

PHASE 4 (DATA BASE) LOGICAL DESIGN



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Faculty of
Computer Science
and Information
Systems

UNIVERSITI TEKNOLOGI MALAYSIA, JOHOR BAHRU

FACULTY OF COMPUTING

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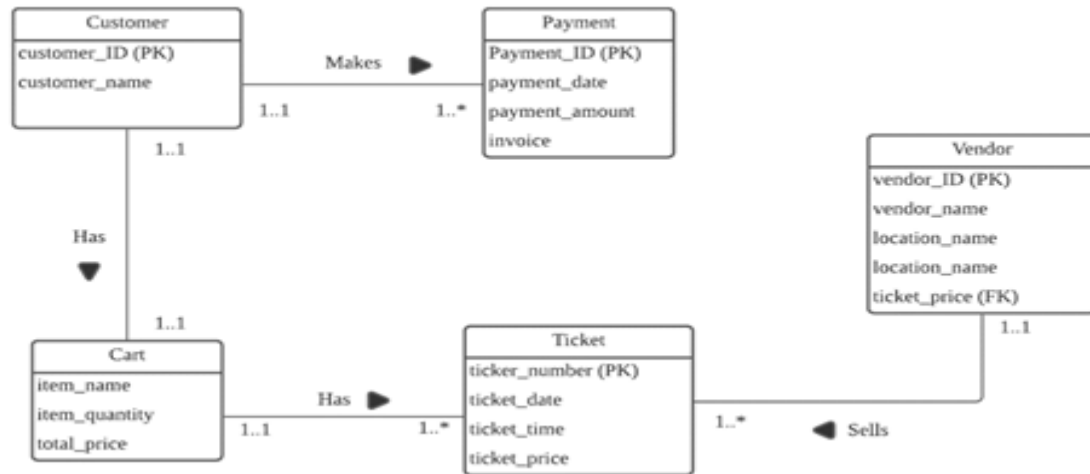
NAME OF GROUP MEMBER :

1. Ahmad Zulfikar (A19EC3003)
2. Muhammad faris ibrahim (A19EC3012)
3. Savero fajri sutiono (A19EC3016)
4. Ahmad kemal aushaf (A19EC3002)
5. Alya nasuha (B19EC3001)

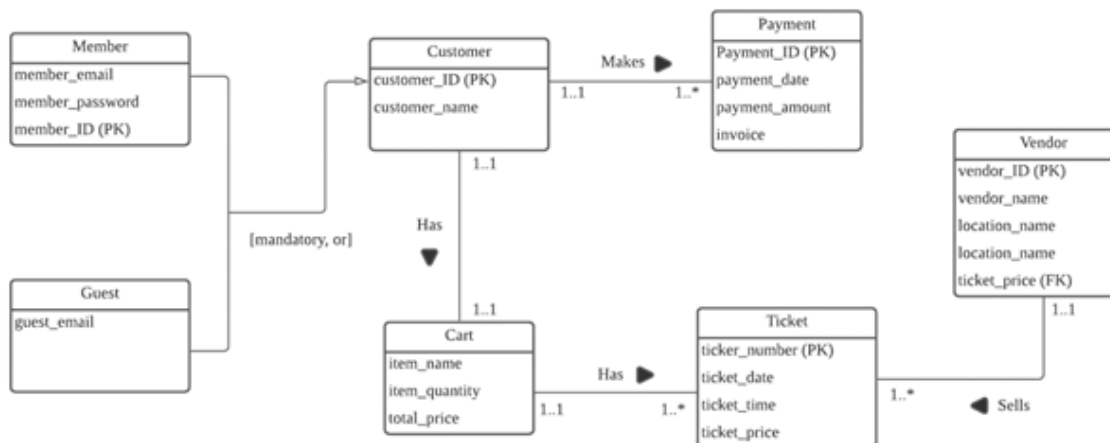


PHASE 4 DB LOGICAL DESIGN

A. TRANSFORMING CONCEPTUAL ERD (FROM P3) TO LOGICAL ERD



EERD



B. RELATIONAL DATABASE SCHEMAS

- Logical Data Derivation

Strong Entity Type Customer (customer_ID {PK}, customer_name) Vendor (vendor_ID {PK}, vendor_name, location_name, ticket_price {FK}) Payment (payment_ID {PK}, payment_date, payment_amount, invoice) Ticket (ticket_number {PK}, ticket_date, ticket_time, ticket_price) Member (member_email, member_password, member_ID {PK})	Binary Relationship Type: One-to-many (1: *) 1) Customer (customer_ID {PK}, customer_name) Payment (payment_ID {PK}, payment_date, payment_amount, invoice) 2) Vendor (vendor_ID {PK}, vendor_name, location_name, ticket_price {FK}) Ticket (ticket_number {PK}, ticket_date, ticket_time, ticket_price) 3) Cart (item_quantity, total_price) Ticket (ticket_number {PK}, ticket_date, ticket_time, ticket_price)
Weak Entity Type Cart (item_quantity, total_price) Guest (guest_email)	Binary Relationship Type: One-to-One (1: 1) 1. Mandatory Participation on Both sides (Customer & Cart) Customer_Cart (customer_ID {PK}, customer_name, item_quantity, total_price) Superclass/ Subclass relationship type Member (member_email, member_password, member_ID {PK}) Guest (guest_email)

- Perform normalization on relation until BCNF

FD

FD 1 - customer_ID, ticket_number --> ticket_date, ticket_time

FD 2 - customer_ID --> customer_name

FD 3 - ticket_time, customer_name --> ticket_number, ticket_price, customer_ID

FD 4 - ticket_number --> customer_ID

FD5 - customer_ID, cart_ID -->, ticket_name, ticket_price, item_quantity, total_price

FD6 - cart_ID --> customer_ID

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CustomerPurchase

customer_ID	customer_name	ticket_number	ticket_name	ticket_date	ticket_time	cart_id	ticket_price	item_quantity	total_price
0001	John Hopkins	15233892091234	Museum ticket	12/5/2020	22:00	C0001	15	1	15
	John Hopkins	14862048593827	Amusement park ticket	13/5/2020	21:30	C0001	25	2	50
0002	Noah Farakhan	15232049367203	Museum	22/6/2020	15:30	C0002	15	2	30
	Noah Farrahkhan	14864939403404	Amusement park ticket	27/6/2020	14:00	C0002	25	4	100

0003	Fikri Ahmad	18524 22512 3684	Aquaria ticket	30/7/ 2020	12: 45	C0 003	40	3	120
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1NF - 1st Normal Form

Customer

customer_ID	customer_name
0001	John Hopkins
0002	Noah Farakhan
0003	Fikri Ahmad

TicketDetailsPerCustomer

ticket_number	ticket_name	ticket_date	ticket_time	ticket_price	cart_id	item_quantity	total_price	customer_ID
15233892 091234	Museum ticket	12/5/ 2020	22:0 0	15	C0 00 1	1	15	0001
14862048 593827	Amusement park ticket	13/5/ 2020	21:3 0	25	C0 00 1	2	50	0001
15232049 367203	Museum	22/6/ 2020	15:3 0	15	C0 00 2	2	30	0002
14864939 403404	Amusement park ticket	27/6/ 2020	14:0 0	25	C0 00 2	4	100	0002

18524225 123684	Aquaria ticket	30/7/20 20	12:4 5	40	C0 00 3	3	120	0003
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FD 1 - customer_ID, ticket_number --> ticket_date, ticket_time (Primary key)

FD 2 - customer_ID --> customer_name (Partial dependency)

FD 3 - ticket_time, customer_name --> ticket_number, ticket_price, customer_ID (Full Functional Dependency)

FD 4 - ticket_number-->customer_ID(transitive dependency)

FD5 - customer_ID, cart_ID -->, ticket_name, ticket_price, item_quantity, total_price (Partial dependency)

FD6 - cart_ID --> customer_ID (Candidate key)

2NF - 2nd Normal Form

Customer

customer_ID	customer_name
0001	John Hopkins
0002	Noah Farakhan
0003	Fikri Ahmad

CustomerCart_1

cart_id	ticket_name	item_quantity	ticket_price	total_price	customer_ID
C0001	Museum ticket	1	15	15	0001

C0001	Amusement ticket	park	2	25	50	0001
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CustomerCart_2

cart_id	ticket _name		item_quantity	ticket_price	total_price	customer_ID
C0002	Museum ticket		2	15	30	0002
C0002	Amusement ticket	Park	4	25	100	0002

CustomerCart_3

cart_id	ticket _name	item_quantity	ticket_price	total_price	customer_ID
C0003	Aquaria ticket	2	15	30	0003

CustomerCartInfo

cart_id	customer_name	customer_ID
C0001	John Hopkins	0001
C0002	Noah Farakhan	0002

C0003	Fikri Ahmad	0003
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3NF - 3rd Normal Form

TicketDetails

ticket_number	ticket_name	ticket_date	ticket_time	ticket_price	item_quantity	total_price
15233892091234	Museum ticket	12/5/2020	22:00	15	1	15
14862048593827	Amusement park ticket	13/5/2020	21:30	25	2	50
15232049367203	Museum	22/6/2020	15:30	15	2	30
14864939403404	Amusement park ticket	27/6/2020	14:00	25	4	100
18524225123684	Aquaria ticket	30/7/2020	12:45	40	3	120

TicketPurchase

ticket_number	customer_ID
15233892091234	0001
14862048593827	0001
15232049367203	0002

14864939403404	0002
18524225123684	0003

BCNF - Boyce-Codd Normal Form

CustomerName

customer_ID	customer_name
0001	John Hopkins
0002	Noah Farakhan
0003	Fikri Ahmad

CustomerCart

customer_ID	cart_id
0001	C0001
0002	C0002
0003	C0003

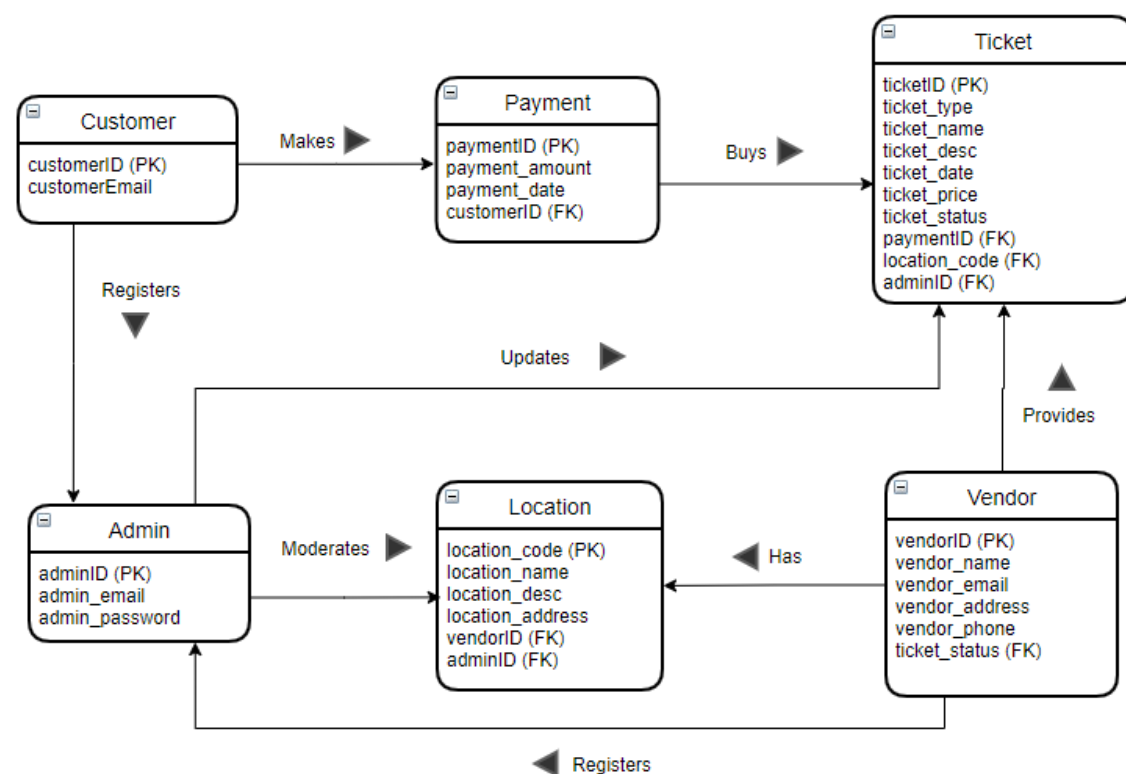
C. PERFORM NORMALIZATION

Insert Anomalies : {X, Noah Farrahkhan, 14864939403404, Amusement park ticket, 27/6/2020, 14:00, C0002, 25, 4, 100}

Delete Anomalies : {0003, Fikri Ahmad , 18524225123684, Aquaria ticket, 30/7/2020, 12:45, C0003, 40 3, 120}

Modification Anomalies : {0002, Noah Farrahkhan, 15232049367203, Museum, 22/6/2020, 15:30, C0002, 15, 2, 30}

D. DRAW THE NORMALIZED LOGICAL ERD



E. UPDATE THE DATA DICTIONARY FOR THE NORMALIZED LOGICAL DESIGN

Entity Name	Entity description	Column name	Column description	Data Type	Length	Primary key	Nullable	Unique
Customer	someone who buys ticket	Customer_ID	The primary identification attribute for customer	integer	10	TRUE	FALSE	TRUE
		Customer_name	personal call name for the customer	varchar	40	FALSE	FALSE	FALSE

Payment	A payment is the voluntary tender of money or its equivalent or of things of value by one party to another in exchange.	Payment_ID	The primary identification attribute for each payment	integer	12	TRUE	FALSE	TRUE
		payment_date	the exact date that the purchase has been paid	date	8	FALSE	FALSE	FALSE
		payment_amount	The required amount of money needed from the customer for this payment	integer	6	FALSE	FALSE	FALSE
		invoice	written description for the payment	varchar	10	FALSE	FALSE	FALSE
Admin	Who maintain the website	Admin_ID	the primary identification for admin	integer	10	TRUE	FALSE	TRUE
		admin_email	email address of admin	varchar	40	FALSE	FALSE	FALSE
		admin_password	password for the admin account	varchar	10	FALSE	FALSE	FALSE
Ticket	Voucher that indicates that an individual is entitled to admission	ticket_number	The primary identification attribute for each ticket	integer	14	TRUE	FALSE	TRUE
		ticket_date	reserved date of the ticket	date	8	FALSE	TRUE	FALSE
		ticket_time	the time designated for visit	time	8	FALSE	TRUE	FALSE
		ticket_price	the listed ticket price	integer	3	FALSE	FALSE	FALSE
Vendor	Vendor is a seller or supplier or specifically a third party	vendor_ID	The primary identification attribute for vendor	integer	10	TRUE	FALSE	TRUE
		vendor_name	name for the vendor	varchar	40	FALSE	FALSE	FALSE
		location_name	vendor location	varhcar	40	FALSE	FALSE	FALSE
		ticket_price	the listed ticket price	integer	3	FALSE	FALSE	FALSE

Location	this is where the museum and parks located	location_code	The primary identification attribute for location	integer	10	TRUE	FALSE	TRUE
		location_name	name for the location	varchar	40	FALSE	FALSE	FALSE
		location_desc	description of the location	varhcar	40	FALSE	FALSE	FALSE
		location_address	the complete address of the location	varchar	250	FALSE	FALSE	FALSE