

**NANYANG
TECHNOLOGICAL
UNIVERSITY**

SINGAPORE

EE4791 Database Systems

Assignment

Database Design and Implementation

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Scenarios for Database

The goal of this project is to create a database management system for a restaurant. The main focus of this project is targeted towards keeping track of the employees and virtualizing the process of serving the customers. Some possible scenarios and the corresponding query include:

1. Finding employee that was hired before a particular date

```
SELECT EmpName, HiredDate  
FROM Employee  
WHERE HiredDate < #insert date#;
```

2. Retrieve foods that costs under 10 dollars

```
SELECT FoodID, FoodName, FoodPrice  
FROM FOOD  
WHERE FoodPrice < 10;
```

3. Find out how many tables with maximum 4 pax

```
SELECT TableNo, Pax  
FROM TABLES  
WHERE Pax = 4;
```

4. Find all customers who paid in cash

```
SELECT CustName AS CashCustomers
FROM CUSTOMER c
WHERE EXISTS
(
    SELECT *
    FROM PAYMENT p
    WHERE c.CustID = p.CustID
    AND PaymentType = 'Cash'
);
```

5. Which waiter earn the most tips

```
SELECT EmpName, Tips
FROM EMPLOYEE e INNER JOIN WAITER w
ON e.EmpID = w.WaiterID
WHERE Tips = (
    SELECT MAX(Tips) FROM WAITER
);
```

6. There is a discrepancy in a bill, find the employee accountable for this

```
SELECT EmpName, p.BillID, Amount
FROM ((EMPLOYEE AS e
    INNER JOIN PAYMENT AS p
    ON e.EmpID = p.CashierID)
    INNER JOIN BILL AS b
    ON p.BillID = b.BillID)
WHERE p.BillID = <insert bill id>;
```

7. What is the most popular item on the menu?

```
SELECT TOP 1 *  
FROM (  
    SELECT f.FoodID, f.FoodName as name, SUM(o.Qty) AS quantity  
    FROM Orders AS o  
    INNER JOIN Food AS f  
    ON f.FoodID = o.FoodID  
    GROUP BY f.FoodID, f.FoodName  
)
```

8. List customers who ordered food over 30 dollars in total

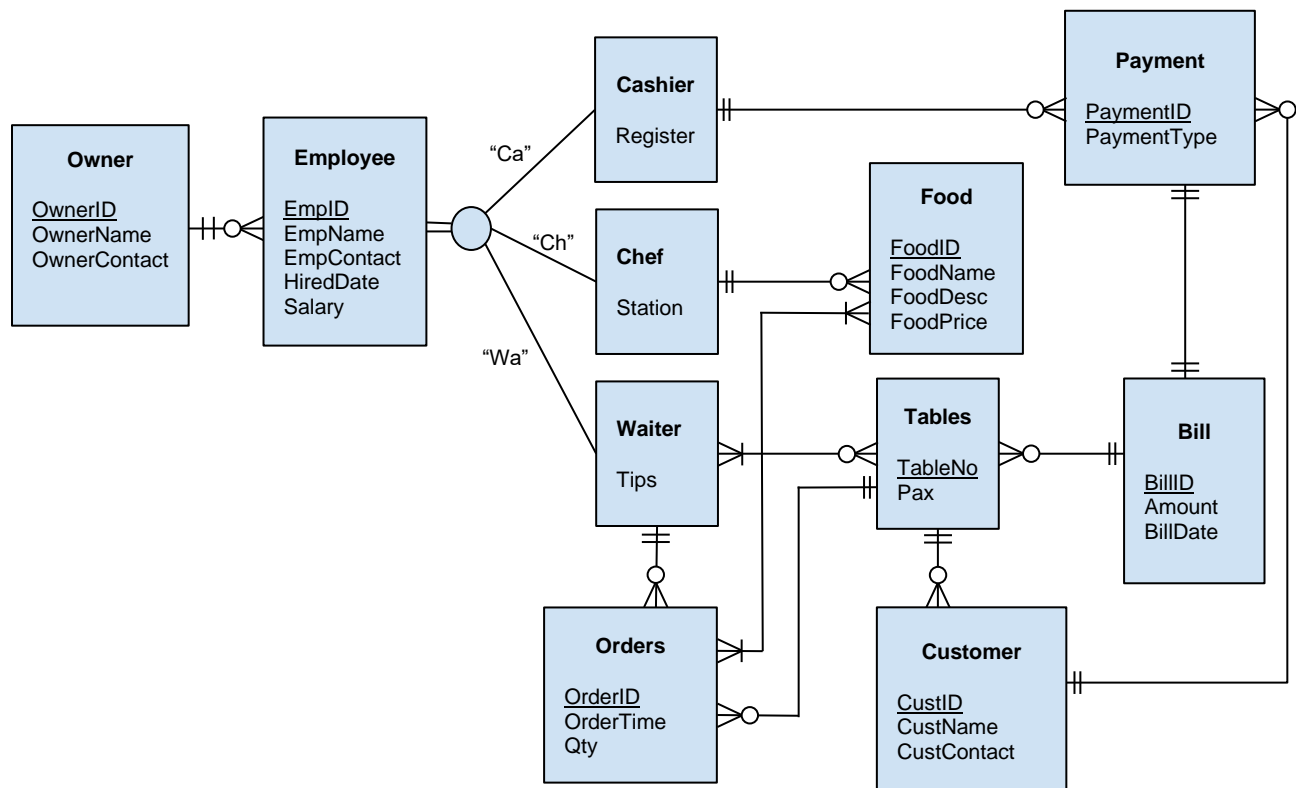
```
SELECT CUSTName  
FROM CUSTOMER  
WHERE CustID IN  
(SELECT CustID  
    FROM PAYMENT  
    WHERE BillID IN  
(SELECT BillID  
    FROM BILL  
    WHERE Amount > 30));
```

Results will return customer name and the amount they spent

```
SELECT c.CustName, b.Amount  
FROM (CUSTOMER AS c INNER JOIN PAYMENT AS p ON c.CustID =  
p.CustID) INNER JOIN BILL AS b ON p.BillID = b.BillID  
WHERE (((b.Amount)>30));
```

ER Diagram

To specify data we store in the restaurant management database, an entity-relationship (ER) diagram is used to model the data stored in the database. The figure below shows the ER diagram for the restaurant management database.



As shown in the ER diagram, each entity and the corresponding attributes and relationships are being displayed. The key identifier of the attribute is underlined and the various relationships - one-to-one, one-to-many, or a many-to-many relationship, are properly indicated. The employee entity has a disjoint subtype of cashier, chef, and waiter.

The figure below shows the screen capture of the relationships of the entities in Microsoft Access.

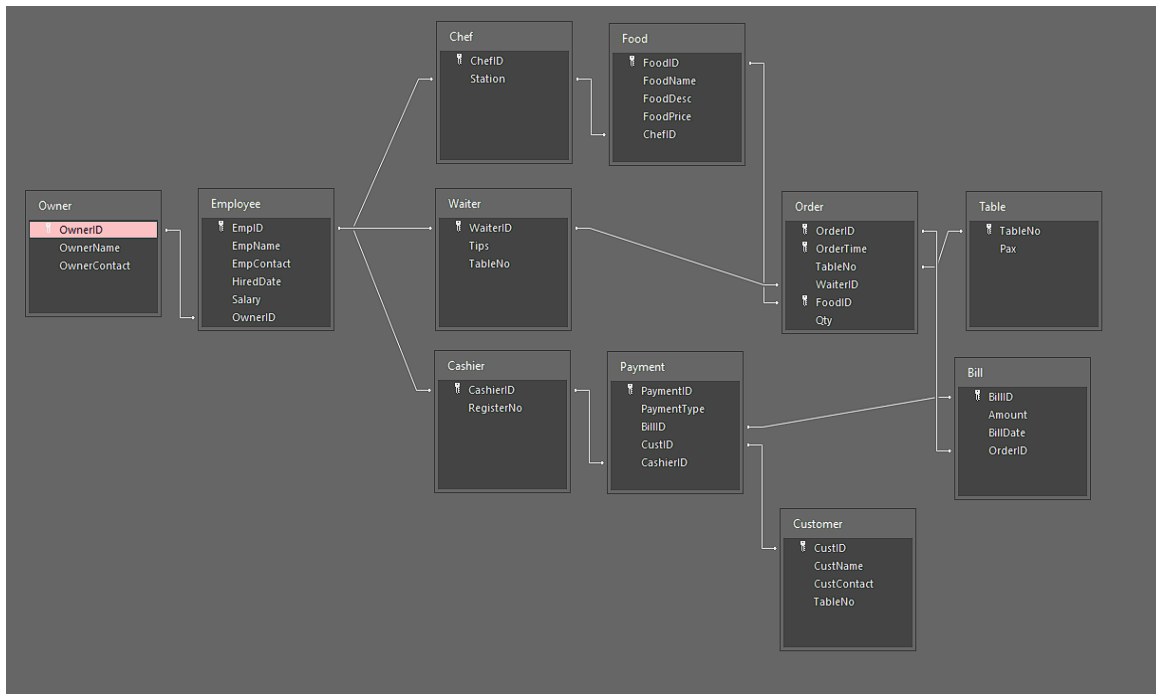


Table Structures(3NF)

With the ER diagram, a third normal form (3NF) relational schema is formed. Each primary key of the relation is underlined while each foreign key of the relation is underlined and italicised.

Restaurant Management System (Database Tables - 3NF)

1. **Owner**(OwnerID, OwnerName, OwnerContact)
2. **Employee**(EmpID, EmpName, EmpContact, HiredDate, Salary, *OwnerID*)
3. **Waiter**(WaiterID, Tips)
4. **Chef**(ChefID, Station)
5. **Cashier**(CashierID, RegisterNo)
6. **Customer**(CustID, CustName, CustContact, *TableNo*)
7. **Tables**(TableNo, Pax, *WaiterID*)
8. **Payment**(PaymentID, PaymentType, *BillID*, *CustID*, *CashierID*)
9. **Bill**(BillID, Amount, BillDate, *OrderID*)
10. **Food**(FoodID, FoodName, FoodDesc, FoodPrice, *ChefID*)
11. **Orders**(OrderID, OrderTime, Qty, *FoodID*, *TableNo*, *WaiterID*)

Screen Captures of Table Designs (Design View & Data)

Owner Table

Owner	
Field Name	Data Type
OwnerID	AutoNumber
OwnerName	Short Text
OwnerContact	Number

Owner Table with data

Owner	
OwnerID	OwnerName
1	John Doe
	98765432

Employee Table

Employee	
Field Name	Data Type
EmpID	AutoNumber
EmpName	Short Text
EmpContact	Number
HiredDate	Date/Time
Salary	Currency
OwnerID	Number

Employee Table with data

Employee						
	EmpID	EmpName	EmpContact	HiredDate	Salary	OwnerID
+	1	Marcus Two	98989898	6/26/2021	\$2,500.00	1
+	2	Jason Tang	97979797	11/14/2021	\$1,000.00	1
+	3	Yanni Lee	90909090	4/1/2021	\$1,020.00	1
+	4	Nur Khalisha	93939393	4/1/2021	\$1,280.50	1
+	5	Yeng Zao	91919191	12/25/2021	\$2,100.00	1
+	6	Tek Hao	96969696	3/25/2021	\$1,300.00	1
+	7	Kit Chan	87878787	3/12/2021	\$2,100.00	1
+	8	Horatio Teo	83838380	1/15/2022	\$2,500.00	1
+	9	Jack Neo	82736452	1/12/2022	\$2,134.00	1
+	10	Grant Kim	89347461	1/21/2022	\$1,234.00	1

Waiter Table

Waiter	
Field Name	Data Type
WaiterID	Number
Tips	Currency
TableNo	Number

Waiter Table with data

Waiter			
	WaiterID	Tips	TableNo
+	2	\$280.00	1
+	3	\$190.00	2
+	4	\$60.00	3
+	10	\$70.00	4

Chef Table

Chef	
Field Name	Data Type
ChefID	Number
Station	Number

Chef Table with data

Chef	
ChefID	Station
1	1
8	2
9	3

Cashier Table

Cashier	
Field Name	Data Type
CashierID	Number
RegisterNo	Number

Cashier Table with data

Cashier	
CashierID	RegisterNo
5	1
6	2
7	3

Customer Table

Customer	
Field Name	Data Type
CustID	AutoNumber
CustName	Short Text
CustContact	Number
TableNo	Number

Customer Table with data

Customer				
	CustID	CustName	CustContact	TableNo
+	1	Tylor Munro	91969760	1
+	2	Ricky Brett	89500193	1
+	3	Emelie Goddard	89394418	1
+	4	Lacy Betts	89045084	1
+	5	Abdullahi Zavala	90030117	2
+	6	Zacharias Forbes	88423661	2
+	7	Rima Mcnamara	89518490	4
+	8	Abdur-Rahman Patrick	89517987	4
+	9	Bertie Nieves	95203816	3
+	10	Shaquille Logan	90404677	3
+	11	Luqman Bruce	80349782	3
+	12	Ayisha Guzman	80208405	2
+	13	Aimee Searle	92688223	1
+	14	Gruffydd Castaneda	80516487	1
+	15	Jamelia Pike	89511519	5
+	16	Yousif Knott	91175699	5
+	17	Mahamed Fellows	89510349	6
+	18	Matteo Dickerson	93354830	6
+	19	Kaidan Haynes	89157149	7
+	20	Ella-Louise Valenzuela	80438934	7

Tables Table

Tables		
	Field Name	Data Type
Key	TableNo	AutoNumber
	Pax	Number

Tables Table with data

Tables		
	TableNo	Pax
+	1	4
+	2	2
+	3	3
+	4	2
+	5	2
+	6	2
+	7	2

Payment Table

Payment		
	Field Name	Data Type
🔑	PaymentID	AutoNumber
	PaymentType	Short Text
	BillID	Number
	CustID	Number
	CashierID	Number

Payment Table with data

Payment					
PaymentID	PaymentType	BillID	CashierID	CustID	
1	Master	1	5	2	
2	Visa	2	5	6	
3	Cash	3	7	8	
4	Cash	4	7	9	
5	Master	5	5	12	
6	Master	6	7	14	
7	Visa	7	6	15	
8	Visa	8	6	17	
9	Cash	9	6	20	

Bill Table

Bill		
	Field Name	Data Type
🔑	BillID	AutoNumber
	Amount	Currency
	BillDate	Date/Time
	OrderID	Number

Bill Table with data

Bill				
	BillID	Amount	BillDate	OrderID
+	1	\$60.00	1/1/2022	1
+	2	\$41.00	1/1/2022	2
+	3	\$20.00	1/1/2022	3
+	4	\$40.00	1/1/2022	4
+	5	\$16.00	1/1/2022	5
+	6	\$12.00	1/1/2022	6
+	7	\$41.00	1/2/2022	7
+	8	\$56.00	1/2/2022	8
+	9	\$32.50	1/2/2022	9

Food Table

Food	
Field Name	Data Type
FoodID	AutoNumber
FoodName	Short Text
FoodDesc	Long Text
FoodPrice	Currency
ChefID	Number

Food Table with data

Food					
	FoodID	FoodName	FoodDesc	FoodPrice	ChefID
+	1	Sirloin Steak	Grilled, succulent Sirloin topped with a dollop of roasted shallot compund butter	\$20.00	1
+	2	Ribeye Steak	Marbled Ribeye, bursting with fresh, grilled flavor	\$25.00	1
+	3	Single Rock Burger	Juicy, Char-Grilled Single Rock Beef Burger	\$10.00	8
+	4	Double Rock Burger	Juicy, Char-Grilled Double Rock Beef Burger	\$13.00	8
+	5	Chicken Chop	Served with grilled potato & beetroot yoghurt slaw	\$10.00	1
+	6	Cheesy Chicken Chop	Grilled Chicken chop topped with melted cheese	\$11.00	1
+	7	Sausage Platter	3 different chicken sausages served with mashed and salad with special spicy mustard	\$7.00	1
+	8	Pilaf Rice	Basmati Rice Pilaf with Dried Fruits and Almonds	\$5.00	8
+	9	Risotto	Italian Arborio rice cooked with grilled mushroom, zucchini, bell peppers and carrots	\$6.00	8
+	10	Seafood Marinara	Seafood Marinara pasta with clams, squid and prawns tossed with tomato and white wine sauce	\$13.00	8
+	11	Carbonara	Rich tangle of pasta with a robust cream sauce of eggs and italian pancetta	\$12.00	8
+	12	Aglio Olio	Spaghetti with slices of fresh chilli, garlic and extra virgin olive oil	\$8.00	8
+	13	Coca Cola	Carbonated, sweetened soft drink	\$3.00	9
+	14	Sprite	Crisp, refreshing and clean tasting	\$3.00	9
+	15	Iced Tea	Light, delicate flavour	\$2.50	9
+	16	Iced Water	Refreshing Cold H2O	\$0.50	9

Orders Table

Orders		
	Field Name	Data Type
🔑	OrderID	Number
🔑	OrderTime	Date/Time
	TableNo	Number
	WaiterID	Number
🔑	FoodID	Number
	Qty	Number

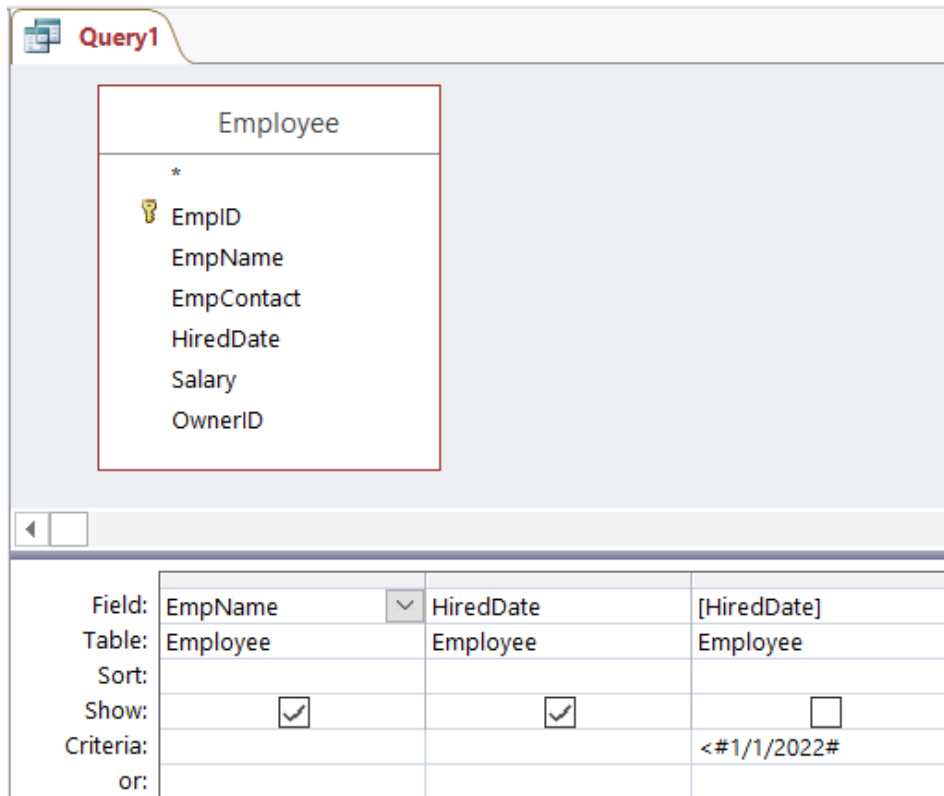
Orders Table with data

Orders						
	OrderID	OrderTime	TableNo	WaiterID	FoodID	Qty
	1	10:40	1	2	1	1
	1	10:40	1	2	2	1
	1	10:40	1	2	3	1
	1	10:40	1	2	4	1
	1	10:41	1	2	13	2
	1	10:41	1	2	14	2
	2	11:00	2	3	1	2
	2	11:00	2	3	16	2
	3	12:01	4	2	11	1
	3	12:01	4	2	12	1
	4	12:01	3	3	1	1
	4	12:01	3	3	3	1
	4	12:01	3	3	5	1
	5	12:03	2	3	4	1
	5	12:03	2	3	14	1
	6	12:05	1	2	9	2
	7	17:03	5	10	1	2
	7	17:03	5	10	16	2
	8	17:40	6	4	2	2
	8	17:40	6	4	13	2
	9	18:00	7	10	10	2
	9	18:00	7	10	14	2
	9	18:20	7	4	16	1

Screen Captures of Queries (Design View & Results)

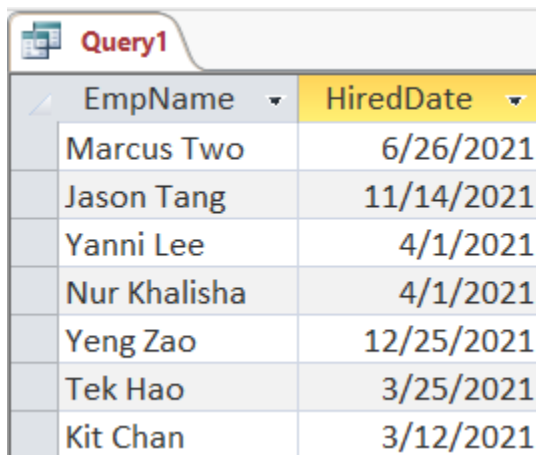
Scenario 1: Finding employee that was hired before a particular date

Query Design View



Field:	EmpName	HiredDate	[HiredDate]
Table:	Employee	Employee	Employee
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:			<#1/1/2022#
or:			

Results:



EmpName	HiredDate
Marcus Two	6/26/2021
Jason Tang	11/14/2021
Yanni Lee	4/1/2021
Nur Khalisha	4/1/2021
Yeng Zao	12/25/2021
Tek Hao	3/25/2021
Kit Chan	3/12/2021

Scenario 2: Retrieve foods that costs under 10 dollars

Query Design View

Query2

FOOD

*

FoodID

FoodName

FoodDesc

FoodPrice

ChefID

Field:	FoodID	FoodName	FoodPrice	[Foodprice]
Table:	FOOD	FOOD	FOOD	FOOD
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:				<10
or:				

Results:

Query2

FoodID	FoodName	FoodPrice
7	Sausage Platter	\$7.00
8	Pilaf Rice	\$5.00
9	Risotto	\$6.00
12	Aglio Olio	\$8.00
13	Coca Cola	\$3.00
14	Sprite	\$3.00
15	Iced Tea	\$2.50
16	Iced Water	\$0.50

Scenario 3: Find out how many tables with maximum 4 pax

Query Design View

Query3

TABLES

*

TableNo

Pax

Field:	TableNo	Pax	[Pax]
Table:	TABLES	TABLES	TABLES
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:			4
or:			

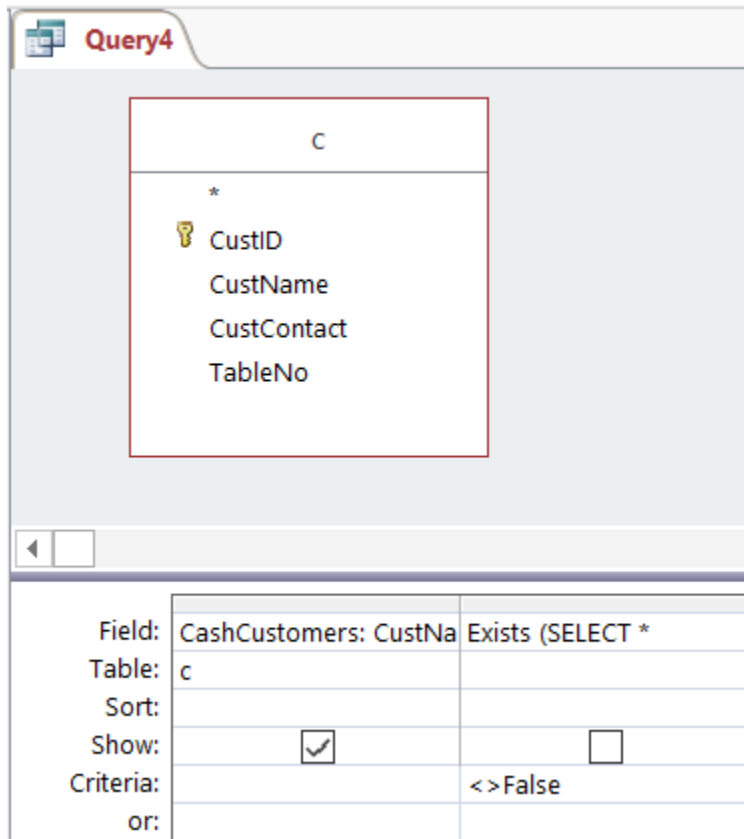
Results:

Query3


TableNo	Pax
1	4

Scenario 4: Find all customers who paid in cash

Query Design View

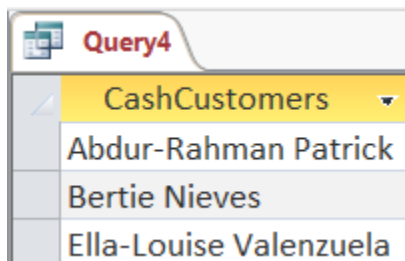


Query4

c	
*	
	CustID
	CustName
	CustContact
	TableNo

Field:	CashCustomers: CustNa	Exists (SELECT *
Table:	c	
Sort:		
Show:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:		<>False
or:		

Results:



CashCustomers
Abdur-Rahman Patrick
Bertie Nieves
Ella-Louise Valenzuela

Scenario 5: Which waiter earn the most tips

Query Design View

Query5

e

*

EmpID

EmpName

EmpContact

HiredDate

Salary

OwnerID

w

*

WaiterID

Tips

TableNo

Field:	EmpName	Tips	[Tips]
Table:	e	w	w
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:			(SELECT MAX(Tips) FROM WAITER
or:			

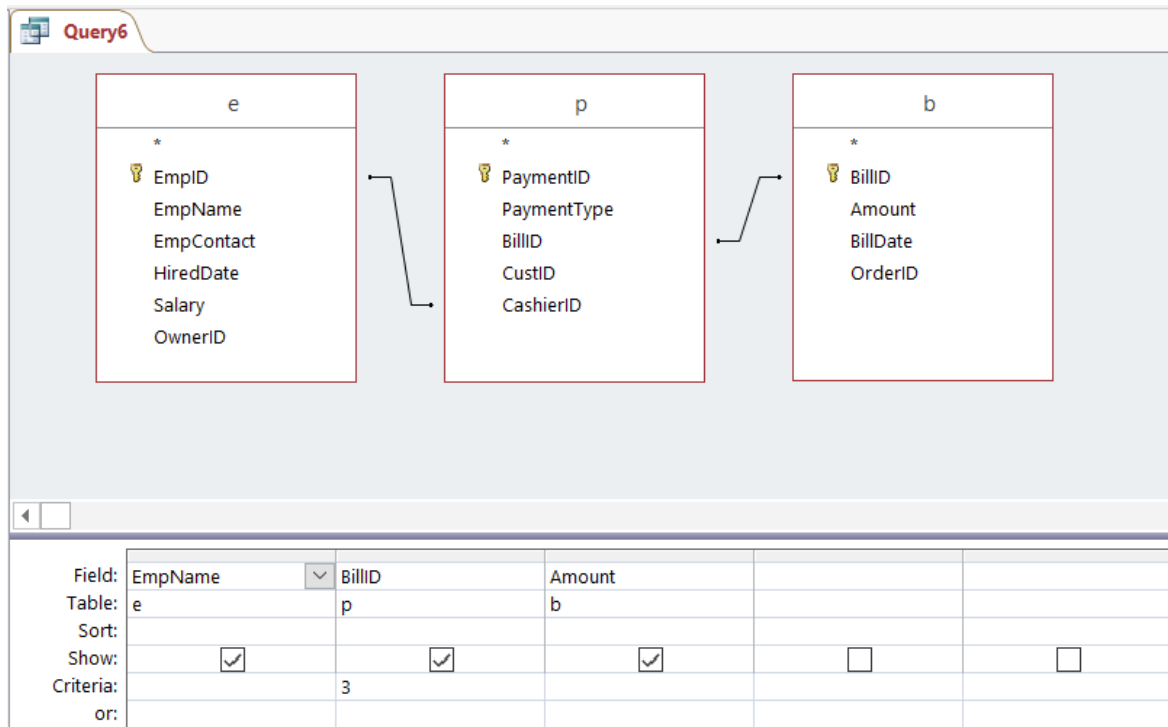
Results:

Query5

EmpName	Tips
Jason Tang	\$280.00

Scenario 6: There is a discrepancy in a bill, find the employee accountable for this

Query Design View



Results:

Query6		
EmpName	BillID	Amount
Kit Chan	3	\$20.00

Scenario 7: What is the most popular item on the menu?

Query Design View

Query7

\$\$\$@_Alias

*

FoodID
name
quantity

Field:		
Table:		
Sort:		
Show:	<input type="checkbox"/>	<input type="checkbox"/>
Criteria:		
or:		

Results:

Query7		
FoodID	name	quantity
1	Sirloin Steak	6

Scenario 8: List customers who ordered food over 30 dollars in total

Query Design View

Query8

CUSTOMER

*

🔑 CustID
CustName
CustContact
TableNo

Field:	CUSTName	[CustID]
Table:	CUSTOMER	CUSTOMER
Sort:		
Show:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:		In (SELECT CustID
or:		

Query9

c

*

🔑 CustID
CustName
CustContact
TableNo

p

*

🔑 PaymentID
PaymentType
BillID
CustID
CashierID

b

*

🔑 BillID
Amount
BillDate
OrderID

Field:	CustName	Amount			
Table:	c	b			
Sort:					
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria:		> 30			
or:					

Results:

Query8	
CUSTName	
Ricky Brett	
Zacharias Forbes	
Bertie Nieves	
Jamelia Pike	
Mahamed Fellows	
Ella-Louise Valenzuela	

Query9	
CustName	Amount
Ricky Brett	\$60.00
Zacharias Forbes	\$41.00
Bertie Nieves	\$40.00
Jamelia Pike	\$41.00
Mahamed Fellows	\$56.00
Ella-Louise Valenzuela	\$32.50

Screen Captures of Forms for Data Entry (Design View & Data Entry View)

The Form Data Entry view allows us to insert a new entry easily, for e.g. Inserting new entry into Employee table:

Employee Table Design View

Form Header	
Employee	

Detail	
EmpID	EmpID
EmpName	EmpName
EmpContact	EmpContact
HiredDate	HiredDate
Salary	Salary
OwnerID	OwnerID

Form Footer	

Employee Table Data Entry View

EmpID	(New)
EmpName	
EmpContact	0
HiredDate	
Salary	\$0.00
OwnerID	0

Employee X Employee X

Employee

EmpID 12

EmpName Garry Long

EmpContact 98785458

HiredDate 22/2/2022

Salary \$2,222.00

OwnerID 1

Record: 12 of 12 No Filter Search

Updated Employees Table:

	EmpID	EmpName	EmpContact	HiredDate	Salary	OwnerID	Click to Add
+	1	Marcus Two	98989898	26/6/2021	\$2,500.00	1	
+	2	Jason Tang	97979797	14/11/2021	\$1,000.00	1	
+	3	Yanni Lee	90909090	1/4/2021	\$1,020.00	1	
+	4	Nur Khalisha	93939393	1/4/2021	\$1,280.50	1	
+	5	Yeng Zao	91919191	25/12/2021	\$2,100.00	1	
+	6	Tek Hao	96969696	25/3/2021	\$1,300.00	1	
+	7	Kit Chan	87878787	12/3/2021	\$2,100.00	1	
+	8	Horatio Teo	83838380	15/1/2022	\$2,500.00	1	
+	9	Jack Neo	82736452	12/1/2022	\$2,134.00	1	
+	10	Grant Kim	89347461	21/1/2022	\$1,234.00	1	
+	11	Henry Kart	90120394	3/1/2022	\$1,110.00	1	
+	12	Garry Long	98785458	22/2/2022	\$2,222.00	1	
*	(New)		0		\$0.00	0	

Screen Captures of Access Reports (Design View & Report Results)

Owner Table Design View

This screenshot shows the design view of an Access report for the 'Owner' table. The report is organized into sections: Report Header, Page Header, Detail, Page Footer, and Report Footer. The Report Header section contains a title 'Owner' and two date/time fields. The Page Header section contains three fields: OwnerID, OwnerName, and OwnerContact. The Detail section contains three fields: OwnerID, OwnerName, and OwnerContact. The Page Footer section contains a page number and total page count. The Report Footer section contains a count of records.

Report Header							
Owner						=Date()	
						=Time()	
Page Header							
OwnerID	OwnerName		OwnerContact				
Detail							
OwnerID	OwnerName		OwnerContact				
Page Footer							
						=Page & [Page] & of & [Pages]	
Report Footer							
=Count(*)							

Owner Table Report Results

This screenshot shows the results of the 'Owner' report. The report displays a single record for 'John Doe' with OwnerID 1 and OwnerContact 98765432. The report is titled 'Owner'.

OwnerID	OwnerName	OwnerContact
1	John Doe	98765432

Employee Table Design View

This screenshot shows the design view of an Access report for the 'Employee' table. The report is organized into sections: Report Header, Page Header, Detail, Page Footer, and Report Footer. The Report Header section contains a title 'Employee' and two date/time fields. The Page Header section contains six fields: EmpID, EmpName, EmpContact, HiredDate, Salary, and OwnerID. The Detail section contains six fields: EmpID, EmpName, EmpContact, HiredDate, Salary, and OwnerID. The Page Footer section contains a page number and total page count. The Report Footer section contains a sum of salaries.

Report Header							
Employee						=Date()	
						=Time()	
Page Header							
EmpID	EmpName		EmpContact	HiredDate	Salary	OwnerID	
Detail							
EmpID	EmpName		EmpContact	HiredDate	Salary	OwnerID	
Page Footer							
						=Page & [Page] & of & [Pages]	
Report Footer							
						=Sum([Salary])	

Employee					
EmpID	EmpName	EmpContact	HiredDate	Salary	OwnerID
1	Marcus Two	98989898	26/6/2021	\$2,500.00	1
2	Jason Tang	97979797	14/11/2021	\$1,000.00	1
3	Yanni Lee	90909090	1/4/2021	\$1,020.00	1
4	Nur Khalisha	93939393	1/4/2021	\$1,280.50	1
5	Yeng Zao	91919191	25/12/2021	\$2,100.00	1
6	Tek Hao	96969696	25/3/2021	\$1,300.00	1
7	Kit Chan	87878787	12/3/2021	\$2,100.00	1
8	Horatio Teo	83838380	15/1/2022	\$2,500.00	1
9	Jack Neo	82736452	12/1/2022	\$2,134.00	1
10	Grant Kim	89347461	21/1/2022	\$1,234.00	1

The screenshot shows the Microsoft Access design grid for a report named 'Cashier'. The grid is organized into sections: Report Header, Page Header, Detail, Page Footer, and Report Footer. The Report Header section contains two rows: the first row has a green square icon and the text 'Cashier', and the second row has the text '-Date()' and '-Time()'. The Page Header section contains one row with two columns: 'CashierID' and 'RegisterNo'. The Detail section contains one row with two columns: 'CashierID' and 'RegisterNo'. The Page Footer section contains one row with two columns: '=Page & [Page] & of ' & [Pages]' and an empty cell. The Report Footer section contains one row with one column: '=Count(*)'. The design grid is shown with a grid of dots and a grid of lines. The 'Cashier' report is highlighted with an orange border.

Cashier	
CashierID	RegisterNo
5	1
6	2
7	3

Chef Table Design View

The screenshot shows the design view of a table named 'Chef'. The design grid is organized into three main sections: Form Header, Detail, and Form Footer. The Form Header section contains a single column with the label 'Chef'. The Detail section contains two columns: 'ChefID' and 'Station'. The Form Footer section is currently empty. The 'Chef' label in the Form Header is highlighted with an orange border.

Chef Table Report Results

Chef	
ChefID	Station
1	1
8	2
9	3

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Payment Table Design View

The screenshot shows the design view of a report named 'Payment'. The design grid is organized into five main sections: Report Header, Page Header, Detail, Page Footer, and Report Footer. The Report Header section contains a single column with the label 'Payment'. The Page Header section contains five columns: 'PaymentID', 'PaymentType', 'BillID', 'CustID', and 'CashierID'. The Detail section contains five columns: 'PaymentID', 'PaymentType', 'BillID', 'CustID', and 'CashierID'. The Page Footer section contains a single column with the formula 'Page & [Page] of & [Pages]'. The Report Footer section contains a single column with the formula '=Count(*)'. The 'Payment' label in the Report Header is highlighted with an orange border.

Payment Table Report Results

Payment				
PaymentID	PaymentType	BillID	CustID	CashierID
1	Master	1	2	5
2	Visa	2	6	5
3	Cash	3	8	7
4	Cash	4	9	7
5	Master	5	12	5
6	Master	6	14	7
7	Visa	7	15	6
8	Visa	8	17	6
9	Cash	9	20	6

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Tables Table Design View

Tables							
Report Header							
Tables							=Date()
							=Time()
Page Header							
TableNo	Pax						
Detail							
TableNo	Pax						
Page Footer							
			=Page & [Page] of & [Pages]				
Report Footer							
=Count(*)							

Tables Table Report Results

Tables	
TableNo	Pax
1	4
2	2
3	3
4	2
5	2
6	2
7	2

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Waiter Table Design View

The screenshot shows the design view of a table named 'Waiter'. The design grid is organized into sections: Form Header, Detail, and Form Footer. The Form Header section contains a label 'Waiter'. The Detail section contains three fields: WaiterID, Tips, and TableNo. The WaiterID field is highlighted with an orange border.

Waiter Table Report Results

Waiter		
WaiterID	Tips	TableNo
2	\$280.00	1
3	\$190.00	2
4	\$60.00	3
10	\$70.00	4

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Food Table Design View

The screenshot shows the design view of a table named 'Food'. The design grid is organized into sections: Form Header, Detail, and Form Footer. The Form Header section contains a label 'Food'. The Detail section contains five fields: FoodID, FoodName, FoodDesc, FoodPrice, and ChefID. The FoodID field is highlighted with an orange border.

Food Table Report Results

Food			
FoodID	FoodName	FoodPrice	ChefID FoodDesc
1	Sirloin Steak	\$20.00	1 Grilled, succulent Sirloin topped with a dollop of roasted shallot compound butter
2	Ribeye Steak	\$25.00	1 Marbled Ribeye, bursting with fresh, grilled flavor
3	Single Rock Burger	\$10.00	8 Juicy, Char-Grilled Single Rock Beef Burger
4	Double Rock Burger	\$13.00	8 Juicy, Char-Grilled Double Rock Beef Burger
5	Chicken Chop	\$10.00	1 Served with grilled potato & beetroot yoghurt slaw
6	Cheesy Chicken Chop	\$11.00	1 Grilled Chicken chop topped with melted cheese
7	Sausage Platter	\$7.00	1 3 different chicken sausages served with mashed and salad with special spicy mustard
8	Pilaf Rice	\$5.00	8 Basmati Rice Pilaf with Dried Fruits and Almonds
9	Risotto	\$6.00	8 Italian Arborio rice cooked with grilled mushroom, zucchini, bell peppers and carrots
10	Seafood Marinara	\$13.00	8 Seafood Marinara pasta with clams, squid and prawns tossed with tomato and white wine sauce
11	Carbonara	\$12.00	8 Rich tangle of pasta with a robust cream sauce of eggs and italian pancetta
12	Agllo Olio	\$8.00	8 Spaghetti with slices of fresh chilli, garlic and extra virgin olive oil
13	Coca Cola	\$3.00	9 Carbonated, sweetened soft drink
14	Sprite	\$3.00	9 Crisp, refreshing and clean tasting
15	Iced Tea	\$2.50	9 Light, delicate flavour
16	Iced Water	\$0.50	9 Refreshing Cold H2O

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Customers Table Design View

The screenshot displays the 'Customers' table design view. The design grid is organized into sections: Form Header, Detail, and Form Footer. The 'Form Header' section contains a label 'Customer'. The 'Detail' section contains four fields: CustID, CustName, CustContact, and TableNo. The 'Form Footer' section is currently empty.

Section	Field Name	Field Type
Form Header	Customer	Text
Detail	CustID	Text
Detail	CustName	Text
Detail	CustContact	Text
Detail	TableNo	Text
Form Footer		


Customers Table Report Results

Customer			
CustID	CustName	CustContact	TableNo
1	Tylor Munro	91969760	1
2	Ricky Brett	89500193	1
3	Emelle Goddard	89394418	1
4	Lacy Betts	89045084	1
5	Abdullahi Zavala	90030117	2
6	Zacharias Forbes	88423661	2
7	Rima Mcnamara	89518490	4
8	Abdur-Rahman Patrick	89517987	4
9	Bertie Nieves	95203816	3
10	Shaquille Logan	90404677	3
11	Luqman Bruce	80349782	3
12	Ayisha Guzman	80208405	2
13	Aimee Searle	92688223	1
14	Gruffydd Castaneda	80516487	1
15	Jamelia Pike	89511519	5
16	Yousif Knott	91175699	5
17	Mahamed Fellows	89510349	6
18	Matteo Dickerson	93354830	6
19	Kaidan Haynes	89157149	7
20	Ella-Louise Valenzuela	80438934	7

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Bill Table Design View

Report Header																			
	Bill																	=Date()	
																		=Time()	
Page Header																			
BillID		Amount		BillDate		OrderID													
Detail																			
BillID		Amount		BillDate		OrderID													
Page Footer																			
																		= "Page " & [Page] & " of " & [Pages]	
Report Footer																			
																		=Sum([Amount])	

Bill Table Report Results

Bill			
BillID	Amount	BillDate	OrderID
1	\$60.00	1/1/2022	1
2	\$41.00	1/1/2022	2
3	\$20.00	1/1/2022	3
4	\$40.00	1/1/2022	4
5	\$16.00	1/1/2022	5
6	\$12.00	1/1/2022	6
7	\$41.00	2/1/2022	7
8	\$56.00	2/1/2022	8
9	\$32.50	2/1/2022	9

Orders Table Design View

Report Header													
	Orders											=Date()	
												=Time()	
Page Header													
OrderID		OrderTime		TableNo		WaiterID		FoodID		Qty			
Detail													
OrderID		OrderTime		TableNo		WaiterID		FoodID		Qty			
Page Footer													
								= "Page " & [Page] & " of " & [Pages]					
Report Footer													
=Count(*)													

Orders Table Report Results

Orders						
OrderID	OrderTime	TableNo	WaiterID	FoodID	Qty	
1	10:40	1	2	1	1	
1	10:40	1	2	2	1	
1	10:40	1	2	3	1	
1	10:40	1	2	4	1	
1	10:41	1	2	13	2	
1	10:41	1	2	14	2	
2	11:00	2	3	1	2	
2	11:00	2	3	16	2	
3	12:01	4	2	11	1	
3	12:01	4	2	12	1	
4	12:01	3	3	3	1	
4	12:01	3	3	5	1	
4	12:01	3	3	1	1	
5	12:03	2	3	14	1	
5	12:03	2	3	4	1	
6	12:05	1	2	9	2	
7	17:03	5	10	1	2	
7	17:03	5	10	16	2	
8	17:40	6	4	13	2	
8	17:40	6	4	2	2	
9	18:00	7	10	10	2	
9	18:00	7	10	14	2	
9	18:20	7	4	16	1	

Database Integration

Database integration refers to combining information from 2 or more databases for a consolidated view. This makes the information more accessible, and users can easily edit data without the need to duplicate or move data around.

However, DBMS teams face several challenges:

- Growing complexity in the system
- Data security
- Limits on scalability

The growing complexity in the system stems from the ever-evolving database market, this results in the difficulty to evaluate and choose a specific type of database. Data security is important especially in a corporate setting, without the prevention of data loss through unauthorized access, damages such as financial loss and damage of reputation would occur. Limits on scalability refers to the limitation of the database servers as the data capacity increases, in order to support the changing usage of the application.

Our Approach

In the case the business expands into multiple branches, we may introduce Database Integration which refers to the process of combining data from different sources into a single unified view.

Without data integration, we would have no way of accessing the data gathered in one system in another. Manually synchronizing massive amounts of data with high variability generated from various sources may compromise the integrity of the data.

There can be a single database (for e.g Sales) that contains multiple databases from each different restaurant. This allows the enterprise to systematically consolidate data from a variety of sources. The integration of data allows the analytics tools to produce actionable insights and business intelligence. This reduces delay and data refreshness (the time in which an update occurs when information is changed in the database).

Our approach manages database growth well as it allows quick retiring of old or unnecessary data, by only keeping essential data in the database this keeps the database input to a bare minimum. In a smaller database, queries will execute much faster, as demonstrated by the fact that our database currently executes each query less than 1 seconds. As a result, we can conclude that the database is efficient, cost-effective, and practical.