**MIST 4610 Project #1**
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Problem Statement:

- This project is a mock representation of abridged data from the top 20 malls in the United States. These malls boast several restaurants in the mall food court, but as less people are interested in shopping at the mall, less people are interested in working at the mall. The restaurants are now understaffed.
- Entities: Mall, Restaurant, Employee, Shift, Customer, Order

Data Model:
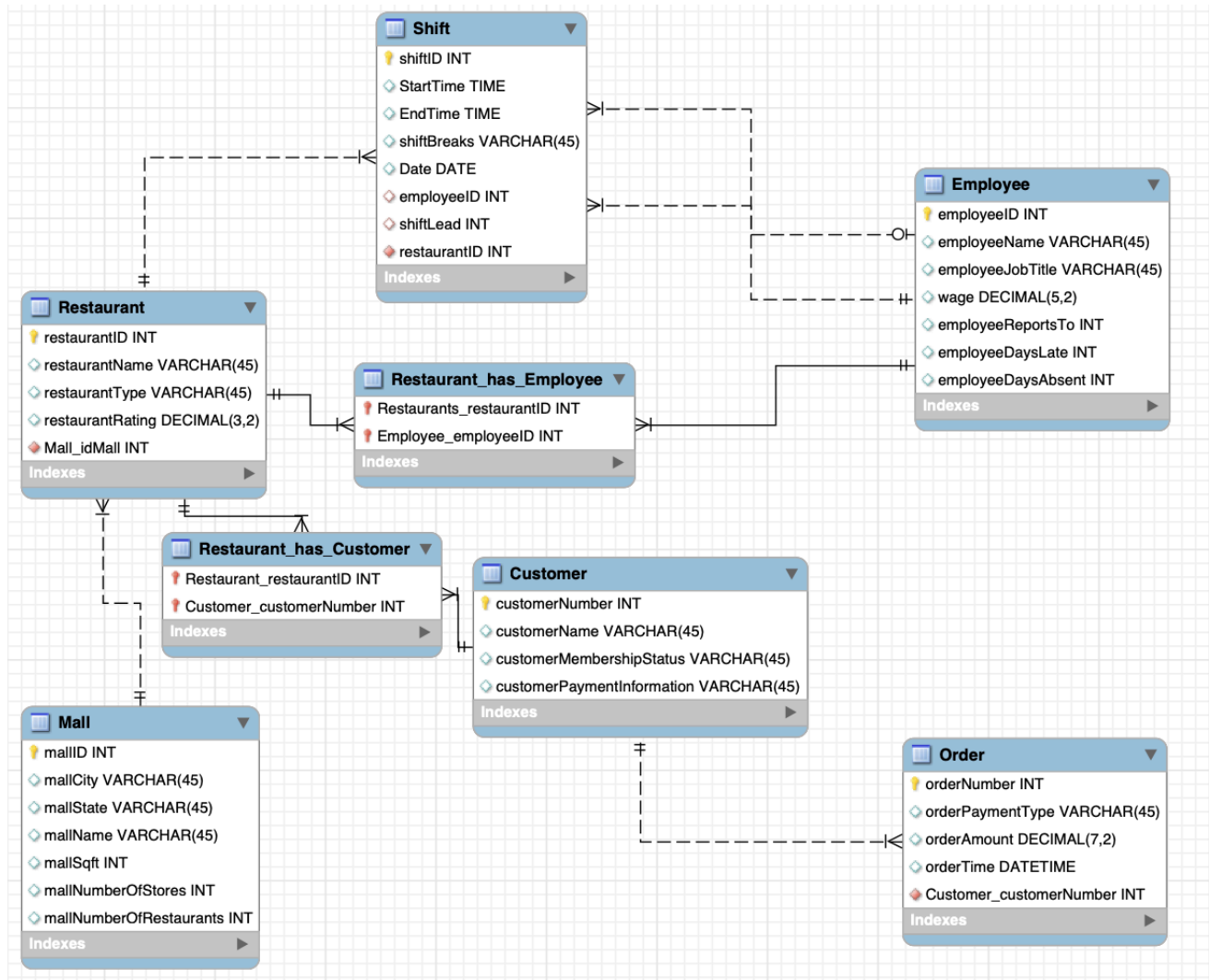
Data Dictionary:

Table: Customer

Column Name	Description	Data Type	Size	Format	Key?
customerNumber	Number that is unique to each customer	INT			PK
customerName	Full name	VARCHAR	45		
customerMembershipStatus	Status of membership	VARCHAR	45		
customerPaymentInformation	Payment info customer uses	VARCHAR	45		

Table: Restaurant

Column Name	Description	Data Type	Size	Format	Key?
restaurantID	Number that is unique to each restaurant	INT			PK
restaurantName	Name of the restaurant	VARCHAR	45		
restaurantType	Type of restaurant (cuisine)	VARCHAR	45		
restaurantRating	Restaurant's rating	DECIMAL	2.2		
Mall_idMall	Number that is unique to each mall	INT			FK (part of Mall table)

Table: Shifts

Column Name	Description	Data Type	Size	Format	Key?
shiftID	Number that is unique to each shift	INT			PK
StartTime	Time shift starts	TIME			
EndTime	Time shift ends	TIME			
shiftBreaks	Time taken as a break during shifts	VARCHAR	45		
Date	Date of the shift	DATE			
Employee_employeeID	Number that is unique to each restaurant	INT			
shiftLead	Leader of each shift (shift manager)	INT			
Restaurants_idRestaurants	Number that is unique to each restaurant	INT			FK (part of Restaurants table)

Table: Employee

Column Name	Description	Data Type	Size	Format	Key?
employeeID	Number that is unique to each employee	INT			PK
employeeName	Name of the employee	VARCHAR	45		
employeeJobTitle	Employee's job title	VARCHAR	45		
employeeWage	Employee's wage	DECIMAL	5.2		
employeeReportsTo	The person each employee reports to (nobody if it's the boss)	INT			
employeeDaysLate	Amount of days an employee is late	INT			
employeeDaysAbsent	Amount of days an employee is absent	INT			

Table: Mall

Column Name	Description	Data Type	Size	Format	Key?
mallID	Number that is unique to each mall	INT			PK
mallCity	City in which mall is located	VARCHAR	45		
mallState	State in which mall is located	VARCHAR	45		
mallCountry	Country in which mall is located	VARCHAR	45		
mallSqft	Size of the mall in square feet	INT			
mallNumberofStores	Number of stores in each mall	INT			
mallNumberofRestaurants	Number of restaurants in each mall	INT			

Table: Orders

Column Name	Description	Data Type	Size	Format	Key?
orderNumber	Number that is unique to each order	INT			PK
orderPaymentType	Payment type of each order, (credit card, debit card, cash, etc.)	VARCHAR	45		
orderAmount	Amount in USD ($) of the order	DECIMAL	7.2		
orderTime	Date and time the order is placed	DATETIME			
Customer_customerNumber	Number that is unique to each customer	INT			FK (part of Customers table)

SQL Queries & Justifications:

1. <u>List out all the shifts that do not currently have an employee assigned.</u>
   Knowing which shifts have no employees assigned is valuable for the restaurant in several ways. It can provide insight into which shifts are not covered, how many more employees need to be hired, and so on.

   ```
   USE ns_4610Su23Group_2
   CREATE PROCEDURE TP_Q1()
   SELECT *
   FROM Shift
   WHERE Shift.employeeID IS NULL;
   CALL TP_Q1();
   ```

shiftID	StartTime	EndTime	shiftBreaks	Date	employeeID	shiftLead	restaurantID
19480	15:00:00	22:00:00	1	2023-06-26	NULL	1015	830
29569	19:40:00	22:00:00	0	2023-06-26	NULL	1015	830
63058	15:00:00	22:00:00	1	2023-06-26	NULL	1014	830
69839	13:00:00	22:00:00	1	2023-06-26	NULL	1014	830

2. <u>List the employees that have an average difference between start time and end time less than 4 hours.</u>
    It is important to understand the average duration of shifts. This will show which employees are being underutilized and could be staffed to more shifts.

```
CREATE PROCEDURE TP_Q2()
SELECT Employee.employeeID, Employee.employeeName
FROM Employee
INNER JOIN Shift ON Employee.employeeID = Shift.employeeID
GROUP BY Employee.employeeID, Employee.employeeName
HAVING AVG((Shift.startTime - Shift.endTime)) < 4;
CALL TP_Q2();
```

employeeID	employeeName
1003	David Brown
1002	Emily Davis
1005	Daniel Wilson
1008	Noah Garcia
1012	Shreeya Chalasani
1004	Jennifer Rodriguez
1013	Nikhil Srini
1011	Sejal Khanna
1007	Sophia Martinez

3. <u>List out the names of customers and corresponding order times that spend greater than the average amount of orders. Order the results by descending amount.</u>
   It is important to know when customers are spending the most money in terms of their orders. This allows the restaurants to better identify busier hours of the day to schedule current employees accordingly. They can also seek new employees who are available during these hours.

   ```
   CREATE PROCEDURE TP_Q3()
   SELECT Customer.customerName, `Order`.orderTime
   FROM Customer
   INNER JOIN `Order` ON Customer.customerNumber =
   `Order`.Customer_customerNumber
   WHERE `Order`.orderAmount > (SELECT AVG(orderAmount) FROM `Order`)
   ORDER BY `Order`.orderAmount DESC;
   CALL TP_Q3();
   ```

customerName	orderTime	
Michael Martinez	2023-06-26 17:03:34	
William Baker	2023-06-26 18:06:37	
Samantha Johnson	2023-06-26 19:06:34	

4. <u>List all the shift leads that have more than 3 employees reporting to them.</u>
   Knowing which shift leads are taking on more managerial responsibilities is valuable for several reasons. First, these shift leads should receive special training than those who may oversee just one or two employees. Next, they should also be observed closely to ensure they are conveying the right values and instructions to those working alongside them. Finally, they should be observed carefully in consideration for a promotion or bonus.

   ```
   CREATE PROCEDURE TP_Q4()
   SELECT sup.employeeName, COUNT(sub.employeeID)
   FROM Employee as sup
   JOIN Employee as sub ON sup.employeeID = sub.employeeReportsTo
   WHERE sup.employeeJobTitle REGEXP "Shift Lead"
   GROUP BY sup.employeeName;
   CALL TP_Q4();
   ```

employeeName	COUNT(sub.employeeI...	
▶ Emily Davis	11	
Savannah Schiengel	2	
Marie Boudreau	1	

5. <u>List the employee names and job titles if the employee is absent more than 5 days.</u>
   It is important to know which employees are absent more than 5 days and violating the common attendance policy. These employees should be looped in for a serious conversation to reassess their attendance and either improve it or be terminated so that more reliable, efficient employees can be hired instead.

CREATE PROCEDURE TP_Q5()
SELECT Employee.employeeName, Employee.employeejobTitle,
Employee.employeeDaysAbsent
FROM Employee
GROUP BY Employee.employeeName, Employee.employeejobTitle,
Employee.employeeDaysAbsent
HAVING (Employee.employeeDaysAbsent) > 5;
CALL TP_Q5();

employeeName	employeejobTi...	employeeDaysAbse...
Jennifer Rodriguez	Sales Associate	7
Noah Garcia	Sales Associate	8
Sejal Khanna	Sales Associate	9
Lauren Toms	Sales Associate	10

6. <u>List the average employee wage by the restaurant.</u>
   The average employee wage by restaurant is valuable information to assess the "market rate". It can also help applicants seeking a job be mindful about which restaurants they apply to in terms of competitive pay.

CREATE PROCEDURE TP_Q6()
SELECT Restaurant.restaurantName, AVG(wage) AS "Average Wage"
FROM Employee
JOIN Shift ON Employee.employeeID = Shift.employeeID
JOIN Restaurant ON Shift.RestaurantID = Restaurant.RestaurantID
GROUP BY Restaurant.restaurantName;
CALL TP_Q6();

restaurantName	Average Wage
Vegan Garden	11.000000
Big Bowl	10.750000
The Savory Bistro	11.000000

7. <u>List the number of orders placed by customers and the total value of orders by each restaurant's name. Order the results by descending order amount.</u>
   It is important to know which restaurants are generating less revenue. This may allow managers to relocate employees from less busy restaurants to more busy ones.

   CREATE PROCEDURE TP_Q7()
   SELECT Restaurant.restaurantName, COUNT(`Order`.orderNumber),
   Customer.customerName, SUM(orderAmount) as TotalAmount
   FROM Restaurant
   JOIN Restaurant_has_Customer ON Restaurant.restaurantID =
   Restaurant_has_Customer.Restaurant_restaurantID
   JOIN Customer ON Restaurant_has_Customer.Customer_customerNumber =
   Customer.customerNumber
   JOIN `Order` ON Customer.customerNumber = `Order`.Customer_customerNumber
   GROUP BY Restaurant.restaurantName, Customer.customerName
   ORDER BY TotalAmount DESC;
   CALL TP_Q7();

restaurantName	COUNT(`Order`.orderNum...	customerName	TotalAmount
The Savory Bistro	4	Michael Martinez	320.08
Big Bowl	4	Michael Martinez	320.08
Big Bowl	3	William Baker	201.73
Vegan Garden	3	Samantha Johnson	141.85
Vegan Garden	1	Harper Hall	NULL
Big Bowl	1	Benjamin Wright	NULL
Big Bowl	1	Charlotte Clark	NULL
Big Bowl	1	Alexander Young	NULL

8. <u>List the names of all the employees that work in a vegan Restaurant.</u>
Some employees have a preference of where they work based on religion, dietary restrictions, and so on. Knowing which employees work in vegan restaurants is important so that they do not get restaffed to a restaurant where they may have to cook with meat or other animal products.

CREATE PROCEDURE TP_Q8()
SELECT Employee.employeeName
FROM Employee
JOIN Restaurant_has_Employee ON Employee.employeeID = Restaurant_has_Employee.Employee_employeeID
JOIN Restaurant ON Restaurant_has_Employee.Restaurants_restaurantID = Restaurant.restaurantID
WHERE Restaurant.restaurantType = "Vegan";
CALL TP_Q8();

employeeName	
Daniel Wilson	
Ethan Johnson	
Sophia Martinez	
Noah Garcia	
Olivia Thompson	
Daniel Thompson	
Sejal Khanna	
Shreeya Chalasani	
Nikhil Srini	
Savannah Schiengel	
John Calhoun	

9. <u>List the names of the customer(s) who placed the highest number of orders.</u>
   It is important to know which customers are regulars to make them feel special so that
   they continue to visit the mall and its food court.

   ```
   CREATE PROCEDURE TP_Q9()
   SELECT Customer.customerName
   FROM Customer
   JOIN `Order` ON Customer.customerNumber = `Order`.Customer_customerNumber
   GROUP BY Customer.customerName
   HAVING COUNT(`Order`.orderNumber) = (
           SELECT COUNT(`Order`.orderNumber)
      FROM `Order`
      GROUP BY `Order`.Customer_customerNumber
      ORDER BY COUNT(`Order`.orderNumber) DESC
      LIMIT 1
      );
   CALL TP_Q9();
   ```

customerName	
▶ Michael Martinez	

10. <u>List out the names of customers that have not placed any orders in the last 6 months.</u>
    It is important to know which customers have not placed any orders in the last 6 months
    for several reasons. For example, restaurant managers can reach out to them for feedback
    about why they stopped visiting the food court and what would make them come back.
    Also, they can send reminders and special promotion codes to bring people back in.

    ```
    CREATE PROCEDURE TP_Q10()
    SELECT Customer.customerName
    FROM Customer
    JOIN `Order` ON Customer.customerNumber = `Order`.Customer_customerNumber
    WHERE `Order`.orderTime IS NULL OR `Order`.orderTime <=
    DATE_SUB(CURDATE(), INTERVAL 6 MONTH);
    CALL TP_Q10();
    ```

customerName	
▶ Harper Hall	
Benjamin Wright	
James Campbell	
Amelia Reed	
Matthew Scott	
Charlotte Clark	
Alexander Young	

11. <u>List out all employees that have at least one absence.</u>
    It is important to know which employees have at least one absence so they can be warned
    about the potential consequences of more absences.

    CREATE PROCEDURE TP_Q11()
    SELECT Employee.employeeID, Employee.employeeName,
    Employee.employeeDaysAbsent
    FROM Employee
    WHERE Employee.employeeDaysAbsent >= 1
    GROUP BY Employee.employeeID, Employee.employeeName,
    Employee.employeeDaysAbsent;
    CALL TP_Q11();

employeeID	employeeName	employeeDaysAbse...	
▶ 1001	John Smith	1	
1002	Emily Davis	1	
1003	David Brown	2	
1004	Jennifer Rodriguez	7	
1005	Daniel Wilson	1	
1006	Ethan Johnson	1	
1008	Noah Garcia	8	
1009	Olivia Thompson	1	
1011	Sejal Khanna	9	
1012	Shreeya Chalasani	1	
1013	Nikhil Srini	1	
1014	Savannah Schien...	1	
1015	Marie Boudreau	1	
1016	John Calhoun	4	
1017	Mary Claire Toms	3	
1018	Lauren Toms	10	
NULL	NULL	NULL	

12. <u>Find those orders where the amount spent is greater than the average for that restaurant.</u>
Understanding which orders were rather large or expensive can help the restaurants better cater to their customers and train employees accordingly.

```
CREATE PROCEDURE TP_Q12()
SELECT r.restaurantName, o.orderAmount AS amountSpent
FROM `Order` o
JOIN Customer c on c.customerNumber = o.Customer_customerNumber
JOIN Restaurant_has_Customer rc ON c.customerNumber =
rc.Customer_customerNumber
JOIN Restaurant r ON rc.Restaurant_restaurantID = r.restaurantID
WHERE o.orderAmount > (
        SELECT Avg(o2.orderAmount)
   FROM `Order` o2
    JOIN Restaurant_has_Customer rc2 ON o2.Customer_customerNumber =
rc2.Customer_customerNumber
   WHERE rc2.Restaurant_restaurantID = r.restaurantID
   );
   CALL TP_Q12();
```

restaurantName	amountSpent
Big Bowl	150.48
The Savory Bistro	234.68
Big Bowl	234.68
Vegan Garden	68.40
Vegan Garden	56.78

13. <u>Finds employees that do not have a record of a shift under their name.</u>
    This query helps to identify which employees aren't currently scheduled for a shift,
    which helps provide availability if any shifts open up.

```
CREATE PROCEDURE TP_Q13()
SELECT employeeName
FROM Employee e
WHERE NOT EXISTS (
    SELECT 1
    FROM Shifts s
    WHERE s.Employee_employeeID = e.employeeID
)
CALL TP_Q13();
```

Query Matrix:

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Multiple table JOIN		X	X	X		X	X	X	X	X		X	
Subquery	X		X									X	
Correlated subquery									X				
GROUP BY				X		X	X				X		
GROUP BY with HAVING		X			X				X				
ORDER BY			X				X						
IN or NOT IN													
Built in function / AVG / calculated field		X				X	X			X		X	
REGEXP				X									
EXISTS OR NOT EXISTS													X