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Design and Implementation of a Database System for Event Management Customizer (EMC): A Case-Based Approach

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Abstract: Database systems are central in the organization and management of complex data with a view to accuracy, accessibility, and scalability. This paper describes the design and implementation of a customized database system for Event Management Customizer, a Subang Jaya-based startup in Malaysia specializing in adventure holidays and team-building events. The main goal was to manage client bookings, accommodate and facility management, and enhance operational efficiency. It also includes the design of a database system, using methodologies such as ER and physical modelling, ending with an implementation based on MySQL. Based on this, eight interconnected entities have been identified: Client, Representative, Accommodation, Booking, Outdoor Facilities, Additional Facilities, Payment, and Staff. The defined key attributes, composite attributes, and derived attributes will present the structure of the proposed system. Features such as facility hire charges, accommodation details, and staff assignments provide comprehensive data management. It further enhanced the system to real-world, scenario-based SQL queries identifying high-transaction clients, calculating additional charges, and even evaluation of staff performances. Further enhancements could also be made upon the challenges they faced, for instance, COVID-19 pandemic-addition of vaccination statuses, quarantine records, and room disinfection schedules. This database design has demonstrated the flexibility of database systems in solving organizational challenges; it also has proved that the database systems are vital in maintaining operational integrity, decision-making, and adapting to unforeseen global disruptions.

Keywords: database system; event management; customization; case-based approach; system implementation

1. Introduction

The effective management of data is critical in today's dynamic business environments, where organizations must store, retrieve, and process vast amounts of information with precision and efficiency. Database systems provide a structured approach to managing this data, offering a platform for systematic storage, seamless retrieval, and efficient manipulation [1–4]. Specialized businesses, like event management firms, rely heavily on efficient, scalable database systems due to their complex client interactions, multifarious service offerings, and real-time decision-making processes associated with the operations [5–9].

This assignment aims at designing and implementing a complete database system for Event Management Customizer, a start-up dealing in adventure holidays and team-building events. The case study of EMC represents a practical scenario where database systems are used to manage customer bookings, accommodation, outdoor facilities, and financial transactions. The aim of the

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project is to enable EMC to smoothen its operations, enhance data accuracy, and facilitate strategic decision-making through an efficient and scalable database architecture.

The project follows a strict design methodology, starting with the development of an ER model that outlines the logical structure of the database. In the ER diagram, there are eight interconnected entities: Client, Representative, Booking, Accommodation, Outdoor Facilities, Additional Facilities, Payment, and Staff. These represent the main operational aspects of EMC and include a wide range of attributes such as key, composite, multivalued, and derived attributes. For instance, attributes like "Representative_Name" (composite) and "Stay_Duration" (derived) are examples of how the database can aggregate and compute information relevant to the business processes of EMC [10–16].

The practical implementation of this design is done on MySQL, which is one of the most popular relational database management systems acknowledged for robustness and scalability [17–20]. The capabilities of MySQL are elaborated with the help of SQL queries to address some complex organizational needs like the generation of detailed client profiles, service utilization calculations, and analysis of financial performances. Additionally, the database system includes features to manage outdoor and additional facilities, ensuring that EMC can offer tailored services to diverse client groups, including families, schools, businesses, and governmental institutions [21–26].

A unique challenge addressed in this project is the global impact of the COVID-19 pandemic, which necessitated modifications to the database schema. Attributes like vaccination status and quarantine records were introduced to enhance health and safety compliance, while additional tables for room disinfection schedules and temperature checks ensured comprehensive monitoring [27,28]. These modifications demonstrate the database's adaptability to evolving business requirements and external factors.

Database systems are not just tools for storage but also pivotal enablers of data-driven decision-making. As highlighted in prior research, databases support key organizational goals such as improving operational efficiency, reducing errors, and fostering strategic planning [29,30]. They also play a vital role in ensuring data security and regulatory compliance, particularly in industries like event management where client information is sensitive [31–33].

Therefore, this project epitomizes the design and implementation of a robust database system that suits every requirement of EMC for its operation processes. It narrates how a database could work as a strong tool for an organization toward growth by proving to be the basic platform for expansion, durability, and innovation regarding challenges. The EMC database system, by using conventional database design principles in combination with modern technology, raises the bar for applied deployment of database management within the event managing sector.

2. Literature Review

Designing and implementation of the event management database system are critical in terms of scalability, functionality, and user-oriented operations. The literature review has shown various developments and challenges concerning the subject matter. Also, integrated approaches have been identified using event management systems in handling these multifarious operations of booking, scheduling, and reporting, with database normalization playing a pivotal role in reduction in redundancy and enhancement in efficiency [34]. Similarly, relational database designs focusing on users have been propounded to enhance access and facilitate the operations for small and medium enterprises [35].

Cloud-based solutions have gained traction for their ability to scale dynamically and handle large volumes of data, particularly during high-traffic periods like event registrations [36]. The integration of Big Data analytics has further enabled personalized event planning by analysing attendee preferences and predicting trends based on historical data. Moreover, mobile databases have facilitated real-time data access and synchronization across devices, enhancing operational efficiency in event management.

In terms of flexibility, NoSQL databases have emerged as viable alternatives to relational databases, especially for managing unstructured data like multimedia associated with events [37]. Customizable database structures are particularly useful in accommodating diverse client

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requirements, making them ideal for event planning systems [38]. However, data security remains a pressing concern, with studies emphasizing the need for robust encryption and access control protocols to safeguard sensitive event data.

For example, there are several proposed techniques aimed at improving the performance of an event management database, including query optimization and indexing. Similarly, various data management challenges involving both structured and unstructured data have been provided for hybrid database systems, integrating SQL and NoSQL technologies. This workflow automation will reduce manual work through automated functions for repetitive tasks such as check-ins enabled by triggers and stored procedures within the database [39].

Scalable architectures have been proposed to address surges in user activity during large-scale events, ensuring that databases remain responsive under heavy loads [38]. Entity-relationship modelling techniques have been explored for designing efficient and logical database schemas, which are crucial for managing complex event data. Feedback management systems supported by databases enable the collection and analysis of attendee feedback, which is vital for post-event evaluations. Integration of Internet of Things technologies into event management systems enables data collection and its monitoring in real time, regarding venue occupancy or environmental conditions [39]. Integration of data, however, has become a big issue in consolidating several data sources coming from different locations into one cohesive system. Real-time databases that require fast data processing capabilities remain very crucial for live update management related to ticket sales or registrations [40].

Artificial intelligence (AI) has played a transformative role in event database management, improving decision-making and predictive analytics for efficient resource allocation [40]. Microservice architectures, which enhance modularity and scalability, ensure that each service operates independently while sharing a unified database. Lastly, the development of testing frameworks for validating database accuracy and reliability has been highlighted as critical for ensuring system performance [41]. This review comprehensively captures the challenges and advancements in designing and implementing database systems for event management. These synthesized studies bring out the fact that scalable, secure, and user-centric solutions are needed to cater to the diverse and dynamic requirements of event management applications. Future research should be directed at refining the existing methodologies and exploring innovative approaches to address the evolving needs of the industry. Future research in event management systems could explore ANN-based models for enhanced security and real-time processing [42], sentiment analysis for predictive insights [43,50], and deep learning techniques for classification and prediction [44,49]. Integrating IoT with 5G technology could further improve system responsiveness and efficiency [45,47]. Additionally, addressing cybersecurity and big data growth remains essential [46]. Experts are also focusing on power generation predictions and anomaly detection using advanced models [48,51].

3. Case Study: Event Management Customizer (EMC)

MC operates a start-up centre in Subang Jaya and intends to redesign its business database to store data about its services and clients efficiently and manage them appropriately. This is a centre with focused interest in providing its customers with adventure-packed holidays as well as teambuilding programmes. Their clients can have just accommodation or team-building programs or both kinds of services according to their goal and preference. The clients will be grouped as family groups, businesses, governmental institutions, and schools. Information to be stored about each client is a unique client number to identify the client, the client's name identifying a school name, business name, or organizational name, and the contact of representatives. In schools, governmental institutions, and businesses, additional contacts are supplied for smooth follow-up and continued marketing.

4. Proposed Methodology

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The methodology of designing and implementation of the database system for EMC is in a structured approach. The broad steps are highlighted below.

4.1. Requirement Analysis

Identify business needs and identify the data requirements concerning client management, booking processes, tracking facilities, and financial management. Classify data into logical categories such as clients, representatives, accommodations, bookings, facilities, payments, and staff.

4.2. Entity-Relationship (ER) Modelling

Draw an ER diagram that captures the logical structure of the database. The diagram looks at interconnected entities: Client, Representative, Booking, Accommodation, Outdoor Facilities, Additional Facilities, Payment, and Staff. Define key attributes and composite attributes for these entities and define how these entities relate to one another.

4.3. Physical Modelling

Translate the ER model into a physical database schema using MySQL. The physical model represents-in a relational form-the logical structure through the use of tables, keys, and constraints.

4.4. MySQL Implementation

The implementation is done in MySQL through the creation of tables, relationships, and subsequently filling the database with sample data. It also includes stored procedures, triggers, and indexes that optimize data operations and automate repetitive tasks.

4.5. SQL Query Design

Provide SQL queries to fetch business information, such as client details, managing bookings, financial reports, and facility usage analysis. These include advanced queries with aggregation, calculation, and conditional logic.

4.6. Testing and Validation

Perform accuracy, integrity, and performance tests on the database by writing test cases for scenarios ranging from high volumes of transactions to error conditions.

4.7. COVID-19 Pandemic Management Enhancements

Add attributes and tables in each level of the hierarchy to manage COVID-19-related data: vaccination statuses, quarantine records, and schedules of disinfections of rooms. This will make sure the database is updated to handle real-world challenges.

Figure 1 shows the conceptual representation of the database structure for EMC, showing the interconnected entities: Client, Representative, Booking, Accommodation, Outdoor Facilities, Additional Facilities, Payment, and Staff. The diagram shows key, composite, and derived attributes and their relationships. Figure 2 shows the detailed physical schema of the EMC database derived from the ER model. It shows the relational tables, keys, and constraints implemented in MySQL for efficient data management and optimization of operations. Figure 3 shows the Representative Table, The structure of the Representative entity in the EMC database. This comprises attributes such as Representative_ID, Representative_Name, and Contact_Details for managing the representatives of clients. Figure 4 shows the Information from clients includes Client_ID, Client_Name, Client_Type-family, business, or school-with attendant contact information for accurate client management in Client Table. Figure 5 shows the depicts the structure of the table used to manage the financial transaction that was involved, including but not limited to attributes like Payment_ID, Booking_ID, Payment_Amount, and Payment_Date for traceability of all kinds of payments in Payment Table. Figure 6 shows the accommodation table depicts details on Accommodation_ID, Room_Type,

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Capacity, and Availability_Status attributes meant to address various clients' needs. Figure 7 shows the additional Facilities Table, Represents the structure of additional facilities available, including attributes like Facility_ID, Facility_Name, Facility_Cost, and Availability. Figure 8: Booking Table A broad table for bookings, including the attributes Booking_ID, Client_ID, booking_ Date, and Total_Charges, to monitor transactions and account for resource distribution. Figure 9 shows the Staff Table which Captures staff-related information, with attributes such as Staff_ID, Name, Certification, and Assigned Duties, supporting workforce management and performance tracking. Figure 10 indicate the Outdoor Facilities Table. The structure of outdoor facilities offered by EMC, along with their respective attributes like Facility_ID, Facility_Type, Usage_Cost, and Booking_Status, efficiently manage the usage.

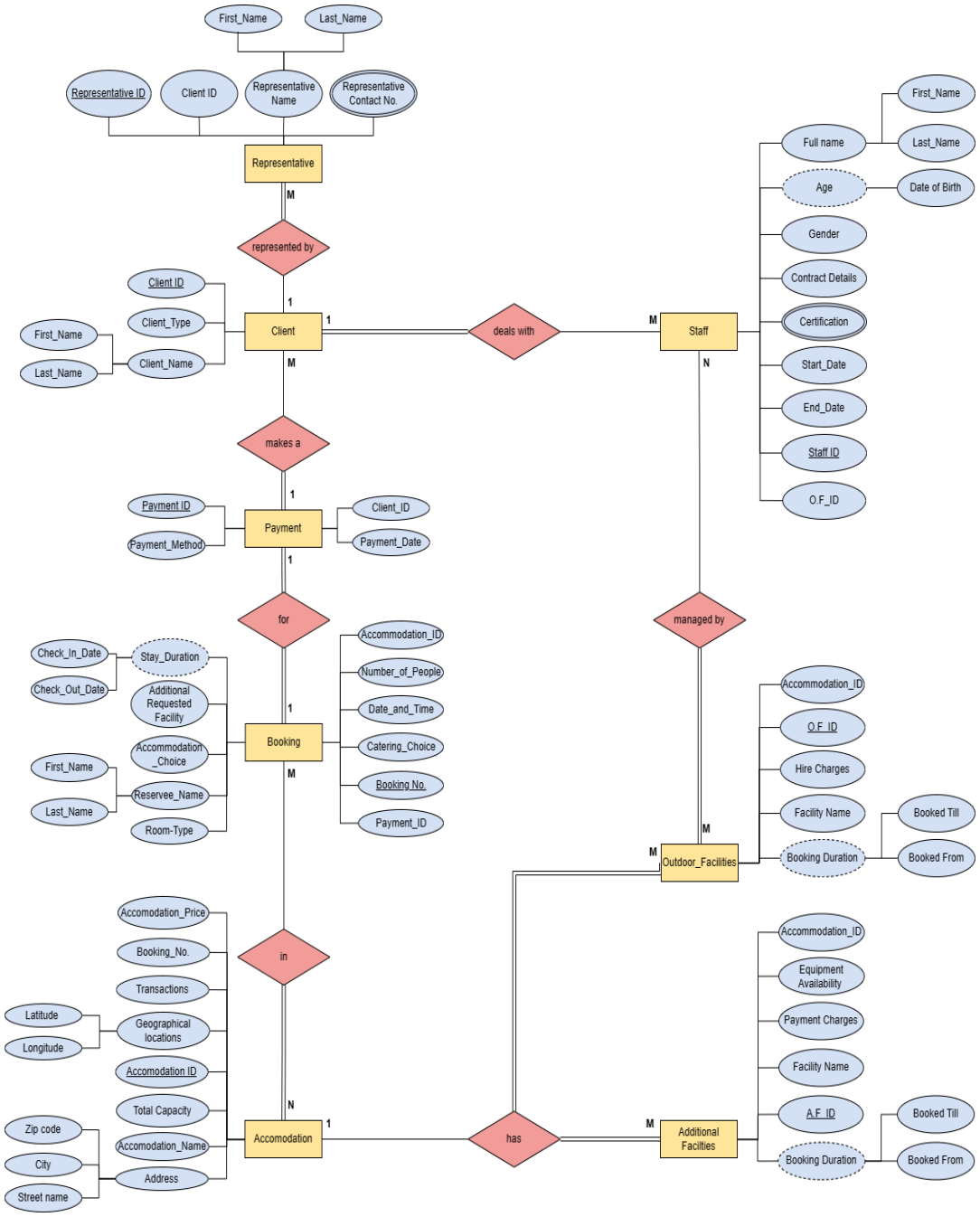


Figure 1. conceptual representation of the database structure for EMC.

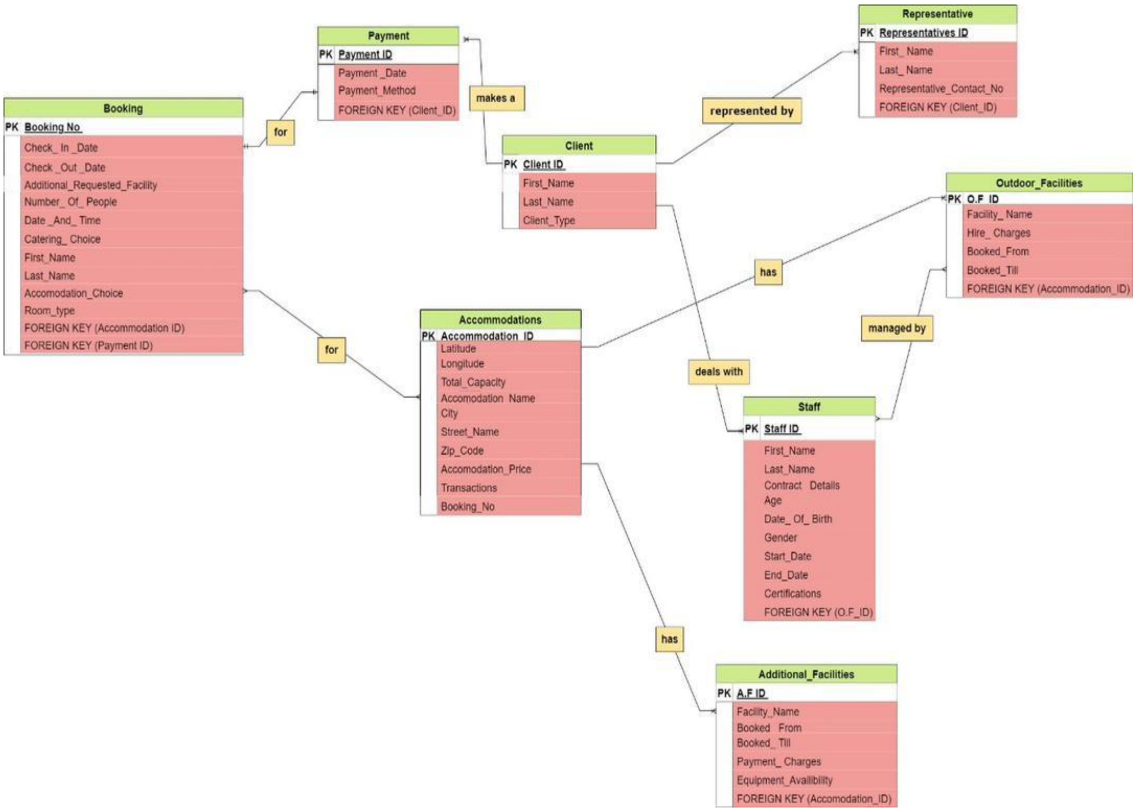
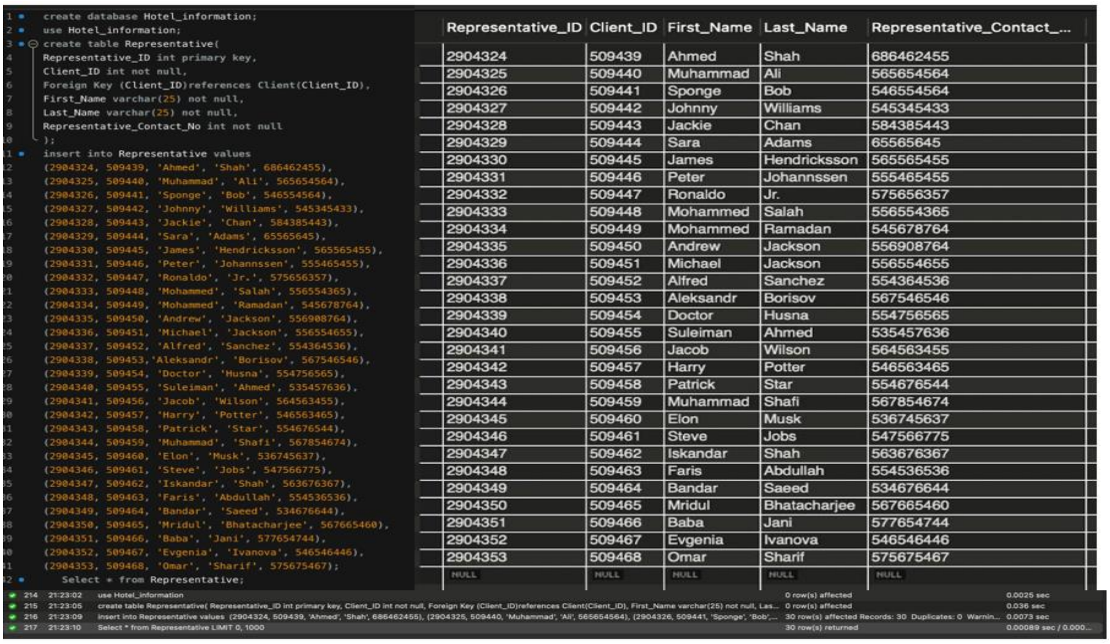


Figure 2. Physical Model.



Representative_ID	Client_ID	First_Name	Last_Name	Representative_Contact_...
2904324	509439	Ahmed	Shah	686462455
2904325	509440	Muhammad	Ali	565654564
2904326	509441	Sponge	Bob	546554564
2904327	509442	Johnny	Williams	545345433
2904328	509443	Jackie	Chan	584385443
2904329	509444	Sara	Adams	65565645
2904330	509445	James	Hendricksson	565565455
2904331	509446	Peter	Johannssen	555465455
2904332	509447	Ronaldo	Jr.	575656357
2904333	509448	Mohammed	Salah	556554365
2904334	509449	Mohammed	Ramadan	545678764
2904335	509450	Andrew	Jackson	556908764
2904336	509451	Michael	Jackson	556554655
2904337	509452	Alfred	Sanchez	554364536
2904338	509453	Aleksandr	Borisov	567546546
2904339	509454	Doctor	Husna	554756565
2904340	509455	Suleiman	Ahmed	535457636
2904341	509456	Jacob	Wilson	564563455
2904342	509457	Harry	Potter	546563465
2904343	509458	Patrick	Star	554676544
2904344	509459	Muhammad	Shafi	567854674
2904345	509460	Elon	Musk	536745637
2904346	509461	Steve	Jobs	547566775
2904347	509462	Iskandar	Shah	563676367
2904348	509463	Faris	Abdullah	554536536
2904349	509464	Bandar	Saeed	534676644
2904350	509465	Mridul	Bhatacharjee	567665460
2904351	509466	Baba	Jani	577654744
2904352	509467	Evgenia	Ivanova	546546446
2904353	509468	Omar	Sharif	575675467
NULL	NULL	NULL	NULL	NULL

Figure 3. Representative Table.

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```
use Hotel_information;
create table Payment(
Payment_ID int primary key,
Client_ID int not null,
Foreign Key (Client_ID)references Client (Client_ID),
Payment_Method varchar(25) not null,
Payment_D4ate varchar(25) not null,
Payment_Status varchar(25) not null
);
insert into Payment values
(6433543,509439,'Credit Card','01/12/2023','Paid'),
(6433544,509440,'Cash','03/04/2022','Paid'),
(6433545,509441,'Credit Card','01/02/2021','Paid'),
(6433546,509442,'Cash','06/03/2025','Pending'),
(6433547,509443,'Credit Card','20/06/2023','Paid'),
(6433548,509444,'Credit Card','11/05/2023','Paid'),
(6433549,509445,'Cash','04/01/2024','Pending'),
(6433550,509446,'Credit Card','21/07/2024','Paid'),
(6433551,509447,'Credit Card','21/08/2024','Paid'),
(6433552,509448,'Credit Card','02/05/2024','Pending'),
(6433553,509449,'Cash','22/11/2021','Pending'),
(6433554,509450,'Credit Card','01/01/2024','Paid'),
(6433555,509451,'Cash','11/11/2024','Paid'),
(6433556,509452,'Credit Card','24/11/2025','Pending'),
(6433557,509453,'Credit Card','19/02/2023','Paid'),
(6433558,509454,'Cash','01/03/2022','Pending'),
(6433559,509455,'Credit Card','09/06/2024','Paid'),
(6433560,509456,'Credit Card','01/01/2023','Paid'),
(6433561,509457,'Credit Card','19/06/2022','Pending'),
(6433562,509458,'Cash','12/07/2021','Pending'),
(6433563,509459,'Credit Card','21/08/2024','Pending'),
(6433564,509460,'Credit Card','18/08/2023','Paid'),
(6433565,509461,'Cash','17/10/2024','Pending'),
(6433566,509462,'Credit Card','28/11/2021','Paid'),
(6433567,509463,'Cash','28/02/2022','Paid'),
(6433568,509464,'Credit Card','22/11/2024','Pending'),
(6433569,509465,'Credit Card','12/09/2023','Paid'),
(6433570,509466,'Cash','13/11/2023','Pending'),
(6433571,509467,'Cash','07/12/2024','Paid'),
(6433572,509468,'Credit Card','21/03/2023','Paid');

Select * from Payment;
```

Payment_ID	Client_ID	Payment_Method	Payment_D4ate	Payment_Status
6433543	509439	Credit Card	01/12/2023	Paid
6433544	509440	Cash	03/04/2022	Paid
6433545	509441	Credit Card	01/02/2021	Paid
6433546	509442	Cash	06/03/2025	Pending
6433547	509443	Credit Card	20/06/2023	Paid
6433548	509444	Credit Card	11/05/2023	Paid
6433549	509445	Cash	04/01/2024	Pending
6433550	509446	Credit Card	21/07/2024	Paid
6433551	509447	Credit Card	21/08/2024	Paid
6433552	509448	Credit Card	02/05/2024	Pending
6433553	509449	Cash	22/11/2021	Pending
6433554	509450	Credit Card	01/01/2024	Paid
6433555	509451	Cash	11/11/2024	Paid
6433556	509452	Credit Card	24/11/2025	Pending
6433557	509453	Credit Card	19/02/2023	Paid
6433558	509454	Cash	01/03/2022	Pending
6433559	509455	Credit Card	09/06/2024	Paid
6433560	509456	Credit Card	01/01/2023	Paid
6433561	509457	Credit Card	19/06/2022	Pending
6433562	509458	Cash	12/07/2021	Pending
6433563	509459	Credit Card	21/08/2024	Pending
6433564	509460	Credit Card	18/08/2023	Paid
6433565	509461	Cash	17/10/2024	Pending
6433566	509462	Credit Card	28/11/2021	Paid
6433567	509463	Cash	28/02/2022	Paid
6433568	509464	Credit Card	22/11/2024	Pending
6433569	509465	Credit Card	12/09/2023	Paid
6433570	509466	Cash	13/11/2023	Pending
6433571	509467	Cash	07/12/2024	Paid
6433572	509468	Credit Card	21/03/2023	Paid
NULL	NULL	NULL	NULL	NULL

Figure 4. Client Table.

```
use Hotel_information;
create table Client(
Client_ID int primary key,
Client_Type varchar(25) not null,
First_Name varchar(25) not null,
Last_Name varchar(25) not null
);
insert into Client values
(509439,'Business','Ahmed','Alsukhailah'),
(509440,'Family','Noor Ul Amin','Jhanjhi'),
(509441,'Family','Salman','Zaman'),
(509442,'School','Mohammed','Abdullah'),
(509443,'Business','Abdullah','Faisal'),
(509444,'Family','Huzaib','Wadoo'),
(509445,'Youth Group','Hatem','Algaafari'),
(509446,'Business,','Bob','Builder'),
(509447,'Family,','Enrico','Silva'),
(509448,'Family','James','Souza'),
(509449,'School','Amir','Reza'),
(509450,'Business','Rostam','Khan'),
(509451,'Family','Anastasia','Ivanova'),
(509452,'Youth Group','Mehrab','Khan'),
(509453,'Family','Hatem','Tai'),
(509454,'School','Evgenia','Servgeevna'),
(509455,'Family','Andrei','Yusupov'),
(509456,'Business','Fakhreddin','Osman'),
(509457,'Family','Hassan','Jalal'),
(509458,'School','Mir','Sohrab'),
(509459,'Family','Abdul','Wahid'),
(509460,'Business','Omar','Mukhtar'),
(509461,'Family','Fabrizio','Rossi'),
(509462,'School','Murtaza','Ali'),
(509463,'Family','Zainul','Abidin'),
(509464,'Family','Khalid','Habshi'),
(509465,'Business','Yasir','Ali'),
(509466,'School','Nasir','Mahmud'),
(509467,'Family','Sultan','Bashir'),
(509468,'Family','Bill','Gates');
  Select * from Client;
```

Client_ID	Client_Type	First_Name	Last_Name
509439	Business	Ahmed	Alsukhailah
509440	Family	Noor Ul Amin	Jhanjhi
509441	Family	Salman	Zaman
509442	School	Mohammed	Abdullah
509443	Business	Abdullah	Faisal
509444	Family	Huzaib	Wadoo
509445	Youth Group	Hatem	Algaafari
509446	Business,	Bob	Builder
509447	Family,	Enrico	Silva
509448	Family	James	Souza
509449	School	Amir	Reza
509450	Business	Rostam	Khan
509451	Family	Anastasia	Ivanova
509452	Youth Group	Mehrab	Khan
509453	Family	Hatem	Tai
509454	School	Evgenia	Servgeevna
509455	Family	Andrei	Yusupov
509456	Business	Fakhreddin	Osman
509457	Family	Hassan	Jalal
509458	School	Mir	Sohrab
509459	Family	Abdul	Wahid
509460	Business	Omar	Mukhtar
509461	Family	Fabrizio	Rossi
509462	School	Murtaza	Ali
509463	Family	Zainul	Abidin
509464	Family	Khalid	Habshi
509465	Business	Yasir	Ali
509466	School	Nasir	Mahmud
509467	Family	Sultan	Bashir
509468	Family	Bill	Gates
NULL	NULL	NULL	NULL

Figure 5. Payment Table.

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Payment_ID	Client_ID	Payment_Method	Payment_D4ate	Payment_Status
6433543	509439	Credit Card	01/12/2023	Paid
6433544	509440	Cash	03/04/2022	Paid
6433545	509441	Credit Card	01/02/2021	Paid
6433546	509442	Cash	06/03/2025	Pending
6433547	509443	Credit Card	20/06/2023	Paid
6433548	509444	Credit Card	11/05/2023	Paid
6433549	509445	Cash	04/01/2024	Pending
6433550	509446	Credit Card	21/07/2024	Paid
6433551	509447	Credit Card	21/08/2024	Paid
6433552	509448	Credit Card	02/05/2024	Pending
6433553	509449	Cash	22/11/2021	Pending
6433554	509450	Credit Card	01/01/2024	Paid
6433555	509451	Cash	11/11/2024	Paid
6433556	509452	Credit Card	24/11/2025	Pending
6433557	509453	Credit Card	19/02/2023	Paid
6433558	509454	Cash	01/03/2022	Pending
6433559	509455	Credit Card	09/06/2024	Paid
6433560	509456	Credit Card	01/01/2023	Paid
6433561	509457	Credit Card	19/06/2022	Pending
6433562	509458	Cash	12/07/2021	Pending
6433563	509459	Credit Card	21/08/2024	Pending
6433564	509460	Credit Card	18/08/2023	Paid
6433565	509461	Cash	17/10/2024	Pending
6433566	509462	Credit Card	28/11/2021	Paid
6433567	509463	Cash	28/02/2022	Paid
6433568	509464	Credit Card	22/11/2024	Pending
6433569	509465	Credit Card	12/09/2023	Paid
6433570	509466	Cash	13/11/2023	Pending
6433571	509467	Cash	07/12/2024	Paid
6433572	509468	Credit Card	21/03/2023	Paid
NULL	NULL	NULL	NULL	NULL

Figure 6. Accommodation Table.

Accomodation_...	Booking_No	Accomodation_na...	Street_name	Zip_code	City	Latitude	Longitude	Total_Capacity	Accomodation_Price_in_U...	Transactions
601	283892	Falafel Hotel	Jannah Street	58944	Aden	38	-122	100	50	17
602	283893	Five Nights at Hatem	Hatem Street	25050	Aden	-23	-43	110	120	22
603	283894	Motorbike Hotel	Motorbike Street	43544	Madina	56	-106	120	45	5
604	283895	Go to Jannah Hotel	King Fahd Street	55434	Madina	-34	151	130	55	12
605	283896	Hilton Hotel	Tun Abdul Razak Street	43434	Kuala Lumpur	42	12	140	60	16
606	283897	Sheraton Hotel	Abdullah Hukum Street	34344	Kuala Lumpur	-4	-76	150	190	3
607	283898	Ritz Hotel	Salman Khan Street	43435	Mumbai	65	-148	160	200	5
608	283899	Movenpic Hotel	King Abdullah Street	45435	Riyadh	-12	-77	170	230	6
609	283900	Kashmir Hotel	Omar Street	43345	Amman	51	10	180	130	6
610	283901	Mehran Hotel	Wall Street	33533	New York	-35	150	190	145	7
611	283902	Oriental Pearl Hotel	King Street	64555	New York	36	140	200	430	8
612	283903	Pearl Continental H...	11th Park Street	54433	New York	-23	-43	210	320	9
613	283904	Burj Jannah Hotel	Shawarma Street	43553	Karachi	41	-74	220	530	8
614	283905	Green Palace Hotel	Bobby Street	54433	London	-34	151	230	110	23
615	283906	Holiday Inn Hotel	Cheapside Street	43334	Liverpool	56	38	240	80	6
616	283907	Marriott Hotel	Jackson Street	54434	Amsterdam	-1	37	250	40	14
617	283908	Evergreen Hotel	Whitechapel Street	54344	Berlin	59	18	240	55	12
618	283909	Mubarak Hotel	Houston Street	43434	Cairo	-3	-63	230	20	19
619	283910	Noor & Co. Hotel	Texas Street	43545	Texas	45	-76	220	300	16
620	283911	Al Tawheed Hotel	Mexico Street	53444	Mexico City	-27	153	210	60	25
621	283912	Jannah Resort	Masjid Jamek Street	54434	Kuala Lumpur	49	2	200	160	9
622	283913	Crowne Plaza Hotel	Brothers Street	64534	Jakarta	-30	149	190	180	18
623	283914	Marriott Hotel	Einstein Street	54343	Bangkok	38	-122	180	235	14
624	283915	InterContinental Hotel	Shabana Street	54533	Geneva	-35	149	170	230	7
625	283916	Holiday Inn Hotel	Jerry Street	54435	Kabul	53	-6	160	120	9
626	283917	Qasr Ahmed Camp...	Tom Street	53435	Ashgabat	-7	-84	150	110	23
627	283918	Jannah Hostel	Washington Street	54434	Moscow	39	-77	140	160	8
628	283919	Hatem Resort	24th Street	54345	Jeddah	-24	-47	210	170	18
629	283920	Habibi Hamoud Hotel	Park Lane Street	54435	Madric	42	12	230	40	7
630	283921	Hyatt Hotel	Beijing Street	54543	Dhaka	-26	28	150	135	25
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

```
161  20:55:45  use Hotel_information                                                                    0 row(s) affected                                  0.00038 sec
162  20:55:51  create table Accomodation( Accomodation_ID int primary key, Booking_No int not null, Foreign Key (Booking_NO)references Booking(Booking_NO), Accomodation_name var...  0 row(s) affected  0.014 sec
163  20:55:54  insert into Accomodation values  (601,283892,'Falafel Hotel','Jannah Street',58944,'Aden',37.7749,-122.4194,100,50,17), (602,283893,'Five Nights at Hatem','Hatem Street',25...  30 row(s) affected Records: 30  Duplicates: 0  Warnin...  0.0048 sec
164  20:55:56  Select * from Accomodation LIMIT 0, 1000                                                30 row(s) returned                                 0.00083 sec / 0.000...
```

 doi:10.20944/preprints202501.0872.v1


```
use Hotel_information;
create table Additional_Facilities (
Additional_Faciltiies_ID int primary key,
Accomodation_ID int not null,
Foreign Key (Accomodation_ID)references Accomodation(Accomodation_ID),
Facility_Name varchar(25) not null,
Equipment_Availibility  varchar(25) not null,
Payment_charges_in_USD int not null,
Booked_from date not null,
Booked_till date not null
);
insert into Additional_Facilities values
(2001,601,'Basketball','Available',10,'2023-12-11','2023-12-14'),
(2002,603,'Theatre','Not Available',10,'2023-12-12','2023-12-15'),
(2003,609,'Meeting Hall','Available',10,'2023-12-13','2023-12-18'),
(2004,607,'Gaming Room','Available',10,'2023-12-14','2023-12-19'),
(2005,602,'Sauna','Not Available',10,'2023-12-15','2023-12-20'),
(2006,602,'Billard Room','Available',10,'2023-12-18','2023-12-21'),
(2007,610,'Children Play room','Available',10,'2023-12-19','2023-12-22'),
(2008,615,'Gym','Not Available',10,'2023-12-20','2023-12-25'),
(2009,630,'Swimming Pool','Available',10,'2023-12-21','2023-12-26'),
(2010,625,'Turkish Bath','Available',10,'2023-12-22','2023-12-27');

Select * from Additional_Facilities;
```

Additional_Facilties_...	Accomodation_...	Facility_Name	Equipment_Availibil...	Payment_charges_in_U...	Booked_from	Booked_till
2001	601	Basketball	Available	10	2023-12-11	2023-12-14
2002	603	Theatre	Not Available	10	2023-12-12	2023-12-15
2003	609	Meeting Hall	Available	10	2023-12-13	2023-12-18
2004	607	Gaming Room	Available	10	2023-12-14	2023-12-19
2005	602	Sauna	Not Available	10	2023-12-15	2023-12-20
2006	602	Billard Room	Available	10	2023-12-18	2023-12-21
2007	610	Children Play room	Available	10	2023-12-19	2023-12-22
2008	615	Gym	Not Available	10	2023-12-20	2023-12-25
2009	630	Swimming Pool	Available	10	2023-12-21	2023-12-26
2010	625	Turkish Bath	Available	10	2023-12-22	2023-12-27
NULL	NULL	NULL	NULL	NULL	NULL	NULL

Figure 7. Additional Facilities Table.

```
use Hotel_information;
create table Booking(
Booking_NO int primary key,
Accomodation_ID int not null,
Foreign Key (Accomodation_ID)references Accomodation(Accomodation_ID),
Payment_ID int not null,
Foreign Key (Payment_ID)references Payment(Payment_ID),
Date_and_Time  date not null,
Number_of_People int not null,
Catering_Choice varchar(25) not null,
Reservee_Fname varchar(25) not null,
Reservee_Lname varchar(25) not null,
Accomodation_Choice varchar(25) not null,
Additional_Requested_Facility varchar(25) not null,
Check_In_Date date not null,
Check_Out_Date date not null,
Room_Type varchar(25) not null
);
insert into Booking values
(283892,601,6433543,'2023-12-01',2,'Restaurant','Ahmed','Alsukhailah','4-Star Hotel','Wifi','2023-11-28','2023-12-01','Luxury suite'),
(283893,602,6433544,'2022-04-03',3,'Restaurant','Noor Ul Amin','Jhanjhi','4-Star Hotel','TV','2022-04-01','2022-04-03','King suite'),
(283894,603,6433545,'2021-02-01',4,'Self-Catering','Salman','Zaman','4-Star Hotel','Microwave','2021-01-27','2021-02-01','King suite'),
(283895,604,6433546,'2025-03-06',2,'Restaurant','Mohammed','Abdullah','4-Star Hotel','Wifi','2025-03-02','2025-03-06','Double'),
(283896,605,6433547,'2023-06-20',4,'Self-Catering','Abdullah','Faisal','4-Star Hotel','extra bed','2023-06-15','2023-06-20','Dormitory'),
(283897,606,6433548,'2023-05-11',2,'Self-Catering','Huzaib','Wadoo','4-Star Hotel','Wifi','2023-05-08','2023-05-11','Dormitory'),
(283898,607,6433549,'2024-01-04',3,'Restaurant','Hatem','Algaafari','4-Star Hotel','TV','2024-01-02','2024-01-04','Dormitory'),
(283899,608,6433550,'2024-07-21',4,'Self-Catering','Bob',"Da'Builder",'4-Star Hotel','Wifi','2024-07-17','2024-07-21','Dormitory'),
(283900,609,6433551,'2024-08-21',2,'Restaurant','Enrico',"D'Silva",'4-Star Hotel','Wifi','2024-08-18','2024-08-21','Single'),
(283901,610,6433552,'2024-05-02',2,'Self-Catering','James',"D'Souza",'4-Star Hotel','extra bed','2024-05-01','2024-05-02','Dormitory'),
(283902,611,6433553,'2021-11-22',3,'Restaurant','Amir','Reza','4-Star Hotel','Wifi','2021-11-20','2021-11-22','Dormitory'),
(283903,612,6433554,'2024-01-01',2,'Restaurant','Rostam','Khan','4-Star Hotel','Wifi','2023-12-29','2024-01-01','Dormitory'),
(283904,613,6433555,'2024-11-11',2,'Restaurant','Anastasia','Ivanova','4-Star Hotel','Wifi','2024-11-07','2024-11-11','Double'),
(283905,614,6433556,'2025-11-24',3,'Self-Catering','Mehrab','Khan','4-Star Hotel','TV','2025-11-20','2025-11-24','Dormitory'),
(283906,615,6433557,'2023-02-19',5,'Self-Catering','Hatem','Tai','4-Star Hotel','Wifi','2023-02-16','2023-02-19','King suite'),
(283907,616,6433558,'2022-03-01',3,'Self-Catering','Evgenia','Servgeevna','4-Star Hotel','extra bed','2022-02-28','2024-06-09','Dormitory'),
(283908,617,6433559,'2024-06-09',4,'Restaurant','Andrei','Yusupov','4-Star Hotel','Wifi','2024-06-06','2024-06-09','King suite'),
(283909,618,6433560,'2023-01-01',2,'Restaurant','Fakhreddin','Osman','4-Star Hotel','Wifi','2022-12-28','2023-01-01','Dormitory'),
(283910,619,6433561,'2022-06-19',3,'Self-Catering','Hassan','Jalal','4-Star Hotel','Microwave','2022-06-11','2022-06-19','Double'),
(283911,620,6433562,'2021-07-12',2,'Self-Catering','Mir','Sohrab','4-Star Hotel','Wifi','2021-07-05','2021-07-12','Single'),
(283912,621,6433563,'2024-08-21',2,'Restaurant','Abdul','Wahid','4-Star Hotel','Wifi','2024-08-16','2024-08-21','Single'),
(283913,622,6433564,'2023-08-18',3,'Restaurant','Omar','Mukhtar','4-Star Hotel','TV','2023-08-13','2023-08-18','Dormitory'),
(283914,623,6433565,'2024-10-27',4,'Self-Catering','Fabrizio','Rossi','4-Star Hotel','Wifi','2024-10-12','2024-10-27','King suite'),
(283915,624,6433566,'2021-11-28',3,'Self-Catering','Murtaza','Ali','4-Star Hotel','Wifi','2021-11-22','2021-11-28','Double'),
(283916,625,6433567,'2022-02-28',2,'Restaurant','Zainul','Abidin','4-Star Hotel','TV','2022-02-25','2022-02-28','Dormitory'),
(283917,626,6433568,'2024-11-22',2,'Self-Catering','Khalid','Habshi','4-Star Hotel','Wifi','2024-11-19','2024-11-22','Dormitory'),
(283918,627,6433569,'2023-09-12',2,'Restaurant','Yasir','Ali','4-Star Hotel','extra bed','2023-09-08','2023-09-12','Single'),
(283919,628,6433570,'2023-11-13',2,'Self-Catering','Nasir','Mahmud','4-Star Hotel','Wifi','2023-11-10','2023-11-13','Single'),
(283920,629,6433571,'2024-12-07',3,'Restaurant','Sultan','Bashir','4-Star Hotel','TV','2024-12-03','2024-12-07','Double'),
(283921,630,6433572,'2023-03-21',4,'Restaurant','Bill','Gates','4-Star Hotel','Wifi','2023-03-15','2023-03-21','King suite');
Select * from Booking;
```

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Figure 8. Booking Table.

```
drop database Hotel_information;
use Hotel_information;
drop table staff;
create table Staff(
Staff_ID int primary key,
Outdoor_Facilities_ID int not null,
Foreign Key (Outdoor_Facilities_ID)references Outdoor_Facilties(Outdoor_Facilties_ID),
First_Name varchar(25) not null,
Last_Name varchar(25) not null,
Certification varchar(100) not null,
Contract_details varchar(25) not null,
Date_of_Birth date not null,
Age int not null,
Gender varchar(25) not null,
Start_Date date not null,
End_Date date not null,
Hire_Charges_in_USD int not null
);
insert into Staff values
(38943,1001,'Aiden','Michael',"Bachelor's in Hotel Management, Bachelor's in Hospitality",'Full time','1999-12-21',24,'M','2021-12-21','2024-12-21',200),
(38944,1001,'Henry','Gabriel',"Bachelor's in Hotel Management",'Part time','2000-11-04',23,'M','2022-11-22','2025-11-22',100),
(38945,1001,'Sebastian','Leo',"Master's in Tourism",'Full time','2001-01-21',22,'M','2025-03-12','2028-03-12',350),
(38946,1001,'Samuel','Connor',"Bachelor's in Tourism",'Full time','2003-05-26',20,'M','2021-12-21','2026-12-21',100),
(38947,1001,'David','Jonathan',"Bachelor's in Tourism",'Full time','2002-11-02',21,'M','2022-11-29','2025-11-29',100),
(38948,1002,'Jayden','Cameron',"Bachelor's in Hotel Management, Bachelor's in Hospitality",'Full time','1998-10-23',25,'M','2021-10-28','2023-10-28',200),
(38949,1002,'Grayson','Wesley',"Bachelor's in Hotel Management",'Part time','1992-12-14',31,'M','2020-12-25','2025-12-25',100),
(38950,1002,'Elissa','Adam',"Bachelor's in Tourism",'Full time','1998-11-21',25,'F','2023-10-30','2028-10-30',100),
(38951,1002,'Angel','Luca',"Bachelor's in Tourism",'Full time','2000-01-01',23,'F','2023-12-31','2025-12-31',100),
(38952,1002,'Camden','Emmett',"Master's in Tourism",'Full time','2001-06-13',22,'M','2024-01-03','2026-01-03',300),
(38953,1005,'Alex','Elliott',"Bachelor's in Hotel Management, Bachelor's in Hospitality",'Part time','2000-05-01',23,'M','2022-03-04','2024-03-04',200),
(38954,1005,'Emmanuel','Antonio',"Bachelor's in Hotel Management",'Full time','1993-11-14',30,'M','2023-02-19','2026-02-19',100),
(38955,1010,'Kaiden','Grant',"Master's in Tourism",'Full time','1992-04-28',31,'M','2022-01-18','2027-01-18',300),
(38956,1005,'Myles','Steven',"Bachelor's in Tourism",'Full time','1995-12-11',28,'M','2022-09-21','2029-09-21',100),
(38957,1004,'River','Liam',"Bachelor's in Hotel Management, Bachelor's in Hospitality",'Full time','1996-10-25',24,'M','2022-08-10','2025-09-22',200),
(38958,1002,'Thiago','Bryson',"Master's in Tourism",'Full time','1987-11-12',36,'M','2021-01-11','2027-09-23',300),
(38959,1004,'Everett','Tyler',"Bachelor's in Hotel Management, Bachelor's in Hospitality",'Full time','1990-02-21',33,'M','2023-07-12','2029-09-24',200),
(38960,1010,'Luis','Braxton',"Master's in Tourism",'Part time','1984-03-12',39,'M','2024-09-13','2029-09-25',300),
(38961,1004,'Logan','Max',"Bachelor's in Tourism",'Full time','2002-04-14',21,'M','2022-11-20','2028-09-26',100),
(38962,1004,'Ezekiel','Alexander',"Master's in Tourism",'Full time','1998-05-05',25,'M','2022-12-23','2026-09-27',300),
(38963,1006,'River','Matteo',"Bachelor's in Hotel Management, Bachelor's in Hospitality",'Full time','1999-07-17',24,'M','2022-01-18','2025-09-28',200),
(38964,1006,'Nicolas','Dawson',"Bachelor's in Hotel Management",'Full time','2001-11-08',22,'M','2021-11-19','2026-09-29',100),
(38965,1008,'Justin',',Patrick',"Bachelor's in Tourism, Bachelor's in Hospitality",'Full time','2002-05-01',21,'M','2023-01-09','2030-09-30',200),
(38966,1006,'Sarah','Abraham',"Master's in Tourism",'Full time','1994-12-09',29,'F','2024-01-15','2031-10-01',300),
(38967,1009,'Lorenzo','Victor',"Bachelor's in Hotel Management",'Part time','2000-08-12',23,'M','2022-09-24','2029-10-02',100),
(38968,1006,'Adrian','Charles',"Bachelor's in Hotel Management, Bachelor's in Hospitality",'Full time','1998-09-16',25,'M','2023-11-23','2028-10-03',200),
(38969,1003,'Connor','Carson',"Bachelor's in Tourism",'Full time','2000-06-19',23,'M','2022-09-21','2027-10-04',100),
(38970,1007,'Jayden','Nicholas',"Master's in Tourism, Bachelor's in Hospitality",'Full time','1983-01-01',40,'M','2022-06-24','2029-10-05',450),
(38971,1008,'Luke','Declan',"Bachelor's in Hotel Management",'Full time','1997-10-13',26,'M','2023-12-12','2027-10-06',100),
(38972,1003,'Jack','Ayden',"Bachelor's in Tourism",'Full time','1996-06-02',27,'M','2024-09-22','2026-10-07',100)
Select * from Staff;
```

Figure 9. Staff Table.

Staff_ID	Outdoor_Facilties_...	First_Name	Last_Name	Certification	Contract_deta...	Date_of_Birth	Age	Gender	Start_Date	End_Date	Hire_Charges_in
38943	1001	Aiden	Michael	Bachelor's in Hotel Management, Bachelor's in...	Full time	1999-12-21	24	M	2021-12-21	2022-12-21	200
38944	1001	Henry	Gabriel	Bachelor's in Hotel Management	Part time	2000-11-04	23	M	2022-11-22	2025-11-22	100
38945	1001	Sebastian	Leo	Master's in Tourism	Full time	2001-01-21	22	M	2025-03-12	2028-03-12	350
38946	1001	Samuel	Connor	Bachelor's in Tourism	Full time	2003-05-26	20	M	2021-12-21	2026-12-21	100
38947	1001	David	Jonathan	Bachelor's in Tourism	Full time	2002-11-02	21	M	2022-11-29	2025-11-29	100
38948	1002	Jayden	Cameron	Bachelor's in Hotel Management, Bachelor's in...	Full time	1998-10-23	25	M	2021-10-28	2022-10-28	200
38949	1002	Grayson	Wesley	Bachelor's in Hotel Management	Part time	1992-12-14	31	M	2020-12-25	2025-12-25	100
38950	1002	Elissa	Adam	Bachelor's in Tourism	Full time	1998-11-21	25	F	2023-10-30	2028-10-30	100
38951	1002	Angel	Luca	Bachelor's in Tourism	Full time	2000-01-01	23	F	2023-12-31	2025-12-31	100
38952	1002	Camden	Emmett	Master's in Tourism	Full time	2001-06-13	22	M	2024-01-03	2026-01-03	300
38953	1005	Alex	Elliott	Bachelor's in Hotel Management, Bachelor's in...	Part time	2000-05-01	23	M	2022-03-04	2024-03-04	200
38954	1005	Emmanuel	Antonio	Bachelor's in Hotel Management	Full time	1993-11-14	30	M	2023-02-19	2026-02-19	100
38955	1010	Kaiden	Grant	Master's in Tourism	Full time	1992-04-28	31	M	2022-01-18	2027-01-18	300
38956	1005	Myles	Steven	Bachelor's in Tourism	Full time	1995-12-11	28	M	2022-09-21	2029-09-21	100
38957	1004	River	Liam	Bachelor's in Hotel Management, Bachelor's in...	Full time	1996-10-25	24	M	2022-08-10	2025-09-22	200
38958	1002	Thiago	Bryson	Master's in Tourism	Full time	1987-11-12	36	M	2021-01-11	2027-09-23	300
38959	1004	Everett	Tyler	Bachelor's in Hotel Management, Bachelor's in...	Full time	1990-02-21	33	M	2023-07-12	2029-09-24	200
38960	1010	Luis	Braxton	Master's in Tourism	Part time	1984-03-12	39	M	2024-09-13	2029-09-25	300
38961	1004	Logan	Max	Bachelor's in Tourism	Full time	2002-04-14	21	M	2022-11-20	2028-09-26	100
38962	1004	Ezekiel	Alexander	Master's in Tourism	Full time	1998-05-05	25	M	2022-12-23	2026-09-27	300
38963	1006	River	Matteo	Bachelor's in Hotel Management, Bachelor's in...	Full time	1999-07-17	24	M	2022-01-18	2025-09-28	200
38964	1006	Nicolas	Dawson	Bachelor's in Hotel Management	Full time	2001-11-08	22	M	2021-11-19	2026-09-29	100
38965	1008	Justin	,Patrick	Bachelor's in Tourism, Bachelor's in Hospitality	Full time	2002-05-01	21	M	2023-01-09	2030-09-30	200
38966	1006	Sarah	Abraham	Master's in Tourism	Full time	1994-12-09	29	F	2024-01-15	2031-10-01	300
38967	1009	Lorenzo	Victor	Bachelor's in Hotel Management	Part time	2000-08-12	23	M	2022-09-24	2029-10-02	100
38968	1006	Adrian	Charles	Bachelor's in Hotel Management, Bachelor's in...	Full time	1998-09-16	25	M	2023-11-23	2028-10-03	200
38969	1003	Connor	Carson	Bachelor's in Tourism	Full time	2000-06-19	23	M	2022-09-21	2027-10-04	100
38970	1007	Jayden	Nicholas	Master's in Tourism, Bachelor's in Hospitality	Full time	1983-01-01	40	M	2022-06-24	2029-10-05	450
38971	1008	Luke	Declan	Bachelor's in Hotel Management	Full time	1997-10-13	26	M	2023-12-12	2027-10-06	100
38972	1003	Jack	Ayden	Bachelor's in Tourism	Full time	1996-06-02	27	M	2024-09-22	2026-10-07	100
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Figure 10. Outdoor Facilities Table.

5. Results (Queries)

In this sections we perform the SQL queries to test the system

 doi:10.20944/preprints202501.0872.v1

Writing SQL query to list down total number of rooms that are of type dormitories.

```
SELECT COUNT(Accomodation_ID) FROM Booking WHERE Room_Type = 'Dormitory';
```

Result Grid | Filter Ro

COUNT(Accomodation_I...
13

187 21:02:36 SELECT COUNT(Accomodation_ID) FROM Booking WHERE Room_Type = 'Dormitory' LIMIT 0, 1000 1 row(s) returned 0.0067 sec / 0.00001...

Computing an increase of 6% on booking charges for all the facilities. Upon having the increased price now compute the raw income that would be achieved in 2023 using the new price.

```
SELECT (Accomodation_Price_in_USD * 1.06) AS New_price from Accomodation;
```

New_price
53.00
127.20
47.70
58.30
63.60
201.40
212.00
243.80
137.80
153.70
455.80
339.20
561.80
116.60
84.80
42.40
58.30
21.20
318.00
63.60
169.60
190.80
249.10
243.80
127.20
116.60
169.60
180.20
42.40
143.10

Providing a report that indicates the total number of booking closed by staff in the year 2022.

```
SELECT COUNT(Booking_No) AS total_bookings_closed FROM Booking WHERE YEAR(Check_Out_Date) = 2022;
```

98:56

Result Grid | Filte

total_bookings_clo...
3

188 21:03:04 SELECT COUNT(Booking_No) AS total_bookings_closed FROM Booking WHERE YEAR(Check_Out_Date) = 2022 LIMIT 0, 1000 1 row(s) returned 0.0013 sec / 0.00001...

Staff_ID	First_Name	Last_Name	total_sales
38943	Aiden	Michael	200
38948	Jayden	Cameron	200

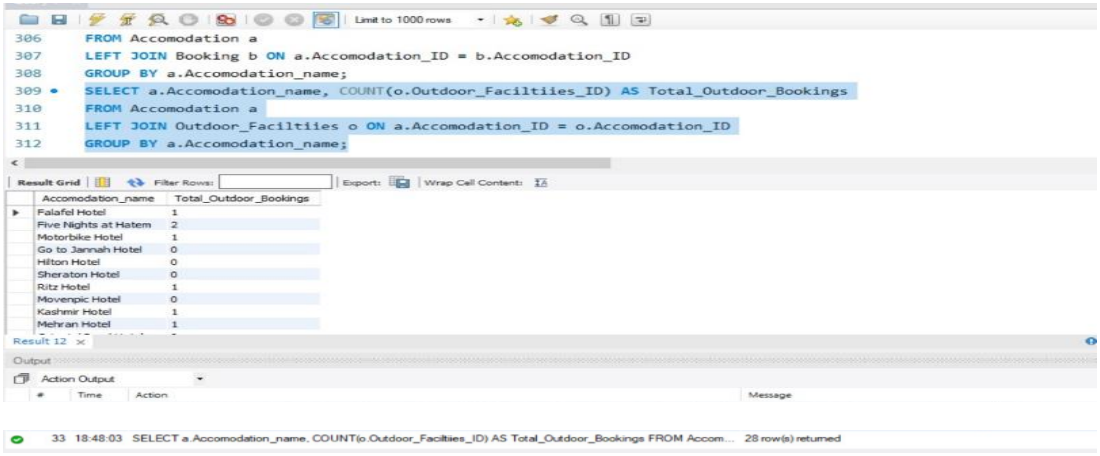
Identify from the system the staff that have closed the highest sales for the year 2022.

101 19:46:27 SELECT Staff_ID, First_Name, Last_Name, SUM(Hire_Charges_in_USD) AS total_sales FROM Staff WHERE YEAR(End_Date)= 202... 2 row(s) returned

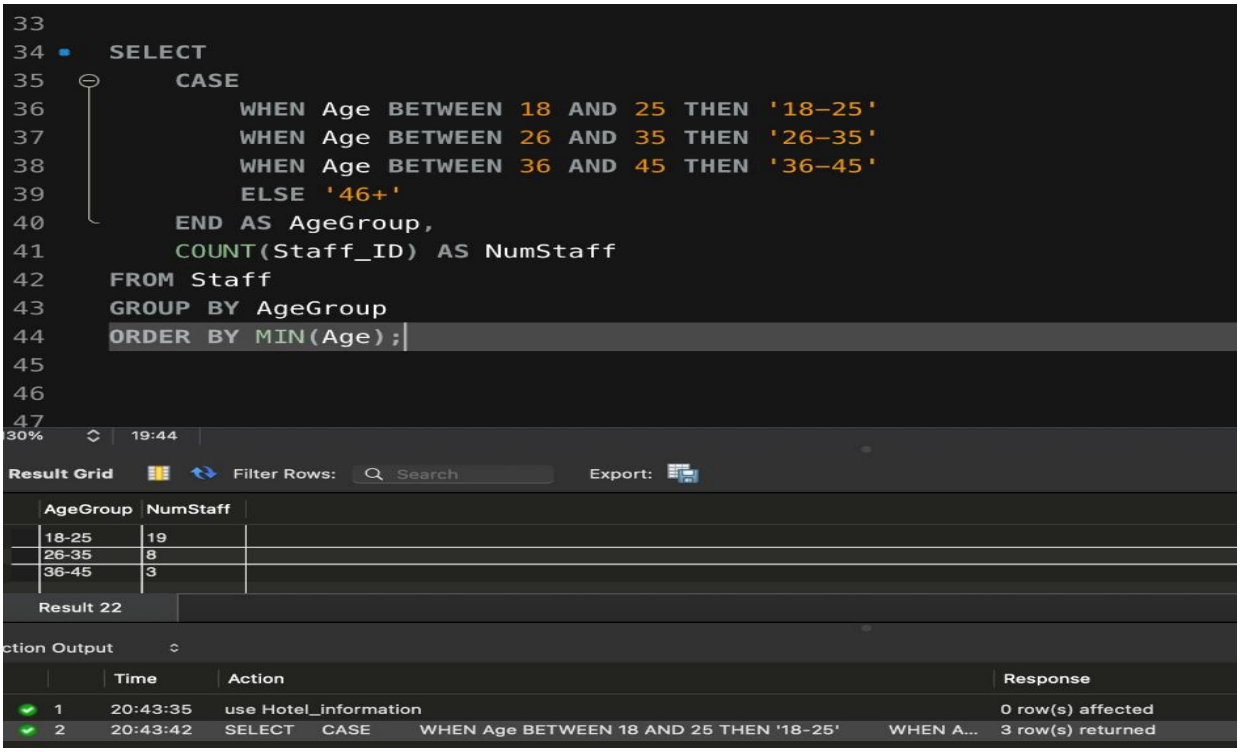
```
SELECT Staff_ID, First_Name, Last_Name, SUM(Hire_Charges_in_USD) AS total_sales FROM Staff WHERE YEAR(End_Date)= 2022 GROUP BY Staff_ID order by total_sales DESC;
```

Finding the total number of booked outdoor facilities for each accommodation:

 doi:10.20944/preprints202501.0872.v1

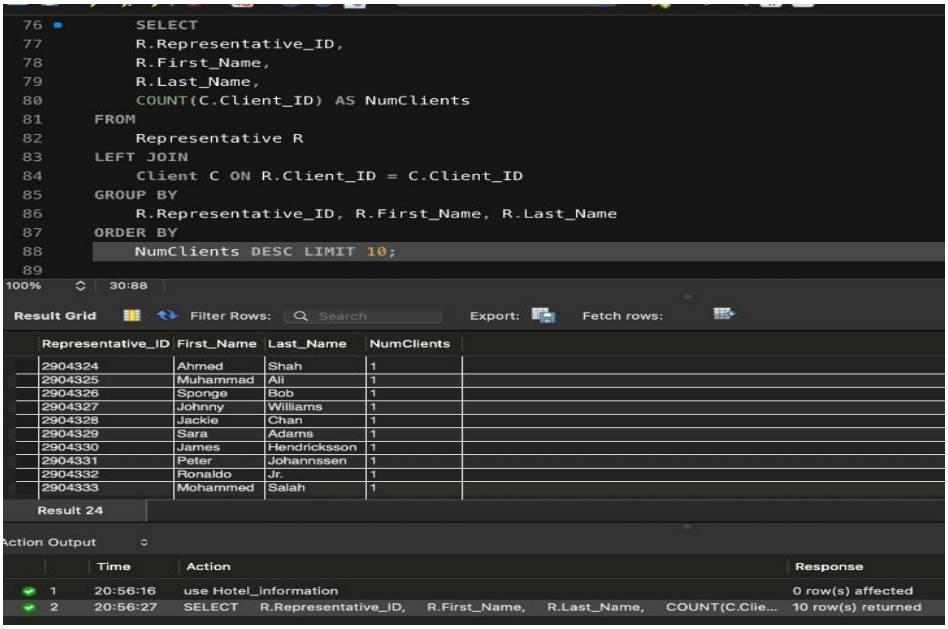


1. Query to list age groups of staff

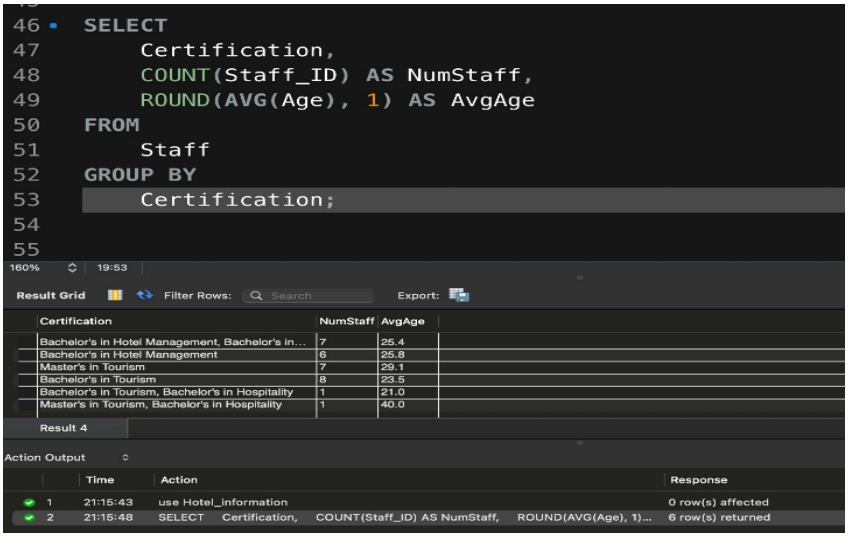


2. Query to list the 10 representatives with highest number of clients

 doi:10.20944/preprints202501.0872.v1



3. Query to list the sum of payments done by clients of each Client_Type
4. Query to show the number of staff by certification and average age of staff holding each certification



Following is a set of queries that work out specific data and provide necessary insights into business outlooks, operational efficiency, and financial evaluation, among other facets that are stored in the EMC database. The first five of them are discussed below:

Query 1: Retrieval of high service transaction in states or towns

This query lists the businesses that have had the most service transactions, grouped by state or town. It summarizes facilities and services booked by businesses to show the level of activity and preferences of clients by region. Such information enables EMC to target high-value clients in certain areas and to develop marketing and enhance its services accordingly.

Query 2: Categorizing Clients by Type with Representative Details

This query categorizes clients into business, school, and youth groupings while fetching names and contact numbers of their representatives. It further enhances the management of clients through a clear outlook on the types of clients and their contacts. Such information aids in targeted communication approaches and follow-ups effectively.

Query 3: Counting Dormitory-Type Rooms

This query calculates the sum of all rooms within the database classified as dorms. The result will help EMC to estimate, in total capacity terms, about hosting, specifically large groups of people

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like schools or companies. This will also be of assistance when planning enhancements or alterations based on this demand.

Query 4: Anticipated Revenue Given an Increase in the Facility Charge

This query calculates a 6% increase in the booking charges of all facilities and develops the forecasted raw income for 2023 based on its updated prices. In this way, EMC will be able to understand the financial impact of changing the price and plan future pricing.

Query 5: Staff Booking Performance in 2022

This query will report the total number of bookings closed by each staff member in 2022, identify high-performing employees, enable performance evaluation, and give insights into the extent of reward allocation. The data also displays operational efficiency with regard to resource utilization in a staff team. These queries thus put together a strategic framework for analyzing client behavior, optimizing resource management, and forecasting financial outcomes to aid informed decisions and operational improvements for EMC.

6. Discussion

Due to the pandemic, several preventive and monitoring measures had to be put in place for the safety of both staff and clients. Some of the major measures include adding the "Vaccination Status" attribute in the Staff and Client tables. This will include information such as the number of doses taken by the staff and clients, and the date of vaccination completion to calculate the percentage coverage of the whole vaccination course within the institution. This will help companies maintain better control, especially in decision-making about whose cases are putting people at a high risk of either being infected or being an infecting agent.

This is further supported by the introduction of a new table named "COVID_Test_History". This table will keep a record of relevant information concerning testing dates, the results of staff and clients tested, whether positive or negative, and subsequent measures taken. In this regard, the table "Quarantine" will be created for those who are positive to capture the quarantine dates and times. The relational structure separated staff and client health data, accordingly, creating appropriate linkages done through foreign keys such as the "Test_ID" in the Quarantine table to show clear, organized testing and quarantine history.

Another critical measurement would be the disinfection of the rooms and all those places, including lobbies, to which one is exposed. There would also be a "Rooms" table that tracks room occupancy with a column indicating whether the occupant tested positive or not, so the company knows which room needs cleaning and disinfection after such person has left. For keeping track of disinfection, the "Disinfection" table will be provided with a list of disinfection schedules in operation for all areas, ensuring that rooms and spaces are kept germ-free between use. Temperature checks of staff and clients alike will also be vital in the monitoring of health status. Two different tables, "Staff_Temperature_Check" and "Client_Temperature_Check," respectively, will be used to store regular temperature checks during staff inspections and upon client entry. Businesses can quickly identify symptomatic individuals by recording the temperature readings and the date and time these checks are performed and take further action like restricting access to the premises or encouraging testing.

Thirdly, the pandemic is very likely to reduce the consumption of outdoor and extra facilities, which may cause temporary suspension or layoffs of part-time workers. In such a perspective, it reveals that the pandemic influences businesses financially and operationally, as such businesses must manage the headcount of employees and available resources. The tables proposed here not only help track public health data but also are instruments to adjust resource utilization optimally in insecure times. In short, the suggested data structure will bring a sound framework to bear in monitoring and mitigating the impacts of COVID-19 in a business setting. It includes vaccination status, test history, quarantine records, room occupancy, disinfection schedules, and temperature checks, all important features for a business to take effective action on the pandemic without affecting the health of staff and clients. However, businesses must constantly adapt and fine-tune these

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measures as new challenges emerge, specifically with the dynamics of the pandemic and its ongoing variants.

7. Conclusions

In conclusion, from this assignment, we learn that the development of a Database System is first identified through the requirements needed, followed by creating an ER diagram which will be acting as a blueprint for developing a physical model and, in the end, use it to design our MySQL database where we input all our records. We also learned the foreign keys that link entities with each other; for every entity, the creation of tables will be done in MySQL, and the relationships along with cardinalities in both Physical and ER Diagrams. Now, we actually did some Part C—simple MySQL commands we used and tried to delve into what was going on conceptually behind the commands. We then applied the said knowledge to develop five custom complex queries in Part D. In Part E, we discussed how our database system could be affected by the global COVID-19 pandemic that began in late 2019 and the changes that would be necessary for the system to remain efficient during the pandemic. With that, we concluded our assignment.

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