

Team 2

Database Management Systems Project

PR Marketing Company

Introduction

Marketing is dynamic and impactful. It is how businesses reach prospective customers and communicate the unique benefits of a product or service. It encompasses all the activities that companies undertake to promote, sell, and distribute that product or service. The goal is to generate sales and build a loyal customer base by informing prospective and existing buyers about the offering.

The target audience must first be aware that the product or service exists before they can hope to inspire a purchase. An essential function in any business, marketing supports efforts to acquire, keep, and grow customers. But marketing does not end there — ongoing engagement also helps build loyalty and establish a long-term relationship. Effective projects and campaigns reach and engage audiences, differentiate the company from competitors, and support larger business objectives, such as increasing sales or expanding to a new market.

History

The Industrial Revolution introduced major innovations in technology, transportation, and mass production of PR marketing.

- By the mid-1800s, companies had the ability to mass-produce items and transport them over large distances. As a result, selling began to shift from a local activity to a more national (or in some cases, international) one.
- In turn, customer demand for goods grew as a wider variety of products were readily available for purchase.
- The advertising revolution ushered in new ways for businesses to broadcast their message and reach potential customers. Some of these new channels included radio (early 1920s), television (early 1940s), and the telephone (mid-1940s).
- With more ways to communicate with audiences than ever before, companies adopted new strategies in order to gain customers and stay competitive.
- Marketing professionals started communicating the unique benefits of their offerings and examining demographic data.

- The digital revolution radically transformed marketing. In particular, the growing use of the internet opened up new ways to engage customers, leading to the rise of e-commerce and online marketing.
- In the late 1990s, companies began building simple websites to share information about their products and services.
- Google and MSN launched search engines that ranked websites based on a variety of metrics. Companies began investing in search engine optimization to appear at the top of the results.
- Most businesses today use some combination of digital tactics to engage with their core audience and grow their brand. These include search engine marketing, blogging, online and mobile advertising, email, video, and social media.

Motive

A PR company is responsible for managing the public image and communications of its clients, which can include corporations, individuals, products, or events. Services offered may range from media relations, content creation, social media management, crisis management, and event planning, to influencer partnerships and strategic communications planning. The company typically operates through coordinated efforts across different departments such as client services, media relations, content development, and digital marketing. Each department works together to ensure the client's messaging is consistent, timely, and impactful, aligning with broader marketing strategies and business goals.

Functional Areas

The structure and organization of a team can vary depending on several factors, including the industry, size of the company, and unique organizational needs. A small startup may have only one dedicated marketing professional, while a multinational corporation may have hundreds. A marketing team is typically responsible for the following functions:

- Advertising
- Brand marketing
- Channel marketing
- Communications
- Content marketing
- Digital marketing
- Email marketing
- Media relations and PR
- Partner marketing

- Product marketing
- Search engine marketing
- Social media marketing

Responsibilities

Responsibilities can vary greatly depending on the specific role and type of organization. In general, these include setting (or implementing) the strategy and planning (or implementing) programs and campaigns. Leaders are typically tasked with presenting strategic marketing plans and progress to executives and representing the group's work at cross-functional meetings. Marketing teammates usually focus on more tactical activities, such as crafting messaging or monitoring analytics to track the performance of campaigns. Some of the core activities include:

- Defining the marketing strategy
- Conducting market research
- Performing competitive differentiation
- Crafting positioning and messaging
- Building marketing roadmaps
- Generating leads
- Running A/B tests
- Optimizing landing pages
- Communicating with customers
- Preparing for product launches
- Cultivating press and analyst relations
- Raising brand awareness

Project Description

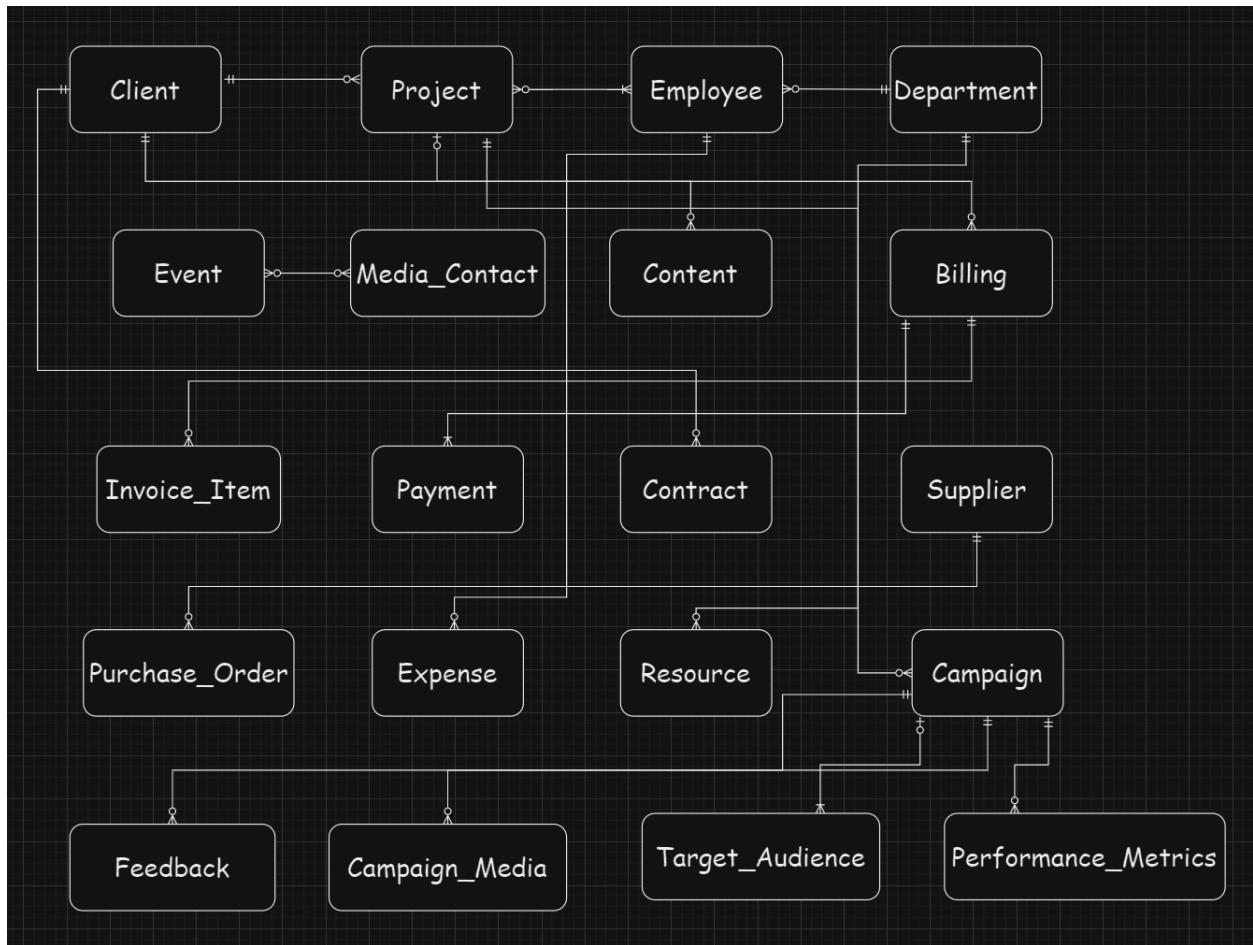
This report provides an insightful exploration into the development and implementation of a Database Management System (DBMS) tailored specifically for a leading PR marketing company. With a focus on innovation and efficiency, the company aims to revolutionize its approach to managing client relationships, media contacts, campaign data, and more, through the integration of a sophisticated DBMS solution.

From the initial conceptualization and design phase to the implementation and deployment of the DBMS, each step of the project journey is meticulously documented to provide a comprehensive understanding of the project's scope and objectives. Through a detailed analysis of the project's outcomes and potential impact, stakeholders will gain valuable insights into the transformative potential of leveraging advanced DBMS technology in the PR marketing sector.

Overall, this DBMS project represents a strategic investment in our company's future, reaffirming our commitment to innovation, excellence, and client success in the dynamic realm of PR marketing.

In the design of the database, we have included a conceptual model, a logical model, a data dictionary, physical design of the database, and the description of some of the tasks expected from the database and related SQL queries.

Conceptual Model



This diagram represents a conceptual model of a database designed to manage the operations of a public relations (PR) company. The model is structured to capture the multifaceted relationships and processes essential to PR activities, ranging from project management to campaign execution and performance assessment.

In the model, core business functions are delineated through several interconnected entities. Clients initiate Projects, which are executed by Employees within various Departments. This hierarchy not only tracks project ownership and employee involvement but also organizes financial transactions through entities such as Invoice_Item, Payment, and Expense, which are crucial for fiscal management. On the operational side, entities like Contract and Supplier detail the company's external engagements and resource acquisitions necessary for project and campaign fulfillment. Campaign effectiveness is evaluated through Feedback and Performance_Metrics, providing essential data for strategic adjustments and client reporting. This database framework is engineered to streamline PR operations, ensuring that each component is accurately represented and efficiently integrated into the company's workflow.

The database's structure further extends to the specific management of media and advertising efforts through entities such as Campaign_Media and Target_Audience. These entities facilitate the tailored delivery of media content to strategically chosen audiences, enhancing the effectiveness of marketing campaigns. The Campaign entity ties directly into this by coordinating these efforts and linking them to specific Projects and Clients, illustrating the comprehensive approach the company takes towards integrated campaign management.

Additionally, the model incorporates a Feedback entity that captures client and audience responses to various campaigns, which is crucial for iterative improvement and client satisfaction. This robust schema ensures that every aspect of a PR campaign, from conceptualization to audience engagement and performance review, is meticulously tracked and managed, enabling the PR company to maintain high standards of service and effectiveness.

Logical Model

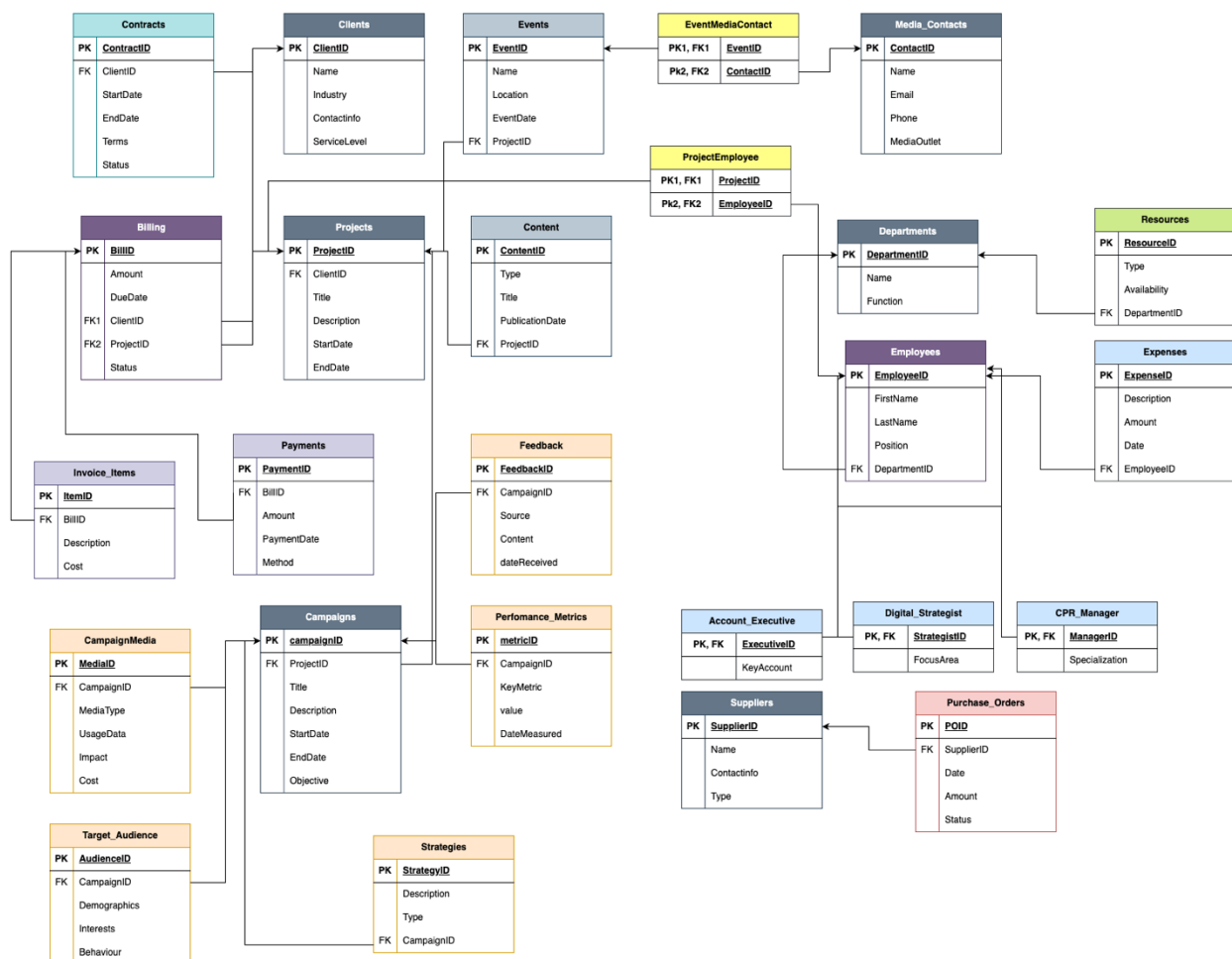


Table Categories

1. *Employee Management*

This category includes tables related to employees, their roles, and attributes:

- Employee: Represents basic information about employees.
- PR_Manager: Specific attributes for PR managers.
- Account_Executive: Specific attributes for account executives.
- Digital_Strategist: Specific attributes for digital strategists.

2. *Project Management*

This category includes tables related to projects and their associated entities:

- Project: Represents information about projects.
- Campaign: Campaigns that belong to projects.
- Strategy: Strategies tied to campaigns.
- ProjectEmployee: Linking employees to projects.

3. *Financial Management*

This category includes tables related to billing, payments, and expenses:

- Billing: Billing information tied to clients and projects.
- InvoiceItem: Items in an invoice, linked to billing.
- Payment: Payments linked to billing.
- PurchaseOrder: Purchase orders linked to suppliers.
- Expense: Expenses linked to employees and projects.

4. *Client and Contact Management*

This category includes tables related to clients and their interactions:

- Client: Represents basic client information.
- Contract: Contracts tied to clients and projects.
- MediaContact: Contacts related to media for events and projects.
- Event: Events tied to projects and media contacts.

5. *Resources and Supply Management*

This category includes tables that manage resources and suppliers:

- Resource: Represents different resources.
- Supplier: Represents suppliers for purchase orders.

6. Marketing and Analytics

This category includes tables for marketing and analytics:

- CampaignMedia: Media usage in campaigns.
- TargetAudience: Audience demographics for campaigns.
- PerformanceMetrics: Metrics for tracking campaign performance.
- Feedback: Feedback from campaigns.

Data Dictionary

Clients

Represents businesses or individuals receiving PR services.

Attribute	DATA TYPE	Description
ClientID	Integer	Unique identifier for each client.
Name	String	Name of the client.
Industry	String	Industry to which the client belongs.
ContactInfo	String	Contact information for the client.
ServiceLevel	String	The level of service provided to the client.

Project

Specific campaigns or initiatives undertaken for clients.

Attribute	Data Type	Description
ProjectID	Integer	Unique identifier for each project.
Title	String	The title of the project.
Description	String	A brief description of the project.
StartDate	Date	The start date of the project.
EndDate	Date	The end date of the project.
ClientID	Integer	References the client who owns the project.

Employee

Staff members of the PR company.

Attribute	Data Type	Description
EmployeeID	Integer	Unique identifier for each employee.
FirstName	String	The first name of the employee.
LastName	String	The last name of the employee.
Position	String	The job title of the employee.
DepartmentID	Integer	References the department the employee belongs to.

Department

Different sectors within the company like Digital Marketing, Media Relations, etc.

Attribute	Data Type	Description
DepartmentID	Integer	Unique identifier for each department.
Name	String	Name of the department.
Function	String	The function of the department.

Event

PR events organized for clients.

Attribute	Data Type	Description
EventID	Integer	Unique identifier for each event.
Name	String	The name of the event.
Location	String	The location of the event.
Date	Date	The date of the event.
ProjectID	Integer	References the project the event belongs to.

Media_Contact

Journalists and media outlets relevant to PR campaigns.

Attribute	Data Type	Description
ContactID	Integer	Unique identifier for each media contact.
Name	String	The name of the media contact.
Email	String	Email address of the media contact.

Phone	String	Phone number of the media contact.
MediaOutlet	String	The media outlet associated with the contact.

Content

Press releases, blog posts, social media posts, etc.

Attribute	Data Type	Description
ContentID	Integer	Unique identifier for each content.
Type	String	The type of content (e.g., press release, blog post).
Title	String	The title of the content.
PublicationDate	Date	The publication date of the content.
ProjectID	Integer	References the project the content belongs to.

Billing

Manages invoicing and payments for services provided.

Attribute	Data Type	Description
BillID	Integer	Unique identifier for each bill.
Amount	Decimal	The total amount of the bill.
DueDate	Date	The due date for payment.
ClientID	Integer	References the client being billed.
ProjectID	Integer	References the project related to the bill.
Status	String	The current status of the bill (e.g., paid, pending).

Invoice_Item

Detailed billing items that make up an invoice.

Attribute	Data Type	Description
ItemID	Integer	Unique identifier for each invoice item.
BillID	Integer	References the bill the item is part of.
Description	String	A description of the invoice item.
Cost	Decimal	The cost of the item.

Payment

Tracks payments made by clients.

Attribute	Data Type	Description
PaymentID	Integer	Unique identifier for each payment.
BillID	Integer	References the bill being paid.
Amount	Decimal	The amount of the payment.
PaymentDate	Date	The date the payment was made.
Method	String	The payment method used.

Contract

Legal agreements between the PR company and its clients.

Attribute	Data Type	Description
ContractID	Integer	Unique identifier for each contract.
ClientID	Integer	References the client involved in the contract.
StartDate	Date	The start date of the contract.
EndDate	Date	The end date of the contract.
Terms	String	The terms of the contract.
Status	String	The current status of the contract.

Supplier

External vendors providing goods or services (e.g., printing services, event materials).

Attribute	Data Type	Description
SupplierID	Integer	Unique identifier for each supplier.
Name	String	The name of the supplier.
ContactInfo	String	Contact information for the supplier.
Type	String	The type of goods/services provided by the supplier.

Purchase_Order

Orders issued to suppliers for procurement of goods and services.

Attribute	Data Type	Description
POID	Integer	Unique identifier for each purchase order.
SupplierID	Integer	References the supplier the order is from.
Date	Date	The date the purchase order was issued.
Amount	Decimal	The total amount of the purchase order.
Status	String	The current status of the purchase order (e.g., fulfilled, pending).

Expense

Manages expenses incurred by employees, often related to client projects.

Attribute	Data Type	Description
ExpenseID	Integer	Unique identifier for each expense.
Description	String	A description of the expense.
Amount	Decimal	The amount of the expense.
Date	Date	The date the expense was incurred.
EmployeeID	Integer	References the employee who incurred the expense.

Resource

Manages resources like meeting rooms, equipment, or digital tools.

Attribute	Data Type	Description
ResourceID	Integer	Unique identifier for each resource.
Type	String	The type of resource (e.g., meeting room, equipment).
Availability	String	The availability status of the resource.
DepartmentID	Integer	References the department that manages the resource.

Campaign

Represents specific marketing or PR campaigns with set goals and timelines.

Attribute	Data Type	Description
CampaignID	Integer	Unique identifier for each campaign.
ProjectID	Integer	References the project the campaign is part of.
Title	String	The title of the campaign.

Description	String	A brief description of the campaign.
StartDate	Date	The start date of the campaign.
EndDate	Date	The end date of the campaign.
Objective	String	The primary objective of the campaign.
Status	String	The current status of the campaign (e.g., active, completed).

Strategy

Outlines the strategic approaches for achieving the campaign objectives.

Attribute	Data Type	Description
StrategyID	Integer	Unique identifier for each strategy.
CampaignID	Integer	References the campaign the strategy is for.
Description	String	A description of the strategy.
Type	String	The type of strategy (e.g., digital marketing, public relations).

Campaign_Media

Tracks the media used in campaigns, including type (e.g., digital, print, broadcast), costs, and impact assessments.

Attribute	Data Type	Description
MediaID	Integer	Unique identifier for each media usage.
CampaignID	Integer	References the campaign the media is used for.
MediaType	String	The type of media used (e.g., digital, print).
UsageDate	Date	The date the media was used.
Impact	String	The assessed impact of the media.
Cost	Decimal	The cost of the media.

Target_Audience

Defines the target audience for each campaign based on demographics, interests, and behaviors.

Attribute	Data Type	Description
AudienceID	Integer	Unique identifier for each target audience.
CampaignID	Integer	References the campaign the audience is targeted for.

Demographics	String	Demographic details of the target audience.
Interests	String	Interests of the target audience.
Behavior	String	Behavioral patterns of the target audience.

Performance_Metrics

Quantitative measures of campaign performance (e.g., reach, engagement, conversions).

Attribute	Data Type	Description
MetricID	Integer	Unique identifier for each performance metric.
CampaignID	Integer	References the campaign the metric is measured for.
KeyMetric	String	The key metric being measured (e.g., reach, engagement).
Value	Decimal	The value of the metric.
DateMeasured	Date	The date the metric was measured.

Feedback

Collects feedback from various stakeholders, including media partners, clients, and the target audience.

Attribute	Data Type	Description
FeedbackID	Integer	Unique identifier for each feedback.
CampaignID	Integer	References the campaign receiving feedback.
Source	String	The source of the feedback (e.g., media, client).
Content	String	The content of the feedback.
DateReceived	Date	The date the feedback was received.

Employee Subtypes

Attribute	Data Type	Description
PR_Manager	ManagerID (Integer)	Specialization (String)
Account_Executive	ExecutiveID (Integer)	KeyAccount (String)
Digital_Strategist	StrategistID (Integer)	FocusArea (String)

Physical Design

The physical design of the database for a PR marketing company is meticulously crafted to handle large volumes of data and complex interdependencies among the data efficiently. Considering the dynamic nature of PR activities, certain tables in the database, such as those handling campaigns and events, might be partitioned by date or project to enhance performance during query operations, ensuring faster retrieval of data pertinent to specific time frames or ongoing projects. Furthermore, denormalization may be applied selectively in areas like campaign management where read performance is critical and data volatility is low, thereby reducing the need for joining tables and expediting access to integrated campaign data.

In terms of access control within the database, different entities or user roles will be granted varying levels of access to perform specific functions such as insert, read, modify, and delete, based on their operational necessities and authority levels. For instance, PR managers may have comprehensive access to the Campaigns, Feedback, and Performance_Metrics tables for both modifying campaigns and analyzing their outcomes, whereas Account Executives might only have read and insert permissions to ensure data integrity and confidentiality. The access controls will be enforced through robust database security measures including role-based access control (RBAC), which provides a granular level of security management and helps prevent unauthorized access to sensitive information.

The database will utilize structured data types to ensure data consistency and optimize storage. For example, numeric types for monetary values to ensure precise calculations, date types for managing temporal data to facilitate easy retrieval and manipulation of dates, and varying character types for textual information allowing efficient storage of strings of different lengths. Optimizing file organization is also pivotal; hence, critical tables like those dealing with financial transactions (Payments, Invoices) may use indexed organization to speed up query processing involving searches and joins. As for the recovery policy, the database will incorporate regular backups and transaction journaling to safeguard against data loss. In the event of a system failure, strategies such as disk mirroring and point-in-time restores will be employed, enabling a swift recovery to the latest consistent state of data either through rollback or roll-forward techniques depending on the scenario.

SQL Queries

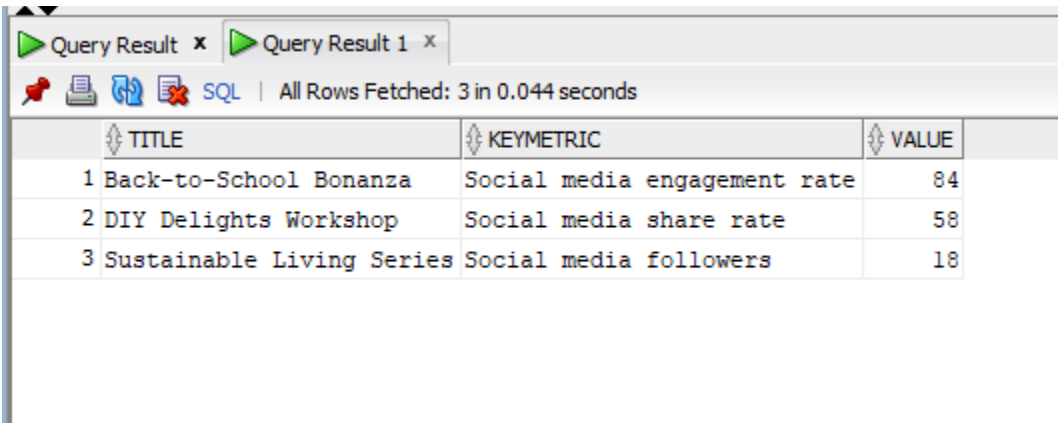
To implement our database design into Oracle for our PR marketing agency project, we commenced by creating 26 tables, each corresponding to an entity or class outlined in our design. These tables were meticulously crafted with appropriate data types for their columns, ensuring the integrity and efficiency of data storage. Furthermore, primary keys and foreign keys were established to accurately represent the relationships between entities within the database structure.

After creating the tables, the next step was to populate them with dummy data to facilitate testing of the database's functionality. While the data inserted may not be accurate or timely, it serves the essential purpose of validating that the database operates as expected and handles data appropriately.

With the tables populated, we proceeded to construct various SQL queries to perform business related tasks expected from our database. These queries enable users to retrieve specific information from the database, such as browsing projects by a certain client or viewing media contacts associated with a particular media outlet. By showcasing these queries, we demonstrate the versatility and utility of our database in serving the needs of our PR marketing agency project.

Query 1. Identify the top 3 performing campaigns based on a specific metric (Top Social Media campaigns)

```
SELECT c.Title, pm.KeyMetric, pm.Value
FROM Campaigns c
INNER JOIN Performance_Metrics pm ON c.CampaignID = pm.CampaignID
WHERE pm.KeyMetric LIKE '%Social media%'
ORDER BY pm.Value DESC
FETCH FIRST 3 ROWS ONLY;
```



The screenshot shows a database query result window with two tabs: 'Query Result' and 'Query Result 1'. The 'Query Result 1' tab is active, displaying the results of the SQL query. The window includes a toolbar with icons for saving, refreshing, and other database operations. Below the toolbar, a status bar indicates 'All Rows Fetched: 3 in 0.044 seconds'. The main area displays a table with three columns: 'TITLE', 'KEYMETRIC', and 'VALUE'. The table contains three rows of data, representing the top 3 performing campaigns based on social media metrics.

	TITLE	KEYMETRIC	VALUE
1	Back-to-School Bonanza	Social media engagement rate	84
2	DIY Delights Workshop	Social media share rate	58
3	Sustainable Living Series	Social media followers	18

This SQL query retrieves the titles of campaigns along with their key social media metrics and corresponding values. By joining the Campaigns and Performance_Metrics tables, it filters results to include only metrics related to social media. The results are sorted in descending order based on the metric values, showcasing the top-performing social media campaigns. Finally, the FETCH NEXT clause limits the output to the top 3 campaigns, providing concise insights into the organization's social media performance.

Query 2. List all employees in a particular department:

```
SELECT e.FirstName, e.LastName, e.Position
FROM Employee e
INNER JOIN Departments d ON e.DepartmentID = d.DepartmentID
```



```
WHERE d.Name = 'Digital Marketing';
```

	🔑 FIRSTNAME	🔑 LASTNAME	🔑 POSITION
1	Joseph	Rubio	Account Executive
2	Matthew	Morris	PR Manager
3	Paul	Carter	Digital Strategist
4	Andrea	Mendez	Account Executive
5	Justin	Wheeler	PR Manager
6	Stacy	Wallace	Digital Strategist
7	Darin	Deleon	PR Manager
8	Samantha	Lara	Digital Strategist
9	Alejandro	Sullivan	Digital Strategist
10	Linda	Santos	PR Manager
11	Michaela	Simon	Digital Strategist
12	Kimberly	Garner	Digital Strategist
13	Cody	Rogers	Account Executive

This SQL query retrieves the first name, last name, and position of employees who belong to the Digital Marketing department. By performing an inner join between the Employee and Departments tables on the DepartmentID, it filters the results to include only employees associated with the 'Digital Marketing' department. The query then selects relevant employee details, providing a concise list of all employees working in the specified department.

Query 3. Find the Most Recent Event for Each Project

```
SELECT
    p.ProjectID,
    p.Title AS ProjectTitle,
    e.EventID,
    e.Name AS EventName,
    e.Event_Date
FROM
    Projects p
JOIN
    Events e ON p.ProjectID = e.ProjectID
WHERE
    e.Event_Date = (
        SELECT
            MAX(e2.Event_Date)
        FROM
            Events e2
```

```

        WHERE
            e2.ProjectID = p.ProjectID
    )
ORDER BY
    p.ProjectID;

```

	PROJECTID	PROJECTTITLE	EVENTID	EVENTNAME	EVENT_DATE
1	3	Reputation Management	130	Creative Campaign Workshop	07-JAN-20
2	4	Crisis Management	104	Media Meetup Mixer	19-NOV-22
3	5	Market Entry Strategy	106	Influencer Insights Forum	27-MAR-23
4	7	Sustainability Campaign	131	Media Meet-and-Greet	25-MAY-23
5	8	Brand Launch	147	Content Creation Carnival	19-MAY-18
6	9	Sustainability Campaign	115	Social Strategy Seminar	16-MAY-20
7	12	Stakeholder Outreach	108	Thought Leadership Symposium	22-AUG-20
8	18	Digital Advertising	138	PR Power Lunch	17-FEB-23
9	20	Consumer Awareness	141	Branding Blitz Bash	14-JUN-19
10	22	Event Promotion	132	Innovation Insights Intensive	11-NOV-18
11	25	Employee Engagement	122	Storytelling Summit	08-APR-22
12	26	Brand Launch	134	Branding Breakthrough Breakfast	15-SEP-22

This SQL query retrieves the project ID, title, and the most recent event associated with each project. By joining the Projects and Events tables on the ProjectID, it ensures that events are linked to their respective projects. The WHERE clause filters events to only include the most recent ones for each project by comparing the event date to the maximum event date for each project obtained through a subquery. Finally, the results are ordered by project ID to present the data systematically.

Query 4. Find Top 5 Most Expensive Projects

```

SELECT
    p.ProjectID,
    p.Title AS ProjectTitle,
    SUM(b.Amount) AS ProjectCost
FROM
    Projects p
JOIN
    Billing b ON p.ProjectID = b.ProjectID
GROUP BY
    p.ProjectID, p.Title
ORDER BY
    ProjectCost DESC
FETCH FIRST 5 ROWS ONLY;

```

	PROJECTID	PROJECTTITLE	PROJECTCOST
1	41	Influencer Collaboration	2799
2	34	Crisis Management	2209
3	62	Brand Launch	1671
4	9	Sustainability Campaign	1542
5	99	Crisis Management	1425

This SQL query identifies the top 5 most expensive projects based on their total billing amount. By joining the Projects and Billing tables on the ProjectID, it aggregates the billing amounts for each project. The results are then grouped by project ID and title. Using the ORDER BY clause with descending order sorts the projects based on their total billing amount in a descending fashion. Finally, the FETCH FIRST 5 ROWS ONLY clause limits the output to only the top 5 most expensive projects.

Query 5. Calculate Total Billing Amount per Client

```
SELECT
    c.ClientID,
    c.Name AS ClientName,
    SUM(b.Amount) AS TotalBillingAmount
FROM
    Clients c
JOIN
    Billing b ON c.ClientID = b.ClientID
GROUP BY
    c.ClientID, c.Name
ORDER BY
    TotalBillingAmount DESC;
```

	CLIENTID	CLIENTNAME	TOTALBILLINGAMOUNT
1	79	Banks, Hickman and Dillon	1925
2	18	Jones and Sons	1698
3	20	Kennedy, Alvarez and Wilson	1549
4	40	May, Sanchez and Hernandez	1148
5	26	Moore PLC	962
6	94	Edwards, James and Lamb	954
7	57	Welch–Nguyen	946
8	46	Diaz Inc	916
9	71	Arias, Jones and Baker	896
10	90	Arnold–Evans	844
11	7	Gonzalez–Roberts	793

This SQL query calculates the total billing amount for each client by summing the billing amounts from the Billing table. It joins the Clients and Billing tables based on the ClientID. The results are then grouped by client ID and name to aggregate the total billing amount for each client. Using the ORDER BY clause with descending order sorts the clients based on their total billing amount in a descending fashion, allowing easy identification of the highest billing clients.

Query 6. Track the performance metrics for each campaign.

```
SELECT
    ca.CampaignID,
    ca.Title AS CampaignTitle,
    pm.MetricID,
    pm.KeyMetric,
    pm.Value,
    pm.DateMeasured
FROM
    Campaigns ca
LEFT JOIN
    Performance_Metrics pm ON ca.CampaignID = pm.CampaignID
ORDER BY
    ca.CampaignID, pm.MetricID;
```

	CAMPAIGNID	CAMPAIGNTITLE	METRICID	KEYMETRIC	VALUE	DATEMEASURED
1	1101	Health Heroes Hike	(null)	(null)	(null)	(null)
2	1102	Empowering Entrepreneurs Expo	1514	Media placement quantity	57	16-AUG-20
3	1103	Spring into Savings	1505	Click-through rate (CTR)	64	24-AUG-22
4	1103	Spring into Savings	1515	Audience demographics	32	16-JUN-23
5	1103	Spring into Savings	1516	Audience reach by channel	8	10-MAR-20
6	1104	New Year, New You	1509	Media mentions	13	23-MAR-19
7	1105	Back-to-School Bonanza	1504	Impressions	67	13-SEP-22
8	1105	Back-to-School Bonanza	1508	Social media engagement rate	84	18-JUL-20

This query fetches performance metrics for each campaign managed by the PR marketing company, providing insights into the effectiveness of various marketing strategies. The query employs a LEFT JOIN operation between the Campaigns table (ca) and the Performance_Metrics table (pm) on the CampaignID column, ensuring that all campaigns are included in the result set, even if they do not have corresponding performance metrics. The results are ordered by CampaignID and MetricID to organize the data logically and facilitate readability.

Query 7. Provide Project Overview with Top Campaign

```
SELECT
    p.ProjectID,
    p.Title AS ProjectTitle,
    p.Description AS ProjectDescription,
    c.Name AS ClientName,
    COALESCE(SUM(b.Amount), 0) AS TotalBillingAmount,
    COUNT(DISTINCT pe.EmployeeID) AS EmployeeCount,
```

```

        (SELECT
            ca.Title
        FROM
            Campaigns ca
        JOIN
            Performance_Metrics pm ON ca.CampaignID = pm.CampaignID
        WHERE
            ca.ProjectID = p.ProjectID
        ORDER BY
            pm.Value DESC
        FETCH FIRST 1 ROWS ONLY
        ) AS TopCampaign
FROM
    Projects p
JOIN
    Clients c ON p.ClientID = c.ClientID
LEFT JOIN
    Billing b ON p.ProjectID = b.ProjectID
LEFT JOIN
    ProjectEmployee pe ON p.ProjectID = pe.ProjectID
GROUP BY
    p.ProjectID,
    p.Title,
    p.Description,
    c.Name
ORDER BY p.projectID;

```

PROJECTID	PROJECTTITLE	PROJECTDESCRIPTION	CLIENTNAME	TOTALBILLINGAMOUNT	EMPLOYEECOUNT	TOPCAMPAIGN
1	3 Reputation Management	Creating marketing content	Espinoza-Johnson	896	0 (null)	
2	4 Crisis Management	Engaging media outlets	Meyers, Cooper and Knapp	0	0	Community Cleanup Campaign
3	5 Market Entry Strategy	Entering new markets	May, Sanchez and Hernandez	101	0	Spring into Savings
4	7 Sustainability Campaign	Boosting staff morale	Johnson Group	779	0 (null)	
5	8 Brand Launch	Social media planning	Welch-Nguyen	413	0	End of Year Clearance
6	9 Sustainability Campaign	Outreach to stakeholders	Mueller PLC	1542	0 (null)	
7	11 Corporate Partnership	Managing public policy	Wagner-Wilson	120	0 (null)	
8	12 Stakeholder Outreach	Forming business partnerships	Scott Group	0	0 (null)	
9	14 Consumer Awareness	Social media planning	Marsh LLC	763	0 (null)	
10	15 Event Promotion	Working with influencers	Welch-Nguyen	638	0 (null)	

This SQL query retrieves key project details such as ID, title, description, and client name. It calculates the total billing amount and counts the number of employees involved in each project. Additionally, it includes a subquery to find the title of the top-performing campaign associated with each project based on performance metrics. The results provide a comprehensive overview of project performance and highlight the most successful campaigns, aiding in strategic decision-making and resource allocation.

Query 8. Provide the financial overview of the projects

```

WITH ProjectFinancials AS (
    SELECT
        b.ProjectID,
        SUM(b.Amount) AS TotalBillingAmount,
        COALESCE(SUM(p.Amount), 0) AS TotalPaymentsReceived
    FROM
        Billing b

```

```

LEFT JOIN
    Payment p ON b.BillID = p.BillID
GROUP BY
    b.ProjectID
)
SELECT
    p.ProjectID,
    p.Title AS ProjectTitle,
    c.Name AS ClientName,
    pf.TotalBillingAmount,
    pf.TotalPaymentsReceived,
    COUNT(DISTINCT pe.EmployeeID) AS EmployeeCount
FROM
    Projects p
JOIN
    Clients c ON p.ClientID = c.ClientID
LEFT JOIN
    ProjectFinancials pf ON p.ProjectID = pf.ProjectID
LEFT JOIN
    ProjectEmployee pe ON p.ProjectID = pe.ProjectID
GROUP BY
    p.ProjectID,
    p.Title,
    c.Name,
    pf.TotalBillingAmount,
    pf.TotalPaymentsReceived
ORDER BY
    p.ProjectID;

```

	PROJECTID	PROJECTTITLE	CLIENTNAME	TOTALBILLINGAMOUNT	TOTALPAYMENTSRECEIVED	EMPLOYEECOUNT
1	3	Reputation Management	Espinoza-Johnson	2688	13900	0
2	4	Crisis Management	Meyers, Cooper and Knapp	(null)	(null)	0
3	5	Market Entry Strategy	May, Sanchez and Hernandez	101	0	0
4	7	Sustainability Campaign	Johnson Group	779	5039	0
5	8	Brand Launch	Welch-Nguyen	413	0	0
6	9	Sustainability Campaign	Mueller PLC	3040	15007	0
7	11	Corporate Partnership	Wagner-Wilson	120	0	0
8	12	Stakeholder Outreach	Scott Group	(null)	(null)	0
9	14	Consumer Awareness	Marsh LLC	763	0	0
10	15	Event Promotion	Welch-Nguyen	638	6300	0
11	18	Digital Advertising	Horne-Hamilton	1566	9812	0

This SQL query provides a comprehensive financial overview of projects within the database. It calculates the total billing amount and total payments received for each project, considering both billing and payment data. Additionally, it counts the number of employees involved in each project. By joining project, client, billing, payment, and project employee tables, the query generates detailed insights into project finances, facilitating better financial management and decision-making processes for the organization.

ChatBot

Imported credentials to allow app to work.

```
[102] # Import credentials to allow app to work
import json

credentials = {}
try:
    with open("/content/drive/MyDrive/credentials.json") as file:
        credentials = json.load(file)
        # Update the "user" and "secret" under "rds"
        credentials['rds']['user'] = "IS680_Sec2_Manchi_Satish"
        credentials['rds']['secret'] = "3890"
        print(credentials)
except FileNotFoundError:
    print("Error: credentials.json file not found.")

{'OPENAI_API_KEY': 'sk-4nIwHZGRff2KD4Wk648QT3B1bkF3qevGYpbehdH0xxPWYIo', 'aws': {'access_key_id': 'AKIA2VMDN0UUPLSXZRIC',
```

Extracted Oracledb credentials.

```
[108] import oracledb

# Extract credentials

db_username = credentials["rds"]["user"]
db_password = credentials["rds"]["secret"]
db_endpoint = credentials["rds"]["endpoint"]
db_sid = credentials["rds"]["sid"]
db_port = credentials["rds"]["port"]

def execute_query_in_connection(connection_name, sql):
    try:
        dsn = oracledb.makedsn(db_endpoint, db_port, db_sid)
        conn = oracledb.connect(user=db_username, password=db_password, dsn=dsn)
```

LLM model for Chatbot Development

```
from langchain_openai import ChatOpenAI
from langchain.chains.conversation.memory import ConversationBufferMemory

# Initialize LangChain components
OPENAI_API_KEY = credentials["OPENAI_API_KEY"]
llm = ChatOpenAI(openai_api_key=OPENAI_API_KEY) # Load API Key from environment variables
memory = ConversationBufferMemory(memory_key="chat_history", return_messages=True)
```

Example:

Input:

You: Can you give latest event de

Output:

Chatbot: Here are the latest event details: Project Title: Content Marketing, Event Name: Crisis Communication Masterclass, Event Date: 2023-11-01 00:00:00