers.

Business process: Cashier Staff Management

Explanation:

Cashiers are hired and trained to ensure they perform their duties effectively. The process begins with a rigorous hiring process to select candidates with good customer service skills, attention to detail, and reliability, and includes a comprehensive training program covering all aspects of the job, including using cash registers, handling transactions correctly, handling cash, and providing excellent customer service. Assessments are also conducted to track the cashiers' performance. Cashiers receive feedback through one-on-one meetings to improve their skills and address issues promptly.

Business process: Supplier Management

Explanation:

Tops Supermarket searches for suppliers by setting evaluation criteria and selects the most suitable suppliers based on various criteria such as price and reliability by negotiating contract terms. Purchase orders are then created and confirmed, the quality of products or services are checked and

	maintained to meet specified standards, and delivery schedules are managed to deliver the products to all Tops Supermarket branches.
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Business rules:

Process: Inventory Management		
No.1	Rule Statement	Relationship
Forward	A staff can check the amount of every product in the inventory.	1:M
Backward	A product can be checked the amount by many staffs.	1:M
Conclusion	Every staff can check the amount of every product in the inventory.	M:N
No.2	Rule Statement	Relationship
Forward	A staff can add many products to inventory.	1:M
Backward	A product can be added by many staffs.	1:M
Conclusion	Every staff can add many products to inventory.	M:N
No.3	Rule Statement	Relationship
Forward	A staff can remove many products.	1:M
Backward	A shelf can be checked by many staffs.	1:M
Conclusion	A staff can remove many products.	M:N
No.4	Rule Statement	Relationship
Forward	A product has to be stored to one inventory.	1:1
Backward	An inventory stores many products.	1:M
Conclusion	An inventory stores many products.	1:M
No.5	Rule Statement	Relationship
Forward	A product has to rely on only one supplier.	1:1
Backward	A supplier can provide many products.	1:M
Conclusion	A supplier can provide many products.	1:M
No.6	Rule Statement	Relationship
Forward	A product can exist in only one promotion.	0:1
Backward	A promotion can contain many products.	1:M
Conclusion	A promotion can contain many products.	1:M

No.7	Rule Statement	Relationship
Forward	Staff can access to one inventory.	1:1
Backward	Inventory can be accessed by many staff.	1:M
Conclusion	Inventory can be accessed by many staff.	1:M
No.8	Rule Statement	Relationship
	Product consists of two main types which are food and appliance. While food comprises of ingredients and size, appliance comprises of materials and brand.	1:1

Process: Customer Checkout		
No.9	Rule Statement	Relationship
Forward	One customer makes many orders.	1:M
Backward	One order is made by one customer.	1:1
Conclusion	One customer is made many orders.	1:M
No.10	Rule Statement	Relationship
Forward	One customer can refund many products.	1:M
Backward	One product is refunded by one customer.	1:1
Conclusion	One customer is refunded many products.	1:M
No.11	Rule Statement	Relationship
Forward	A customer can use only one membership per transaction.	1:1
Backward	A membership will be used by one customer during transaction.	1:1
Conclusion	A customer can use only one membership per transaction.	1:1
No. 12	Rule Statement	
	Customer consists of name, gender, age, bdate, and phone number.	

Process: Promotional Campaigns		
No.13	Rule Statement	Relationship
Forward	A staff has to determine promotion.	1:M
Backward	Each promotion is determined by the staff.	1:1
Conclusion	A staff has to determine promotion.	1:M

No.14	Rule Statement	Relationship
Forward	Memberships can receive many promotions.	1:M
Backward	A promotion can be provided to many memberships	1:M
Conclusion	Every membership can receive many promotions.	M:N
No.15	Rule Statement	
	Membership comprises of <u>ID</u> , name, point, email, EXP date.	
No.16	Rule Statement	Relationship
Forward	Each promotion can have many advertisements.	1:M
Backward	An advertisement is associated with one promotion	1:1
Conclusion	Each promotion can have many advertisements.	1:M
No.17	Rule Statement	Relationship
Forward	One order can have many promotions.	1:M
Backward	A promotion can have one order.	1:1
Conclusion	One order can have many promotions.	1:M
No.18	Rule Statement	
	Promotion comprises of ID, name, discount, membership benefits, special offers.	

Process: Cashier Staff Management		
No.19	Rule Statement	Relationship
Forward	One order contains many products.	1:M
Backward	A product can be included in one order.	1:1
Conclusion	One order contains many products.	1:M
No.20	Rule Statement	Relationship
Forward	The cashier makes many orders.	1:M
Backward	One order is made by the cashier.	1:1
Conclusion	The cashier makes many orders.	1:M
No.21	Rule Statement	Relationship
Forward	The cashier makes many payments.	1:M
Backward	One payment can be made by the cashier.	1:1
Conclusion	The cashier make payment.	1:M

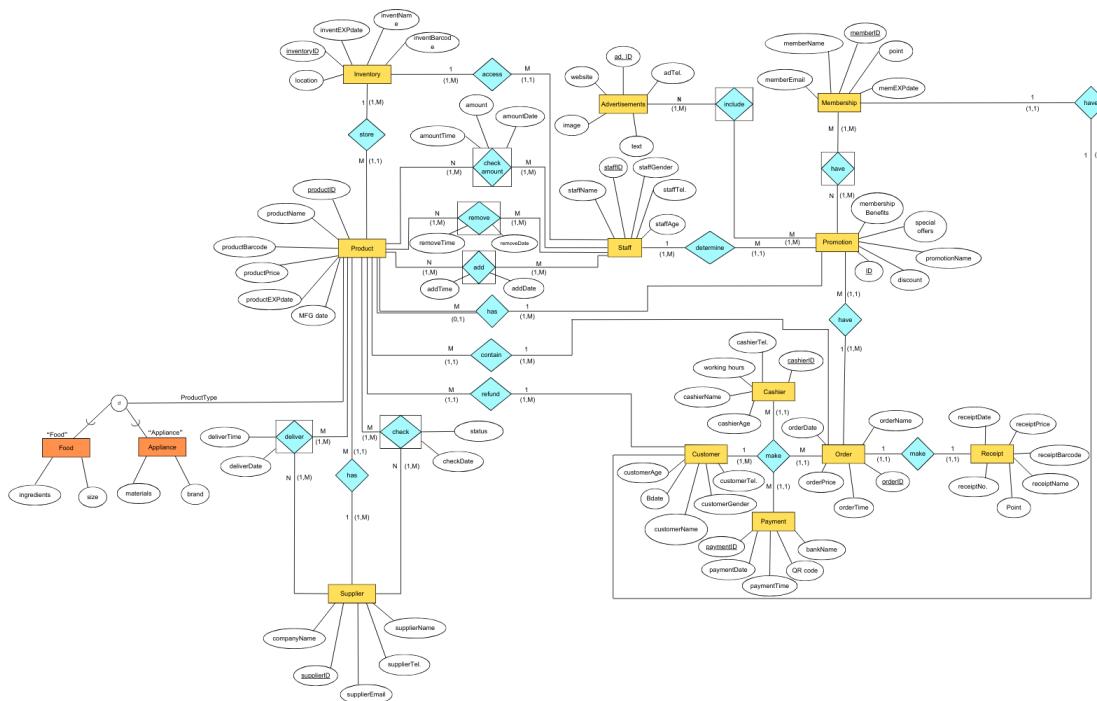
No.22	Rule Statement	Relationship
Forward	Customer can make one payment.	1:1
Backward	One payment can be made by the customer	1:1
Conclusion	Customer can make one payment.	1:1
No.23	Rule Statement	Relationship
Forward	One payment is made for many orders.	1:M
Backward	One order makes one payment.	1:1
Conclusion	One payment is made for many orders.	1:M
No.24	Rule Statement	Relationship
Forward	One receipt will be received one order.	1:1
Backward	One order will be received by one receipt.	1:1
Conclusion	One receipt will be received one order.	1:1
No.25	Rule Statement	
	Cashier comprises of ID, name, working hours, age, phone number	

Process: Supplier Management		
No.26	Rule Statement	Relationship
Forward	A supplier must deliver products according to orders from Tops.	1:M
Backward	Product must be delivered by suppliers according to orders from Tops.	1:M
Conclusion	Many suppliers must deliver products according to orders from Tops.	N:M
No.27	Rule Statement	Relationship
Forward	Supplier checks products quality.	1:M
Backward	Product quality is checked by suppliers.	1:M
Conclusion	Suppliers checks products quality.	N:M
No.28	Rule Statement	Relationship
Forward	Supplier has many products.	1:M
Backward	One Product has by supplier.	1:1
Conclusion	Supplier has many products.	1:M
No.29	Rule Statement	
	Supplier comprises of ID, name, email, phone number, company name	

No.30	Rule Statement
	Product comprises of Product ID, name, barcode, price, EXP date, MFG date

No.	Entity	Attributes
1	Product	<u>Product code</u> , name, barcode, price, EXP date, MFG date
2	Staff	<u>ID</u> , name, gender, age, phone number
3	Inventory	<u>ID</u> , location, name, barcode, EXP date
4	Customer	<u>Name</u> , gender, age, bdate, phone number
5	Supplier	<u>ID</u> , name, email, phone number, company name
6	Payment	<u>ID</u> , date, time, QR code, bank name
7	Cashier	<u>ID</u> , name, working hours, age, phone number
8	Order	<u>ID</u> , name, date, time, price
9	Receipt	<u>Receipt Number</u> , name, point, date, price, barcode
10	Promotion	<u>ID</u> , name, discount, membership benefits, special offers
11	Membership	<u>ID</u> , name, point, email, EXP date
12	Advertisements	<u>AddressID</u> , text, phone number, image, website
13	Food	Size, Ingredients
14	Appliance	Material, brand

Entity Relationship Diagram:



https://www.canva.com/design/DAGR2htBDu0/44tpeIjB1ILujUPVffqCg/edit?utm_content=DAGR2htBDu0&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

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