ROAD SAFETY

A Case Study Submitted to

DEPARTMENT
of
COMPUTER SCIENCE AND SYSTEMS ENGINEERING

Submitted by

SK SAMEERA	**20121A15A3**
P VARSHINI	**21121A1588**

Under the Guidance of
M. P. Yogendra Prasad
Assistant Professor

Department of Computer Science and Systems Engineering
Sree Vidyanikethan Engineering College
(Autonomous)
Sree Sainath Nagar, Tirupati – 517 102

(2022-2023)

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)
Sree Sainath Nagar, Tirupati

DEPARTMENT OF COMPUTER SCIENCE AND SYSTEMS ENGINEERING

CERTIFICATE

This is to certify that the Case Study report entitled

ROAD SAFETY

is the Bonafide work done by

SK SAMEERA	**20121A15A3**
P VARSHINI	**21121A1588**

in the Department of **Computer Science and Systems Engineering**, and submitted to Computer Science and Systems Engineering during the academic year 2022-2023. This work has been carried out under my supervision.

Guide:	***Head:***
P. Yogendra Prasad Assistant Professor Dept. of CSSE	Dr. K. Ramani Professor & Head Dept. of CSSE

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DEPARTMENT OF COMPUTER SCIENCE AND SYSTEMS ENGINEERING

VISION

To become a center of excellence in Computer Sciences and Systems Engineering through teaching, training, research and innovation to create quality engineering professionals who can solve the growing complex problems of the society.

MISSION

- ✔ Established with the cause of development of technical education in advanced computer sciences and engineering with applications to systems thereby serving the society and nation.
- ✔ Transfer of Knowledge through contemporary curriculum and fostering faculty and student development.
- ✔ Create keen interest for research and innovation among students and faculty by understanding the needs of the society and industry.
- ✔ Skill development among diversity of students in technical domains and profession for development of systems and processes to meet the demands of the industry and research.
- ✔ Imbibing values and ethics in students for prospective and promising engineering professions and developing a sense of respect for all.

PROGRAM EDUCATIONAL OBJECTIVES

1. Demonstrate competencies in the Computer Science domain and Management with an ability to comprehend, analyze, design and create software systems for pursuing advanced studies in the areas of interest.
2. Evolve as entrepreneurs or be employed by acquiring required skill sets for developing computer systems and solutions in multi-disciplinary areas.
3. Exhibit progression and professional skill development in Computer programming and systems development with ethical attitude through life-long learning.

PROGRAM SPECIFIC OUTCOMES

PSO1: Employ Systems Approach to model the solutions for real life problems, design and develop software systems by applying Modern Tools.

PSO2: Develop solutions using novel algorithms in High Performance Computing and Data Science.

PSO3: Use emerging technologies for providing security and privacy to design, deploy and manage network systems.

PROGRAM OUTCOMES

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

II B. Tech. – II Semester

(20BT40531) DATABASE MANAGEMENT SYSTEMS LAB

COURSE OUTCOMES

CO1. Analyze the requirements of a given database problem and design viable ER-Models for implementation of database.

CO2. Create database schemas, select and apply suitable integrity constraints for querying databases using SQL interface.

CO3. Develop and interpret PL/SQL blocks to centralize database applications for maintainability and reusability.

CO4. Develop database applications for societal applications such as ticket reservation system, employee payroll system using modern tools.

CO5. Work independently and communicate effectively in oral and written forms.

DECLARATION

We hereby declare that this project report titled “Road Safety” is a genuine work carried out by us, in B.Tech (Computer Science and Systems Engineering) degree course of Jawaharlal Nehru Technological University Anantapur and has not been submitted to any other course or University for the award of any degree by us.

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea / data / fact / source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Signature of the students

1.

2.

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)

Department of Computer science and Systems Engineering

ROAD SAFETY ANALYSIS DATABASE

ABSTRACT

This paper presents an analysis of road safety in a database management system (DBMS) context. The paper provides a problem statement for designing and implementing a DBMS that can efficiently store and process large amounts of road safety data. The data includes information about road conditions, driver behavior, vehicle types, and accident outcomes. By analyzing this data, policymakers and law enforcement agencies can identify patterns and trends in road accidents and take action to improve road safety. The paper highlights the importance of data-driven approaches to reduce the number of road accidents and fatalities .The DBMS should be able to integrate with other systems and data sources, such as traffic monitoring systems and weather forecasts, to enhance the accuracy and completeness of the data. The paper emphasizes the need for an effective DBMS to improve road safety and save lives. The abstract for a road safety analysis in a database management system (DBMS) describes the use of data-driven approaches to enhance road safety. In this study, various data sources such as accident records, traffic data, weather data, and road infrastructure data are integrated and analyzed in a DBMS. The DBMS provides a platform for efficient and effective data storage, retrieval, and analysis to support decision-making related to road safety. Through the use of data mining and statistical techniques, patterns and trends are identified and analyzed to provide insights into the factors contributing to road accidents. The study aims to assist policy makers' and stakeholders in making informed decisions to improve road safety and reduce accidents

P.Varshini (21121A1588)

S.K Sameera(21121A15A3)

TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION

1.1 Introduction to the topic

Road safety is a critical concern worldwide as traffic accidents continue to cause significant loss of lives and property. To address this issue, implementing a comprehensive Road Safety Project utilizing a Database Management System (DBMS) can prove highly effective. This project aims to leverage the power of data management and analysis to enhance road safety measures, reduce accidents, and improve overall transportation systems.

The primary objective of the Road Safety Project is to collect, store, process, and analyze data related to traffic accidents, road conditions, vehicle registrations, and driver behavior. By using a robust DBMS, such as a relational database or NoSQL solution, this project can handle vast amounts of data from various sources, ensuring efficient storage, retrieval, and manipulation.

The DBMS will play a pivotal role in organizing and integrating diverse data sets, including accident reports, traffic citations, road infrastructure details, and weather conditions. Through careful data modeling and normalization techniques, the project will establish structured relationships between different entities, enabling the generation of valuable insights and actionable information.

One crucial aspect of the Road Safety Project is the implementation of real-time data acquisition systems. These systems can incorporate technologies such as sensors, surveillance cameras, and mobile applications to capture data on traffic flow, speed violations, and road conditions. The DBMS will serve as the central repository for this data, enabling timely analysis and decision-making.

Additionally, the project will utilize data analytics and visualization techniques to identify patterns, trends, and potential risk factors associated with road accidents. By leveraging

machine learning algorithms, the DBMS can predict accident-prone areas, driver behaviors, and hazardous road conditions. These insights can aid authorities in designing targeted interventions, allocating resources effectively, and implementing preventive measures to minimize accidents.

Moreover, the Road Safety Project will promote collaboration between various stakeholders, including government agencies, law enforcement, transportation departments, and road safety organizations. The DBMS will facilitate data sharing and secure access controls to ensure that the right information is available to the relevant entities, thereby enabling effective coordination and cooperation.

1.2 Problem Statement

Problem Statement: Road Safety Project in DBMS

The issue of road safety is a pressing concern that demands urgent attention. Despite numerous measures and initiatives taken to improve road safety, traffic accidents continue to claim countless lives and cause significant damage to property. The lack of an efficient and integrated system for data management and analysis poses a major challenge in effectively addressing this problem. Therefore, the road safety project aims to address the following key issues Inadequate Data Management: The existing road safety systems often suffer from fragmented data collection and storage methods. Various organizations, such as law enforcement agencies, transportation departments, and hospitals, maintain separate databases, resulting in data silos and redundancy. This lack of centralized data management hinders accurate analysis, making it difficult to identify accident-prone areas, trends, and risk factors.

Limited Data Integration: The absence of a unified platform for data integration poses a significant obstacle to comprehensive road safety analysis. The current systems struggle to integrate data from different sources, such as traffic accident reports, vehicle registration databases, driver records, and road infrastructure information. This fragmented approach inhibits a holistic understanding of the factors contributing to accidents and limits the effectiveness of preventive measures.

The road safety project in DBMS aims to overcome these challenges by developing a comprehensive and integrated system for data management, analysis, and collaboration. By addressing the gaps in data management, integrating diverse data sources, leveraging advanced analytics techniques, and facilitating real-time monitoring, this project aims to enhance road safety measures and reduce accidents, ultimately saving lives and improving transportation systems.

1.3 Objectives

\The objective of the Road Safety Project in DBMS is to leverage the power of database management and analysis to enhance road safety measures and minimize accidents. The project aims to achieve the following objectives:

1. Efficient Data Management: Implementing a robust DBMS will ensure centralized and efficient management of road safety data. This includes collecting, storing, and organizing diverse data sets related to traffic accidents, road conditions, vehicle registrations, and driver behavior. The objective is to establish a reliable and accessible repository of data, enabling quick and accurate retrieval for analysis and decision-making.

2. Comprehensive Data Analysis: By utilizing data analytics techniques, the project aims to analyze the collected data to identify patterns, trends, and risk factors associated with road accidents. Through advanced algorithms and models, the objective is to extract meaningful insights that can inform targeted interventions and preventive measures. The focus is on developing predictive capabilities to forecast accident-prone areas, driver behaviors, and hazardous road conditions.

3. Real-time Monitoring and Alerting: The project aims to incorporate real-time data acquisition systems that capture information on traffic flow, speed violations, and road conditions. By integrating these systems with the DBMS, the objective is to enable timely monitoring, analysis, and alerting. This will empower authorities to respond quickly to

emerging risks, implement immediate corrective actions, and improve overall road safety in a proactive manner.

4. Collaborative Approach: The objective is to foster collaboration and coordination among various stakeholders involved in road safety, including government agencies, law enforcement, transportation departments, and road safety organizations. The DBMS will facilitate secure data sharing, enabling effective communication and cooperation. The aim is to create a shared knowledge base that promotes informed decision-making, resource allocation, and implementation of comprehensive road safety strategies.

5. Continuous Improvement: The objective is to establish a feedback loop that enables continuous improvement of road safety measures. By regularly collecting and analyzing data on accidents, near-misses, and their contributing factors, the project aims to identify areas for improvement and evaluate the effectiveness of implemented interventions. The objective is to create a data-driven approach to road safety that evolves and adapts to changing conditions and emerging challenges.

Overall, the objective of the Road Safety Project in DBMS is to leverage data management, analysis, and collaboration to create a safer road network, reduce accidents, and save lives. By harnessing the power of technology and utilizing a comprehensive database management system, the project aims to transform road safety strategies into proactive, evidence-based interventions.

CHAPTER 2. DATABASE DESIGN

2.1 List of Attributes, entities and relationship

1. **Entity Name: vehicle**

Attributes	**Type**
Id	INT
Make	VARCHAR(50)
Model	VARCHAR(50)
Year	INT CHECK (year >= 1900 AND year <= 2100),
Color	VARCHAR(20),
Price	DECIMAL(10, 2)

2. **Entity Name: Accidents**

Attributes	**Type**
AccidentID	PRIMARY KEY,
PERSONNAME	VARCHAR(50)
Date	DATE
Location	VARCHAR(100)
RoadCondition	VARCHAR(50)
Weather)	VARCHAR(50

3. **Entity Name: Driver**

Attributes	**Type**
id	PRIMARY KEY
name	VARCHAR(100)
age	INT CHECK (age >= 18)
license_number	VARCHAR(20)
phone_number	VARCHAR(20)
email	VARCHAR(20)

4. **Entity Name: Road Infrastructure**

Attributes	Type
id	PRIMARY KEY
name	VARCHAR(100)
type	VARCHAR(20)
length	DECIMAL(10, 2)
capacity	INT CHECK (capacity > 0)

5. **Entity Name: Weatherconditions**

Attributes	Type
id	PRIMARY KEY
location	VARCHAR(100)
date	DATE
temperature	DECIMAL(10, 2)
humidity	DECIMAL(5, 2)
precipitation	DECIMAL(5, 2)

6. **Entity Name: TrafficViolations**

Attributes	Type
id	PRIMARY KEY
location	VARCHAR(100)
date	DATE
officer_name	VARCHAR(100)
violation_type	VARCHAR(100)

7. **Entity Name: InsuranceData**

Attributes	Type
id	PRIMARY KEY
location	VARCHAR(100)
improvement_type	DATE
start_date	DATE
completion_date	DATE

8. **Entity Name: Insurencedata**

Attributes	**Type**
id	PRIMARY KEY
vehicle_id	VARCHAR(100)
provider	INT
policy_number	VARCHAR(100)
start_date	DATE
end_date	DATE

9. **Entity Name: EmergencyServices**

Attributes	**Type**
id	PRIMARY KEY
provider	VARCHAR(100)
service_type	VARCHAR(50)
contact_number	VARCHAR(100)
service_area	VARCHAR(50)

10. **Entity Name: RoadSign**

Attributes	**Type**
id	PRIMARY KEY
location	VARCHAR(100)
signtype	VARCHAR(100)
additional details	VARCHAR(100)

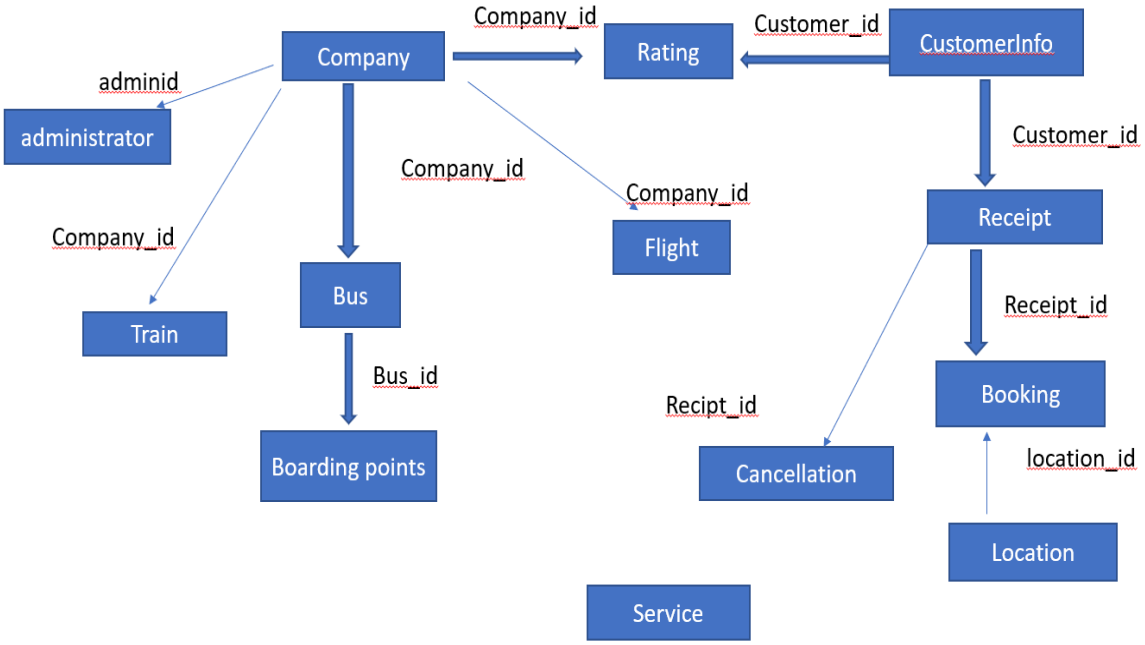
11. **Entity Name: VehicleInspection**

Attributes	**Type**
id	PRIMARY KEY
vehicle_id	INT
inspection_date	DATE
inspector_name	VARCHAR(100)
inspection_result	VARCHAR(100)

12. **Entity Name: Traffic flow**

Attributes	**Type**
id	PRIMARY KEY
Date	DATE
location	VARCHAR(100)
signtype	VARCHAR(100)
additional details	VARCHAR(100)

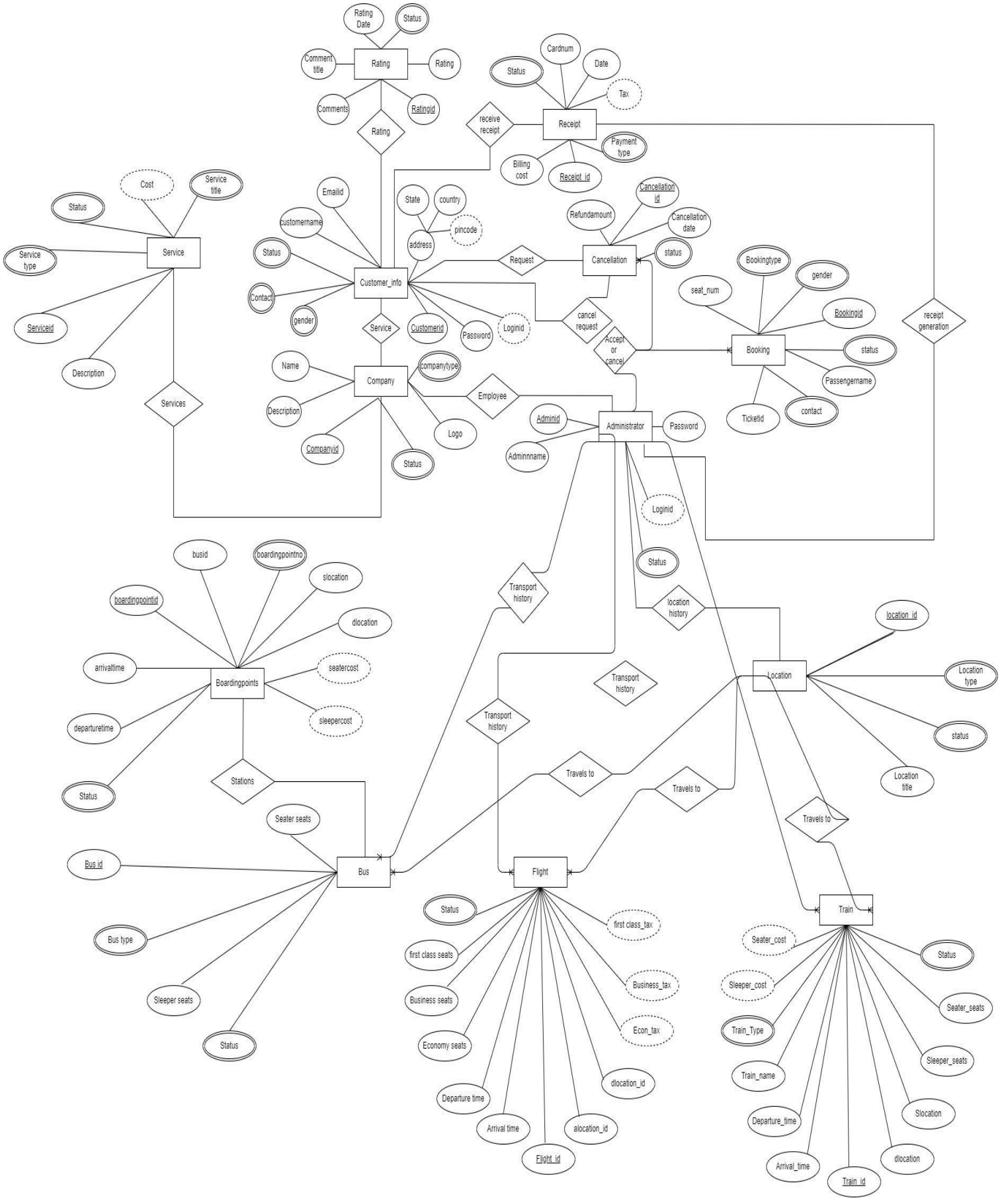
2.1.1 Entities and their relationships:



The above diagram is a simple representation of entities which shows the connectivity between all the entities and the relationship between various entities

To know in detail about the types of relationships that exist between all the entities and to know the different attributes that describes about the entity we design ER(entity relation) diagram.

2.2 E-R Diagram



CHAPTER 3. RELATIONAL MODEL

3.1 Database languages

Four categories of database languages :

1. Data definition language (DDL)

Data definition language (DDL) creates the framework of the database by specifying the database schema, which is the structure that represents the organization of data. Its common uses include the creation and alteration of tables, files, indexes and columns within the database. This language also allows users to rename or drop the existing database or its components.

Here's a list of DDL statements:

- CREATE: Creates a new database or object, such as a table, index or column.
- ALTER: Changes the structure of the database or object.
- DROP: Deletes the database or existing objects.
- RENAME: Renames the database or existing objects.

2. Data manipulation language (DML)

Data manipulation language (DML) provides operations that handle user requests, offering a way to access and manipulate the data that users store within a database. Its common functions include inserting, updating and retrieving data from the database.

Here's a list of DML statements:

- INSERT: Adds new data to the existing database table.
- UPDATE: Changes or updates values in the table.
- DELETE: Removes records or rows from the table.
- SELECT: Retrieves data from the table or multiple tables.

3. Data control language (DCL)

Data control language (DCL) controls access to the data that users store within a database. Essentially, this language controls the rights and permissions of the database system. It allows users to grant or revoke privileges to the database.

Here's a list of DCL statements:

- GRANT: Gives a user access to the database.
- REVOKE: Removes a user's access to the database.

4. Transaction control language (TCL)

Transaction control language (TCL) manages the transactions within a database. Transactions group a set of related tasks into a single, executable task. All the tasks must succeed in order for the transaction to work. Here's a list of TCL statements:

- COMMIT: Carries out a transaction.
- ROLLBACK: Restores a transaction if any tasks fail to execute.

3.2 Table Description

Following are the tables along with constraints used in All in one travel booking database.

1. company: This table contains various travel booking company details like company id, company name, description, moto of the company, status of the company, etc.

Constraint: company id should be provided if the company is linked up with this web site.

2. Administrator: Administrator entity contains the details of the administrator like admin id, admin name, login id, password.

Constraint: Here administrator id will not be accessed by any other relation because all the details of the tables and their relations, tuples will be accessed by the admin.

3. Customer: This table contains all the details of the customer such as customer id, name, date of birth, gender, address, email, login, password and also the status of the customer which described about the registration status of the customer.

Constraint: The customer id will be as the primary key constraint for the customer info relation in the database and also the customer id will be considered as the foreign key constraint for the other tuples like booking, receipt, cancellation, rating, etc.

4. Bus: This entity contains the detailed description about the bus like bus id, bus name, bus type, types of seats available in the bus and also the number of those seats count, availability of the bus.

Constraint: considering Bus id as the main constraint of the bus relation this id can be accessed by the boarding points relation where it contains the details of the bus whether it visits the particular boarding point or not.

5. Boarding points: The boarding point table describes about the number of buses passing through the particular point, it contains all the details of the bus that arrives and leaves the stopping and also the details regarding the cost of the type of seat selected from one boarding point to the other boarding point.

Constraint: Here we can consider the primary key as the boarding point id and the bus id as the foreign key constraint.

6. Train: The train table contains the details about the types of trains available, no. of trains available, train id, seating capacity of train, division of seats, arrival and departure timings of the train , name of the train and the cost of the seat.

Constraint: Train id will be the primary key constraint of this relation and to know for which company the train belongs to the company id would be considered as the foreign key.

7. Flight: The flight entity belongs to the service of the company provided , which deals with the details of the flight like flight id, flight name, location id's that flight lands and takes of at, arrival time and departure time of the flight , additional details like the no. of seats and division of those seats and the seating cost .

Constraint: Flight id will be the primary key constraint of this relation and to know for which company the train belongs to the company id would be considered as the foreign key.

8. Booking: The booking entity of the database deals with the no. of bookings held on

the particular day, type of travel chosen , passenger name, ticket id, seat number, gender, contact and booking status .

Constraints: Booking id plays the role of primary key constraint in this relation and the receipt id would be referred as the foreign key constraint.

9. Receipt: Receipt relation contains the details about the bill generation on the booking of travel service by the customer, it will have the details regarding the receipt such as, receipt id, date , tax, billing cost, type of payment chosen, card number, and the status of the receipt.

Constraints: The receipt id will be referred as the primary key, and customer id will be the foreign key to know that on whose id the bill was generated.

10. Cancellation: Cancellation table contains the details of the cancelled services request like cancellation id, receipt id, cancellation date, refundable amount, and the approval status of the cancellation.

Constraints: Cancellation id as the primary key would help in accessing the cancellation details of the receipts generated and to know this the receipt id will be considered as the foreign key.

11. Rating: Rating table will have the ratings of the customers given for the services the have been provided, to describe these details the attributes that are being constituted by the rating entity are rating id, customer id, company id, rating, comments title, comments, date of the rating and status of the rating.

Constraints: Rating id will be considered as the primary key constraint and the customer id will be used as the reference and will be a foreign key constraint of the relation.

12. Location: The location table contains the details like location id , location type, location title.

Constraints: Location id will be used as the reference to get all the details about the locations , so location id works as primary key in this relation.

13. Services: The service table will have the details about the types of services provided by the company . It have the attributes like service id, service type , cost of the service and availability of the service.

Constraint: Service id will be referenced as the primary key to give the details about the services available.

The above descripted information is the brief detailing about the entities and relations and their attributes.

3.3 Relational Database Scheme

The relational database schema for ***road safety*** database is as follows:

3.4 Relational Queries

```
CREATE TABLE Accidents (

   AccidentID      INT        PRIMARY KEY,
   PERSON NAME    VARCHAR(50) NOT NULL,
   Date             DATE        NOT NULL,
   Location        VARCHAR(100)   NOT NULL,
   RoadCondition  VARCHAR(50)   NOT NULL,

Weather      VARCHAR(50)   NOT NULL,

);
DROP table Accidents;
INSERT INTO Accidents VALUES (1, 'varshi','2023-05-18',  'Main Street', 'Wet', 'Rainy');
INSERT INTO Accidents VALUES (2, 'sam','2023-05-19',  'Highway 101', 'Dry', 'Clear');
INSERT INTO Accidents VALUES (3, 'guna','2023-06-20',  'Oak Avenue', 'Icy', 'Snowy');
```

```
INSERT INTO Accidents VALUES (4, 'lakshmi','2023-07-20',  'RSROAD', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES (5, 'pavani','2023-08-20','RAMAYYAH STREET', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES (6, 'chinni','2023-09-20', ' Avenue', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES (7, 'sandhya','2023-10-20', 'TNAGAR', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES(8, 'tejo','2023-11-20',  'AMBATTUR', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES (9, 'supriya','2023-12-20',  'ANNA SALAI', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES (10, 'bhavya','2023-01-20', 'GANDHI ROAD', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES (11, 'mounika','2023-02-20', 'BAZAR STREET', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES (12, 'vidya','2023-03-20',  'MAIN ROAD', 'Icy', 'Snowy');
INSERT INTO Accidents VALUES (13, 'geethika','2023-04-20',  'CROSS ROAD', 'Icy', 'Snowy');
   INSERT INTO Accidents VALUES (14, 'priya','2023-05-22', 'ANNA NAGAR', 'Icy',
                                                    'Snowy');
INSERT INTO Accidents VALUES (15, 'sanjana','2023-05-24','COIMBATE', 'Icy', 'Snowy');

SELECT * FROM Accidents;
```

OUTPUT:

varshi	2023-05-18	Main Street	1	Wet	Rainy	2
sam	2023-05-19	Highway 101	2	Dry	Clear	3
guna	2023-06-20	Oak Avenue	3	Icy	Snowy	4
lakshmi	2023-07-20	RSROAD	4	Icy	Snowy	5
pavani	2023-08-20	RAMAYYAH STREET	5	Icy	Snowy	2
chinni	2023-09-20	Avenue	6	Icy	Snowy	1
sandhya	2023-10-20	TNAGAR	7	Icy	Snowy	2
tejo	2023-11-20	AMBATTUR	8	Icy	Snowy	3
supriya	2023-12-20	ANNA SALAI	9	Icy	Snowy	2
bhavya	2023-01-20	GANDHI ROAD	10	Icy	Snowy	1

mounika	2023-02-20	BAZAR STREET	11	Icy	Snowy 3
vidya	2023-03-20	MAIN ROAD 12	Icy	Snowy 2	
geethika	2023-04-20	CROSS ROAD	13	Icy	Snowy 3
priya	2023-05-22	ANNA NAGAR	14	Icy	Snowy 1
sanjana	2023-05-24	COIMBATE 15	Icy	Snowy 4	

```
CREATE TABLE Vehicles (
  id INT PRIMARY KEY,
  make VARCHAR(50) NOT NULL,
  model VARCHAR(50) NOT NULL,
  year INT CHECK (year >= 1900 AND year <= 2100),
  color VARCHAR(20),
  price DECIMAL(10, 2),
  CONSTRAINT unique_vehicle UNIQUE (make, model),
  CONSTRAINT positive_price CHECK (price >= 0)
);
INSERT INTO Vehicles  VALUES(1, 'Toyota', 'Camry', 2020, 'Silver', 25000.00);
INSERT INTO Vehicles  VALUES(2, 'Honda', 'Civic', 2018, 'Blue', 18000.00);
INSERT INTO Vehicles  VALUES(3, 'Ford', 'F-150', 2021, 'Black', 35000.00);
INSERT INTO Vehicles  VALUES(4, 'Chevrolet', 'Impala', 2019, 'White', 22000.00);
INSERT INTO Vehicles  VALUES(5, 'BMW', 'X5', 2022, 'Red', 55000.00);
INSERT INTO Vehicles  VALUES(6, 'Tesla', 'Model S', 2020, 'Gray', 80000.00);
INSERT INTO Vehicles  VALUES(7, 'Nissan', 'Altima', 2017, 'Silver', 16000.00);
INSERT INTO Vehicles  VALUES(8, 'Mercedes-Benz', 'E-Class', 2021, 'Black',
65000.00);
INSERT INTO Vehicles  VALUES(9, 'Audi', 'A4', 2019, 'White', 38000.00);
INSERT INTO Vehicles  VALUES(10, 'Lexus', 'RX 350', 2023, 'Blue', 45000.00);
INSERT INTO Vehicles  VALUES(11, 'Volkswagen', 'Golf', 2016, 'Gray', 14000.00);
INSERT INTO Vehicles  VALUES(12, 'Hyundai', 'Tucson', 2020, 'Red', 26000.00);
INSERT INTO Vehicles  VALUES(13, 'Subaru', 'Outback', 2018, 'Green', 20000.00);
INSERT INTO Vehicles  VALUES(14, 'Mazda', 'CX-5', 2022, 'Silver', 32000.00);
INSERT INTO Vehicles  VALUES(15, 'Kia', 'Sorento', 2019, 'White', 24000.00);
```

SELECT * from vehicles;

OUTPUT:

1	Toyota	Camry	2020	Silver	25000.00
2	Honda	Civic	2018	Blue	18000.00
3	Ford	F-150	2021	Black	35000.00
4	Chevrolet	Impala	2019	White	22000.00
5	BMW	X5	2022	Red	55000.00
6	Tesla	Model S	2020	Gray	80000.00
7	Nissan	Altima	2017	Silver	16000.00
8	Mercedes-Benz	E-Class	2021	Black	65000.00
9	Audi	A4	2019	White	38000.00
10	Lexus	RX 350	2023	Blue	45000.00
11	Volkswagen	Golf	2016	Gray	14000.00
12	Hyundai	Tucson	2020	Red	26000.00
13	Subaru	Outback	2018	Green	20000.00
14	Mazda	CX-5	2022	Silver	32000.00
15	Kia	Sorento	2019	White	24000.00

```
CREATE TABLE Drivers (
  id INT PRIMARY KEY,
  name VARCHAR(100) NOT NULL,
  age INT CHECK (age >= 18),
  license_number VARCHAR(20) UNIQUE,
  phone_number VARCHAR(15) NOT NULL,
  email VARCHAR(100) UNIQUE,
);
INSERT INTO Drivers VALUES(1, 'varshi', 25, 'ABC123', '15551234', 'varshi.smith@gmail.com');
INSERT INTO Drivers VALUES(2, 'shalini', 32, 'XYZ456', '15555678901', 'shalini.doe@egmail.com');
INSERT INTO Drivers VALUES(3, 'bindu', 40, 'DEF789', '441234567890', 'bindu.johnson@gmail.com');
```

```
INSERT INTO Drivers VALUES(4, 'sameera', 28, 'GHI987', '6198765432', 'sam.williams@gmail.com');
INSERT INTO Drivers VALUES(5, 'pavan', 45, 'JKL321', '491234567890', 'pavan.brown@gmail.com');
INSERT INTO Drivers VALUES(6, 'Sarah', 22, 'MNO654', '15556789012', 'sarah.wilson@gmail.com');
INSERT INTO Drivers VALUES(7, 'teja', 36, 'PQR987', '4407777123456', 'teja.taylor@gmail.com');
INSERT INTO Drivers VALUES(8, 'Olivia', 29, 'STU321', '6198765432', 'olivia.davis@gmail.com');
INSERT INTO Drivers VALUES(9, 'sai', 31, 'VWX654', '491234567890', 'sai.anderson@gmail.com');
INSERT INTO Drivers VALUES(10, 'neha', 27, 'YZA987', '15558901234', 'neha.martin@gmail.com');
INSERT INTO Drivers VALUES(11, 'pspk', 39, 'BCD456', '447890123456', 'pspk.thompson@gmail.com');
INSERT INTO Drivers VALUES(12, 'virat', 23, 'EFG987', '6187654321', 'virat.garcia@gmail.com');
INSERT INTO Drivers VALUES(13, 'James', 33, 'HIJ654', '4909876543210', 'james.robinson@gmail.com');
INSERT INTO Drivers VALUES(14, 'anushka', 30, 'KLM321', '15551234567', 'anushka.clark@gmail.com');
INSERT INTO Drivers VALUES(15, 'dolly', 26, 'NOP987', '445678123456', 'dolly.rodriguez@gmail.com');

select * from Drivers;
```

OUTPUT:

1	varshi	25	ABC123	15551234	varshi.smith@gmail.com
2	shalini	32	XYZ456	15555678901	shalini.doe@egmail.com
3	bindu	40	DEF789	441234567890	bindu.johnson@gmail.com
4	sameera	28	GHI987	6198765432	sam.williams@gmail.com
5	pavan	45	JKL321	491234567890	pavan.brown@gmail.com
6	Sarah	22	MNO654	15556789012	sarah.wilson@gmail.com
7	teja	36	PQR987	4407777123456	teja.taylor@gmail.com

8	Olivia	29	STU321	6198765432	olivia.davis@gmail.com
9	sai	31	VWX654	491234567890	sai.anderson@gmail.com
10	neha	27	YZA987	15558901234	neha.martin@gmail.com
11	pspk	39	BCD456	447890123456	pspk.thompson@gmail.com
12	virat	23	EFG987	6187654321	virat.garcia@gmail.com
13	James	33	HIJ6544909876543210		james.robinson@gmail.com
14	anushka	30	KLM321	15551234567	anushka.clark@gmail.com
15	dolly	26	NOP987	445678123456	dolly.rodriguez@gmail.com

```
CREATE TABLE RoadInfrastructuree (
  id INT PRIMARY KEY,
  name VARCHAR(100) NOT NULL,
  type VARCHAR(50) NOT NULL,
  length DECIMAL(10, 2) NOT NULL,
  capacity INT CHECK (capacity > 0),
  CONSTRAINT unique_infrastructure UNIQUE (name),
  CONSTRAINT positive_length CHECK (length > 0)
);
drop  table RoadInfrastructuree;
INSERT INTO RoadInfrastructuree VALUES(1, 'Highway 101', 'Highway', 100.5, 10000);
INSERT INTO RoadInfrastructuree VALUES(2, 'Main Street', 'Street', 2.7, 500);
INSERT INTO RoadInfrastructuree VALUES(3, 'Golden Gate Bridge', 'Bridge', 2737.4, 5000);
INSERT INTO RoadInfrastructuree VALUES(4, 'Interstate 5', 'Highway', 200.2, 12000);
INSERT INTO RoadInfrastructuree VALUES(5, 'Broadway Avenue', 'Street', 5.1, 800);
INSERT INTO RoadInfrastructuree VALUES(6, 'George Washington Bridge', 'Bridge', 1450.8, 3000);
INSERT INTO RoadInfrastructuree VALUES(7, 'Expressway 123', 'Highway', 75.6, 9000);
INSERT INTO RoadInfrastructuree VALUES(8, 'Elm Street', 'Street', 1.9, 400);
INSERT INTO RoadInfrastructuree VALUES(9, 'Brooklyn Bridge', 'Bridge', 1834.1, 2500);
INSERT INTO RoadInfrastructuree VALUES(10, 'Highway 20', 'Highway', 150.3, 8000);
```

```
INSERT INTO RoadInfrastructuree VALUES(11, 'Oak Avenue', 'Street', 4.2, 700);
INSERT INTO RoadInfrastructuree VALUES(12, 'Tower Bridge', 'Bridge', 422.9, 2000);
INSERT INTO RoadInfrastructuree VALUES(13, 'Freeway 456', 'Highway', 125.8, 9500);
INSERT INTO RoadInfrastructuree VALUES(14, 'Cedar Street', 'Street', 2.4, 600);
INSERT INTO RoadInfrastructuree VALUES(15, 'London Bridge', 'Bridge', 269.7, 1800);
select * from RoadInfrastructuree;
```

OUTPUT:

```
1   Highway 101   Highway   100.50 10000
2   Main Street   Street    2.70   500
3   Golden Gate Bridge   Bridge 2737.40   5000
4   Interstate 5   Highway   200.20 12000
5   Broadway Avenue   Street   5.10   800
6   George Washington Bridge   Bridge 1450.80   3000
7   Expressway 123   Highway   75.60   9000
8   Elm Street   Street   1.90   400
9   Brooklyn Bridge   Bridge 1834.10   2500
10  Highway 20   Highway   150.30 8000
11  Oak Avenue   Street   4.20   700
12  Tower Bridge   Bridge 422.90 2000
13  Freeway 456   Highway   125.80 9500
14  Cedar Street   Street   2.40   600
15  London Bridge   Bridge 269.70 1800
```

```
CREATE TABLE TrafficViolations (
  id INT PRIMARY KEY,
  driver_id INT NOT NULL,
  violation_date DATE NOT NULL,
  violation_type VARCHAR(50) NOT NULL,
  amount DECIMAL(10, 2) NOT NULL,
  CONSTRAINT fk_driver FOREIGN KEY (driver_id) REFERENCES Drivers (id),
  CONSTRAINT positive_amount CHECK (amount > 0)
);
drop  table TrafficViolations;
```

```
INSERT INTO TrafficViolations VALUES(1, 1, '2023-05-01', 'Speeding', 100.00);
INSERT INTO TrafficViolations VALUES(2, 3, '2023-05-05', 'Red Light Violation', 150.00);
INSERT INTO TrafficViolations VALUES(3, 2, '2023-05-10', 'Illegal Parking', 50.00);
INSERT INTO TrafficViolations VALUES(4, 4, '2023-05-12', 'Distracted Driving', 200.00);
INSERT INTO TrafficViolations VALUES(5, 1, '2023-05-15', 'Speeding', 100.00);
INSERT INTO TrafficViolations VALUES(6, 5, '2023-05-18', 'Seatbelt Violation', 75.00);
INSERT INTO TrafficViolations VALUES(7, 3, '2023-05-21', 'Stop Sign Violation', 100.00);
INSERT INTO TrafficViolations VALUES(8, 2, '2023-05-24', 'Illegal U-turn', 75.00);
INSERT INTO TrafficViolations VALUES(9, 4, '2023-05-26', 'Failure to Yield', 150.00);
INSERT INTO TrafficViolations VALUES(10, 5, '2023-05-29', 'Speeding', 100.00);
INSERT INTO TrafficViolations VALUES(11, 1, '2023-06-03', 'Red Light Violation', 150.00);
INSERT INTO TrafficViolations VALUES(12, 3, '2023-06-08', 'Illegal Parking', 50.00);
INSERT INTO TrafficViolations VALUES(13, 2, '2023-06-13', 'Distracted Driving', 200.00);
INSERT INTO TrafficViolations VALUES(14, 4, '2023-06-16', 'Speeding', 100.00);
INSERT INTO TrafficViolations VALUES(15, 5, '2023-06-21', 'Stop Sign Violation', 100.00);
select * from TrafficViolations;
```

OUTPUT:

1	1	2023-05-01	Speeding	100.00
2	3	2023-05-05	Red Light Violation	150.00
3	2	2023-05-10	Illegal Parking	50.00
4	4	2023-05-12	Distracted Driving	200.00
5	1	2023-05-15	Speeding	100.00
6	5	2023-05-18	Seatbelt Violation	75.00
7	3	2023-05-21	Stop Sign Violation	100.00
8	2	2023-05-24	Illegal U-turn	75.00
9	4	2023-05-26	Failure to Yield	150.00
10	5	2023-05-29	Speeding	100.00
11	1	2023-06-03	Red Light Violation	150.00

12 3 2023-06-08 Illegal Parking 50.00

13 2 2023-06-13 Distracted Driving 200.00

14 4 2023-06-16 Speeding 100.00

15 5 2023-06-21 Stop Sign Violation 100.00

```
CREATE TABLE WeatherConditions (
 id INT PRIMARY KEY,
 location VARCHAR(100) NOT NULL,
 date DATE NOT NULL,
  DECIMAL(5, 2),
 humidity temperatureDECIMAL(5, 2),
 precipitation DECIMAL(5, 2),
  CONSTRAINT positive_temperature CHECK (temperature >= -100 AND temperature <= 100),
 CONSTRAINT valid_humidity CHECK (humidity >= 0 AND humidity <= 100),
 CONSTRAINT non_negative_precipitation CHECK (precipitation >= 0)
);
INSERT INTO WeatherConditions VALUES(1, 'TIRUPATI', '2023-05-01', 15.2, 65.4, 0);
INSERT INTO WeatherConditions VALUES(2, 'CHENNAI', '2023-05-01', 22.7, 72.1, 0);
INSERT INTO WeatherConditions VALUES(3, 'MANGAPURAM', '2023-05-01', 10.5, 80.2, 2.5);
INSERT INTO WeatherConditions VALUES(4, 'RANGAMPETA', '2023-05-01', 18.3, 58.9, 0.8);
INSERT INTO WeatherConditions VALUES(5, 'BAKARAPETA', '2023-05-01', 23.8, 75.6, 0);
INSERT INTO WeatherConditions VALUES(6, 'PILERU', '2023-05-01', 20.1, 62.3, 0.5);
INSERT INTO WeatherConditions VALUES(7, 'KALIKIRI', '2023-05-02', 18.9, 70.2, 0);
INSERT INTO WeatherConditions VALUES(8, 'CHINTHAPARTHY', '2023-05-02', 25.6, 68.7, 0);
INSERT INTO WeatherConditions VALUES(9, 'CTM', '2023-05-02', 11.2, 78.5, 1.2);
INSERT INTO WeatherConditions VALUES(10, 'VAYALPAD', '2023-05-02', 19.7, 61.8, 0.3);
INSERT INTO WeatherConditions VALUES(11, 'MADANAPALLI', '2023-05-02', 24.3, 73.8, 0);
INSERT INTO WeatherConditions VALUES(12, 'TRICHY', '2023-05-02', 19.8, 65.9, 0);
```

```
INSERT INTO WeatherConditions VALUES(13, 'CHITTOR', '2023-05-03', 20.4, 68.9, 0);
INSERT INTO WeatherConditions VALUES(14, 'VELLORE', '2023-05-03', 27.8, 62.4, 0);
INSERT INTO WeatherConditions VALUES(15, 'MADURAI', '2023-05-03', 13.5, 75.1, 0.1);
SELECT * FROM WeatherConditions;
```

OUTPUT:

1	TIRUPATI	2023-05-01	15.20	65.40	0.00
2	CHENNAI	2023-05-01	22.70	72.10	0.00
3	MANGAPURAM	2023-05-01	10.50	80.20	2.50
4	RANGAMPETA	2023-05-01	18.30	58.90	0.80
5	BAKARAPETA	2023-05-01	23.80	75.60	0.00
6	PILERU	2023-05-01	20.10	62.30	0.50
7	KALIKIRI	2023-05-02	18.90	70.20	0.00
8	CHINTHAPARTHY	2023-05-02	25.60	68.70	0.00
9	CTM	2023-05-02	11.20	78.50	1.20
10	VAYALPAD	2023-05-02	19.70	61.80	0.30
11	MADANAPALLI	2023-05-02	24.30	73.80	0.00
12	TRICHY	2023-05-02	19.80	65.90	0.00
13	CHITTOR	2023-05-03	20.40	68.90	0.00
14	VELLORE	2023-05-03	27.80	62.40	0.00
15	MADURAI	2023-05-03	13.50	75.10	0.10

```
CREATE TABLE EnforcementData (
  id INT PRIMARY KEY,
  officer_name VARCHAR(100) NOT NULL,
  location VARCHAR(100) NOT NULL,
  date DATE NOT NULL,
  violation_type VARCHAR(50) NOT NULL,
  CONSTRAINT positive_id CHECK (id > 0),
  CONSTRAINT valid_location CHECK (location <> ''),
  CONSTRAINT valid_violation_type CHECK (violation_type <> '')
);
```

```
drop table EnforcementData;
INSERT INTO EnforcementData VALUES(1, 'Officer varshi', 'Main Street', '2023-05-01', 'Speeding');
INSERT INTO EnforcementData VALUES(2, 'Officer varni', 'Park Avenue', '2023-05-02', 'Red Light Violation');
INSERT INTO EnforcementData VALUES(3, 'Officer shalini', 'Broadway', '2023-05-03', 'Illegal Parking');
INSERT INTO EnforcementData VALUES(4, 'Officer bindu', 'Elm Street', '2023-05-04', 'Distracted Driving');
INSERT INTO EnforcementData VALUES(5, 'Officer raj', 'Oak Avenue', '2023-05-05', 'Speeding');
INSERT INTO EnforcementData VALUES(6, 'Officer kiran', 'Maple Drive', '2023-05-06', 'Seatbelt Violation');
INSERT INTO EnforcementData VALUES(7, 'Officer bhavesh', 'Washington Street', '2023-05-07', 'Stop Sign Violation');
INSERT INTO EnforcementData VALUES(8, 'Officer sushanth', 'Cedar Road', '2023-05-08', 'Illegal U-turn');
INSERT INTO EnforcementData VALUES(9, 'Officer ramya', 'Pine Avenue', '2023-05-09', 'Failure to Yield');
INSERT INTO EnforcementData VALUES(10, 'Officer dharani', 'Church Street', '2023-05-10', 'Speeding');
INSERT INTO EnforcementData VALUES(11, 'Officer swetha', 'Main Street', '2023-05-11', 'Red Light Violation');
INSERT INTO EnforcementData VALUES(12, 'Officer chandu', 'Park Avenue', '2023-05-12', 'Illegal Parking');
INSERT INTO EnforcementData VALUES(13, 'Officer varun', 'Broadway', '2023-05-13', 'Distracted Driving');
INSERT INTO EnforcementData VALUES(14, 'Officer hasini', 'Elm Street', '2023-05-14', 'Speeding');
INSERT INTO EnforcementData VALUES(15, 'Officer alehya', 'Oak Avenue', '2023-05-15', 'Stop Sign Violation');
select * from EnforcementData;
```

OUTPUT:

1 Officer varshi Main Street 2023-05-01 Speeding

2 Officer varni Park Avenue 2023-05-02 Red Light Violation
3 Officer shalini Broadway 2023-05-03 Illegal Parking
4 Officer bindu Elm Street 2023-05-04 Distracted Driving
5 Officer raj Oak Avenue 2023-05-05 Speeding
6 Officer kiran Maple Drive 2023-05-06 Seatbelt Violation
7 Officer bhavesh Washington Street 2023-05-07 Stop Sign Violation
8 Officer sushanth Cedar Road 2023-05-08 Illegal U-turn
9 Officer ramya Pine Avenue 2023-05-09 Failure to Yield
10 Officer dharani Church Street 2023-05-10 Speeding
11 Officer swetha Main Street 2023-05-11 Red Light Violation
12 Officer chandu Park Avenue 2023-05-12 Illegal Parking
13 Officer varun Broadway 2023-05-13 Distracted Driving
14 Officer hasini Elm Street 2023-05-14 Speeding
15 Officer alehya Oak Avenue 2023-05-15 Stop Sign Violation

```
CREATE TABLE RoadImprovements (
  id INT PRIMARY KEY,
  location VARCHAR(100) NOT NULL,
  improvement_type VARCHAR(50) NOT NULL,
  start_date DATE NOT NULL,
  completion_date DATE,
  CONSTRAINT valid_dates CHECK (completion_date >= start_date)
);
drop table RoadImprovements;
INSERT INTO RoadImprovements VALUES(1, 'Main Street', 'Repaving', '2023-05-01', '2023-05-15');
INSERT INTO RoadImprovements VALUES(2, 'Park Avenue', 'Widening', '2023-05-03', '2023-06-10');
INSERT INTO RoadImprovements VALUES(3, 'Broadway', 'Intersection Improvement', '2023-05-08', '2023-06-01');
INSERT INTO RoadImprovements VALUES(4, 'Elm Street', 'Bridge Reconstruction', '2023-05-12', '2023-07-31');
```

```
INSERT INTO RoadImprovements VALUES(5, 'Oak Avenue', 'Sidewalk Expansion', '2023-05-15', '2023-06-30');
INSERT INTO RoadImprovements VALUES(6, 'Maple Drive', 'Roundabout Construction', '2023-05-18', '2023-07-15');
INSERT INTO RoadImprovements VALUES(7, 'Washington Street', 'Traffic Signal Upgrade', '2023-05-22', '2023-06-05');
INSERT INTO RoadImprovements VALUES(8, 'Cedar Road', 'Guardrail Installation', '2023-05-25', '2023-06-10');
INSERT INTO RoadImprovements VALUES(9, 'Pine Avenue', 'Curb and Gutter Repair', '2023-05-28', '2023-06-20');
INSERT INTO RoadImprovements VALUES(10, 'Church Street', 'Street Lighting Enhancement', '2023-06-01', '2023-06-15');
INSERT INTO RoadImprovements VALUES(11, 'Main Street', 'Bike Lane Addition', '2023-06-04', '2023-06-30');
INSERT INTO RoadImprovements VALUES(12, 'Park Avenue', 'Pothole Patching', '2023-06-07', '2023-06-12');
INSERT INTO RoadImprovements VALUES(13, 'Broadway', 'Median Landscaping', '2023-06-10', '2023-07-31');
INSERT INTO RoadImprovements VALUES(14, 'Elm Street', 'Pedestrian Crosswalk Markings', '2023-06-13', '2023-06-15');
INSERT INTO RoadImprovements VALUES(15, 'Oak Avenue', 'Speed Bump Installation', '2023-06-16', '2023-06-20');
select * from RoadImprovements;
```

OUTPUT:

1	Main Street	Repaving	2023-05-01	2023-05-15
2	Park Avenue	Widening	2023-05-03	2023-06-10
3	Broadway	Intersection Improvement	2023-05-08	2023-06-01
4	Elm Street	Bridge Reconstruction	2023-05-12	2023-07-31
5	Oak Avenue	Sidewalk Expansion	2023-05-15	2023-06-30
6	Maple Drive	Roundabout Construction	2023-05-18	2023-07-15
7	Washington Street	Traffic Signal Upgrade	2023-05-22	2023-06-05
8	Cedar Road	Guardrail Installation	2023-05-25	2023-06-10
9	Pine Avenue	Curb and Gutter Repair	2023-05-28	2023-06-20
10	Church Street	Street Lighting Enhancement	2023-06-01	2023-06-15

11	Main Street	Bike Lane Addition	2023-06-04	2023-06-30
12	Park Avenue	Pothole Patching	2023-06-07	2023-06-12
13	Broadway	Median Landscaping	2023-06-10	2023-07-31
14	Elm Street	Pedestrian Crosswalk Markings	2023-06-13	2023-06-15
15	Oak Avenue	Speed Bump Installation	2023-06-16	2023-06-20

```
CREATE TABLE Contractor (
  id INT PRIMARY KEY,
  name VARCHAR(100) NOT NULL,
  contact_number VARCHAR(20) NOT NULL,
  email VARCHAR(100),
  address VARCHAR(200),
  CONSTRAINT valid_contact_number CHECK (contact_number <> ''),
  CONSTRAINT valid_email CHECK (email = '' OR email LIKE '%@%._%')
);
INSERT INTO Contractor VALUES(1, 'ABC Construction', '1234567890', 'abc@example.com', '123 Main Street, City');
INSERT INTO Contractor VALUES(2, 'XYZ Builders', '9876543210', 'xyz@example.com', '456 Oak Avenue, Town');
INSERT INTO Contractor VALUES(3, 'BuildRight Inc.', '4561237890', 'buildright@example.com', '789 Maple Lane, Village');
INSERT INTO Contractor VALUES(4, 'Master Builders', '7894561230', '', '321 Elm Road, County');
INSERT INTO Contractor VALUES(5, 'Construction Co.', '7418529630', 'construction@example.com', '852 Pine Drive, City');
INSERT INTO Contractor VALUES(6, 'BuildWell Ltd.', '3692581470', '', '963 Cedar Street, Town');
INSERT INTO Contractor VALUES(7, 'Ace Contractors', '2581473690', 'ace@example.com', '147 Oak Avenue, Village');
INSERT INTO Contractor VALUES(8, 'BuildTech Solutions', '9517538520', 'buildtech@example.com', '753 Maple Lane, County');
INSERT INTO Contractor VALUES(9, 'Pro Builders', '1473692580', '', '258 Elm Road, City');
```

INSERT INTO Contractor VALUES(10, 'Dream Builders', '2583691470', 'dream@example.com', '369 Pine Drive, Town');
INSERT INTO Contractor VALUES(11, 'Mega Construction', '7539518520', 'mega@example.com', '852 Cedar Street, Village');
INSERT INTO Contractor VALUES(12, 'Golden Builders', '6549873210', 'golden@example.com', '741 Oak Avenue, County');
INSERT INTO Contractor VALUES(13, 'Renovation Experts', '3697418520', '', '147 Maple Lane, City');
INSERT INTO Contractor VALUES(14, 'Precision Builders', '8523697410', 'precision@example.com', '963 Elm Road, Town');
INSERT INTO Contractor VALUES(15, 'BuildPro Contractors', '7418523690', 'buildpro@example.com', '369 Pine Drive, Village');

select * from Contractor;
OUTPUT:
1 ABC Construction 1234567890 abc@example.com 123 Main Street, City
2 XYZ Builders 9876543210 xyz@example.com 456 Oak Avenue, Town
3 BuildRight Inc. 4561237890 buildright@example.com 789 Maple Lane, Village
4 Master Builders 7894561230 321 Elm Road, County
5 Construction Co. 7418529630 construction@example.com 852 Pine Drive, City
6 BuildWell Ltd.3692581470 963 Cedar Street, Town
7 Ace Contractors 2581473690 ace@example.com 147 Oak Avenue, Village
8 BuildTech Solutions 9517538520 buildtech@example.com 753 Maple Lane, County
9 Pro Builders 1473692580 258 Elm Road, City
10 Dream Builders 2583691470 dream@example.com 369 Pine Drive, Town
11 Mega Construction 7539518520 mega@example.com 852 Cedar Street, Village
12 Golden Builders 6549873210 golden@example.com 741 Oak Avenue, County
13 Renovation Experts 3697418520 147 Maple Lane, City

14 Precision Builders 8523697410 precision@example.com 963 Elm Road, Town
15 BuildPro Contractors 7418523690 buildpro@example.com 369 Pine Drive, Village

```
CREATE TABLE InsuranceData (
  id INT PRIMARY KEY,
  vehicle_id INT NOT NULL,
  provider VARCHAR(100) NOT NULL,
  policy_number VARCHAR(50) NOT NULL,
  start_date DATE NOT NULL,
  end_date DATE NOT NULL,
);
 drop table InsuranceData;
INSERT INTO InsuranceData VALUES(1, 1, 'ABC Insurance', 'ABC123', '2023-01-01', '2023-12-31');
INSERT INTO InsuranceData VALUES(2, 2, 'XYZ Insurance', 'XYZ456', '2023-02-01', '2024-01-31');
INSERT INTO InsuranceData VALUES(3, 3, 'Insurance Co.', 'INS789', '2023-03-01', '2023-08-31');
INSERT INTO InsuranceData VALUES(4, 4, 'DEF Insurance', 'DEF321', '2023-04-01', '2024-03-31');
INSERT INTO InsuranceData VALUES(5, 5, 'GHI Insurance', 'GHI654', '2023-05-01', '2023-11-30');
INSERT INTO InsuranceData VALUES(6, 6, 'Insurance Corp.', 'INS789', '2023-06-01', '2024-05-31');
INSERT INTO InsuranceData VALUES(7, 7, 'JKL Insurance', 'JKL123', '2023-07-01', '2023-10-31');
INSERT INTO InsuranceData VALUES(8, 8, 'MNO Insurance', 'MNO456', '2023-08-01', '2024-07-31');
INSERT INTO InsuranceData VALUES(9, 9, 'Insurance Ltd.', 'INS789', '2023-09-01', '2024-08-31');
INSERT INTO InsuranceData VALUES(10, 10, 'PQR Insurance', 'PQR321', '2023-10-01', '2023-12-31');
```

```
INSERT INTO InsuranceData VALUES(11, 11, 'Insurance Services', 'INS789', '2023-11-01', '2024-10-31');
INSERT INTO InsuranceData VALUES(12, 12, 'STU Insurance', 'STU123', '2023-12-01', '2023-12-31');
INSERT INTO InsuranceData VALUES(13, 13, 'VWX Insurance', 'VWX456', '2023-06-01', '2024-05-31');
INSERT INTO InsuranceData VALUES(14, 14, 'Insurance Solutions', 'INS789', '2023-07-01', '2024-06-30');
INSERT INTO InsuranceData VALUES(15, 15, 'YZA Insurance', 'YZA321', '2023-08-01', '2024-07-31');
select * from InsuranceData;
```

OUTPUT:

1	1	ABC Insurance	ABC123	2023-01-01	2023-12-31
2	2	XYZ Insurance	XYZ456	2023-02-01	2024-01-31
3	3	Insurance Co.	INS789	2023-03-01	2023-08-31
4	4	DEF Insurance	DEF321	2023-04-01	2024-03-31
5	5	GHI Insurance	GHI654	2023-05-01	2023-11-30
6	6	Insurance Corp.	INS789	2023-06-01	2024-05-31
7	7	JKL Insurance	JKL123	2023-07-01	2023-10-31
8	8	MNO Insurance	MNO456	2023-08-01	2024-07-31
9	9	Insurance Ltd.	INS789	2023-09-01	2024-08-31
10	10	PQR Insurance	PQR321	2023-10-01	2023-12-31
11	11	Insurance Services	INS789	2023-11-01	2024-10-31
12	12	STU Insurance	STU123	2023-12-01	2023-12-31
13	13	VWX Insurance	VWX456	2023-06-01	2024-05-31
14	14	Insurance Solutions	INS789	2023-07-01	2024-06-30
15	15	YZA Insurance	YZA321	2023-08-01	2024-07-31

```
CREATE TABLE EmergencyServices (
  id INT PRIMARY KEY,
  service_type VARCHAR(50) NOT NULL,
  contact_number VARCHAR(20) NOT NULL,
  service_area VARCHAR(100) NOT NULL,
```

```
);
INSERT INTO EmergencyServices VALUES(1, 'Police', '911', 'City A');
INSERT INTO EmergencyServices VALUES(2, 'Ambulance', '999', 'City B');
INSERT INTO EmergencyServices VALUES(3, 'Fire', '112', 'City C');
INSERT INTO EmergencyServices VALUES(4, 'Police', '911', 'City D');
INSERT INTO EmergencyServices VALUES(5, 'Ambulance', '999', 'City E');
INSERT INTO EmergencyServices VALUES(6, 'Fire', '112', 'City F');
INSERT INTO EmergencyServices VALUES(7, 'Police', '911', 'City G');
INSERT INTO EmergencyServices VALUES(8, 'Ambulance', '999', 'City H');
INSERT INTO EmergencyServices VALUES(9, 'Fire', '112', 'City I');
INSERT INTO EmergencyServices VALUES(10, 'Police', '911', 'City J');
INSERT INTO EmergencyServices VALUES(11, 'Ambulance', '999', 'City K');
INSERT INTO EmergencyServices VALUES(12, 'Fire', '112', 'City L');
INSERT INTO EmergencyServices VALUES(13, 'Police', '911', 'City M');
INSERT INTO EmergencyServices VALUES(14, 'Ambulance', '999', 'City N');
INSERT INTO EmergencyServices VALUES(15, 'Fire', '112', 'City O');
select * from EmergencyServices;
```

OUTPUT:

1	Police	911	City A
2	Ambulance	999	City B
3	Fire	112	City C
4	Police	911	City D
5	Ambulance	999	City E
6	Fire	112	City F
7	Police	911	City G
8	Ambulance	999	City H
9	Fire	112	City I
10	Police	911	City J
11	Ambulance	999	City K
12	Fire	112	City L
13	Police	911	City M
14	Ambulance	999	City N
15	Fire	112	City O

```
CREATE TABLE RoadSigns (
  id INT PRIMARY KEY,
  location VARCHAR(100) NOT NULL,
  sign_type VARCHAR(50) NOT NULL,
  additional_details VARCHAR(200),

);
INSERT INTO RoadSigns VALUES(1, 'Intersection A', 'Stop Sign', 'Red and white octagon-shaped sign');
INSERT INTO RoadSigns VALUES(2, 'Highway B', 'Speed Limit', 'Maximum speed limit 60 mph');
INSERT INTO RoadSigns VALUES(3, 'School Zone C', 'School Zone', 'Caution: Children crossing');
INSERT INTO RoadSigns VALUES(4, 'Residential Area D', 'Yield Sign', 'Yellow and black upside-down triangle');
INSERT INTO RoadSigns VALUES(5, 'Construction Zone E', 'Road Work Ahead', 'Expect delays and lane closures');
INSERT INTO RoadSigns VALUES(6, 'Intersection F', 'No Right Turn', 'Prohibited right turn at this intersection');
INSERT INTO RoadSigns VALUES(7, 'Highway G', 'Exit Ahead', 'Upcoming exit in 2 miles');
INSERT INTO RoadSigns VALUES(8, 'Pedestrian Crosswalk H', 'Pedestrian Crossing', 'Look out for pedestrians');
INSERT INTO RoadSigns VALUES(9, 'Roundabout I', 'Keep Right', 'Vehicles must keep right in the roundabout');
INSERT INTO RoadSigns VALUES(10, 'Construction Zone J', 'Detour Ahead', 'Follow detour signs for alternate route');
INSERT INTO RoadSigns VALUES(11, 'Railroad Crossing K', 'Railroad Crossing', 'Look, listen, and proceed with caution');
INSERT INTO RoadSigns VALUES(12, 'School Zone L', 'School Bus Stop', 'Stop when red lights are flashing');
INSERT INTO RoadSigns VALUES(13, 'Intersection M', 'No Left Turn', 'Prohibited left turn at this intersection');
```

INSERT INTO RoadSigns VALUES(14, 'Highway N', 'Merge', 'Merge into traffic from the right');
INSERT INTO RoadSigns VALUES(15, 'Hospital Zone O', 'Hospital Ahead', 'Medical facility ahead, drive with care');
select * from RoadSigns;
OUTPUT:

1	Intersection A	Stop Sign	Red and white octagon-shaped sign
2	Highway B	Speed Limit	Maximum speed limit 60 mph
3	School Zone C	School Zone	Caution: Children crossing
4	Residential Area D	Yield Sign	Yellow and black upside-down triangle
5	Construction Zone E	Road Work Ahead	Expect delays and lane closures
6	Intersection F	No Right Turn	Prohibited right turn at this intersection
7	Highway G	Exit Ahead	Upcoming exit in 2 miles
8	Pedestrian Crosswalk H	Pedestrian Crossing	Look out for pedestrians
9	Roundabout I	Keep Right	Vehicles must keep right in the roundabout
10	Construction Zone J	Detour Ahead	Follow detour signs for alternate route
11	Railroad Crossing K	Railroad Crossing	Look, listen, and proceed with caution
12	School Zone L	School Bus Stop	Stop when red lights are flashing
13	Intersection M	No Left Turn	Prohibited left turn at this intersection
14	Highway N	Merge	Merge into traffic from the right
15	Hospital Zone O	Hospital Ahead	Medical facility ahead, drive with care

```
CREATE TABLE TrafficFlow (
  id INT PRIMARY KEY,
  date DATE NOT NULL,
  time TIME NOT NULL,
  location VARCHAR(100) NOT NULL,
  vehicle_count INT NOT NULL,
  average_speed FLOAT NOT NULL,

);
INSERT INTO TrafficFlow VALUES(1, '2023-06-01', '08:00:00', 'Highway A', 100, 60.5);
```

```
INSERT INTO TrafficFlow VALUES(2, '2023-06-01', '12:00:00', 'City Center B', 80, 35.2);
INSERT INTO TrafficFlow VALUES(3, '2023-06-01', '16:30:00', 'Intersection C', 150, 45.8);
INSERT INTO TrafficFlow VALUES(4, '2023-06-02', '07:30:00', 'Highway D', 120, 65.3);
INSERT INTO TrafficFlow VALUES(5, '2023-06-02', '13:15:00', 'Residential Area E', 70, 30.9);
INSERT INTO TrafficFlow VALUES(6, '2023-06-02', '18:00:00', 'City Center F', 90, 40.6);
INSERT INTO TrafficFlow VALUES(7, '2023-06-03', '09:45:00', 'Intersection G', 110, 55.2);
INSERT INTO TrafficFlow VALUES(8, '2023-06-03', '14:30:00', 'Highway H', 95, 50.1);
INSERT INTO TrafficFlow VALUES(9, '2023-06-03', '17:45:00', 'City Center I', 75, 38.7);
INSERT INTO TrafficFlow VALUES(10, '2023-06-04', '08:30:00', 'Highway J', 130, 62.4);
INSERT INTO TrafficFlow VALUES(11, '2023-06-04', '11:00:00', 'Intersection K', 105, 47.9);
INSERT INTO TrafficFlow VALUES(12, '2023-06-04', '15:20:00', 'Residential Area L', 85, 42.3);
INSERT INTO TrafficFlow VALUES(13, '2023-06-05', '10:15:00', 'City Center M', 95, 37.8);
INSERT INTO TrafficFlow VALUES(14, '2023-06-05', '13:45:00', 'Intersection N', 115, 52.6);
INSERT INTO TrafficFlow VALUES(15, '2023-06-05', '17:00:00', 'Highway O', 140, 58.3);
select * from TrafficFlow;
CREATE TABLE VehicleInspections (
  id INT PRIMARY KEY,
  vehicle_id INT NOT NULL,
  inspection_date DATE NOT NULL,
  inspector_name VARCHAR(100) NOT NULL,
  inspection_result VARCHAR(50) NOT NULL,

);
```

```
INSERT INTO VehicleInspections VALUES(1, 1001, '2023-06-01', 'varshi', 'Pass');
INSERT INTO VehicleInspections VALUES(2, 1002, '2023-06-01', 'varni', 'Pass');
INSERT INTO VehicleInspections VALUES(3, 1003, '2023-06-02', 'swatho', 'Fail');
INSERT INTO VehicleInspections VALUES(4, 1004, '2023-06-02', 'swetha', 'Pass');
INSERT INTO VehicleInspections VALUES(5, 1005, '2023-06-03', 'Robo', 'Pass');
INSERT INTO VehicleInspections VALUES(6, 1006, '2023-06-03', 'Jackie chan', 'Fail');
INSERT INTO VehicleInspections VALUES(7, 1007, '2023-06-04', 'shinchan', 'Pass');
INSERT INTO VehicleInspections VALUES(8, 1008, '2023-06-04', 'doreomon', 'Pass');
INSERT INTO VehicleInspections VALUES(9, 1009, '2023-06-05', 'nobita', 'Pass');
INSERT INTO VehicleInspections VALUES(10, 1010, '2023-06-05', 'suniyo', 'Fail');
INSERT INTO VehicleInspections VALUES(11, 1011, '2023-06-06', 'suzuka', 'Pass');
INSERT INTO VehicleInspections VALUES(12, 1012, '2023-06-06', 'ninja hattori', 'Pass');
INSERT INTO VehicleInspections VALUES(13, 1013, '2023-06-07', 'shero', 'Fail');
INSERT INTO VehicleInspections VALUES(14, 1014, '2023-06-07', 'himavari', 'Pass');
INSERT INTO VehicleInspections VALUES(15, 1015, '2023-06-08', 'boss', 'Pass');
```

OUTPUT:

1	1001	2023-06-01	varshi	Pass
2	1002	2023-06-01	varni	Pass
3	1003	2023-06-02	swatho	Fail
4	1004	2023-06-02	swetha	Pass
5	1005	2023-06-03	Robo	Pass
6	1006	2023-06-03	Jackie chan	Fail
7	1007	2023-06-04	shinchan	Pass
8	1008	2023-06-04	doreomon	Pass
9	1009	2023-06-05	nobita	Pass
10	1010	2023-06-05	suniyo	Fail
11	1011	2023-06-06	suzuka	Pass
12	1012	2023-06-06	ninja hattori	Pass
13	1013	2023-06-07	shero	Fail
14	1014	2023-06-07	himavari	Pass
15	1015	2023-06-08	boss	Pass

SQL QUERIES:

---QUERIES------

1) How many vehicles were involved in accidents on main street when the weather was rainy?

code:

```
select  VehiclesInvolved
from Accidents
where Location='Main street'and Weather='Rainy';
```

output:

VehiclesInvolved

2

2) what are traffic violations that are recorded by driver officer varni?

code:

```
select TrafficViolations
from EnforcementData
where Officer_name='officer varni';
```

output:

Red Light Violation

3) Retrieve the date an acccident occured at main street?

code:

```
select Date from Enforcementdata
where location='Main Street';
```

output:

Date

1. 2023-05-01
2. 2023-05-11

4)which driver has highest record of accidents?

code:

```
select max (personname) as maxrecord
from accidents;
```

output:

```
  maxrecord
1 vidya
```

5)which driver recored maximum violations?

code:

```
SELECT Name
FROM Drivers
where PreviousViolations=(SELECT MAX(PreviousViolations)FROM Drivers);
```

output

```
   name
1) pavan
```

6)what is the total count of trafficviolation occured due to male drivers?

code:

```
select name
FROM DriverData
WHERE Gender='Male';
```

output:

```
   name
1  teja
2  sai
```

7)retrieve accident ids not occured on march 18 and 19?

code:

```
SELECT Accident_ID
FROM AccidentData
WHERE Date NOT IN ('2023-05-18','2023-05-19');
```

output:

```
  Accident_ID
1 3
```

8)what are the accident ids which doesnt occured in main street?

code:

```
SELECT Accident_ID
FROM AccidentData
WHERE Location NOT IN ('Main Street');
```

output:

```
  Accident_id
1 2
2 3
```

9)what type of vehicles are involved in the accidents?

code:

```
SELECT VehicleData.VehicleType, AccidentData.Accident_ID
FROM VehicleData
INNER JOIN AccidentData ON VehicleData.VehicleType=AccidentData.Vehicletype;
```

output:

	Vehicletype	Accident_ID
1	car	1
2	Truck	2

10)which vehicle's model has highest price?

code:

```
SELECT model
FROM Vehicles
where price=(select max(price) from Vehicles);
```

output:

	model
1	Model S

11)In which road surface condition most of the accidents occur?

code:

```
select  RoadSurfaceCondition
from WeatherCondition
where countofaccidents=(select max (countofaccidents) from WeatherCondition);
```

output:

	RoadSurfaceCondition
1	icy

12)write a query that gives timespan of start and end of insurance?

code:

```
select DATEDIFF(month,start_date,end_date)
as datediff
from InsuranceData;
```

output:

	datediff
1	11
2	11
3	5
4	11
5	6
6	11
7	3
9	11
10	2
11	11
12	0
13	11
14	11
15	11

13)write time and date details of trafficflow whose average speed is more than 30?

code:

```
select GETUTCDATE() as Timings
from TrafficFlow
where average_speed>30;
```

output:

1	2023-06-08 16:36:45.420
2	2023-06-08 16:36:45.420
3	2023-06-08 16:36:45.420
4	2023-06-08 16:36:45.420
5	2023-06-08 16:36:45.420
6	2023-06-08 16:36:45.420
7	2023-06-08 16:36:45.420
8	2023-06-08 16:36:45.420
9	2023-06-08 16:36:45.420

10 2023-06-08 16:36:45.420

11 2023-06-08 16:36:45.420

12 2023-06-08 16:36:45.420

13 2023-06-08 16:36:45.420

14 2023-06-08 16:36:45.420

15 2023-06-08 16:36:45.420

14)write all the vehicle ID's and inspector name who passed inspection result?

code:

```
select Vehicle_id,Inspector_name
from VehicleInspections
where inspection_result='pass';
```

output:

Vehicle_id	Inspector_name
1001	varshi
1002	varni
1004	swetha
1005	Robo
1007	shinchan
1008	doreomon
1009	nobita
1011	suzuka
1012	ninja hattori
1014	himavari
1015	boss

15) write the average speed in traffic flow?

code:

```
select AVG (average_speed) as avgspeed
```

from TrafficFlow;

output:

avgspeed

1 48.24

16)retrieve location and vehicle count from accident happenned on june 2nd?

code:

```
select vehicle_count,location
from TrafficFlow
where date='2023-06-01';
```

output:

100 Highway A

80 City Center B

150 Intersection C

17)get total details of all drivers whose name starts which starts with p letter?

code:SELECT * FROM Drivers

WHERE name LIKE 'p%';

output:

id	name	age	licence_ number	phone number	email	previous violations
5	pavan	45	JKL321	491234567890	pavan.brown@gmail.com	5
11	pspk	39	BCD456	447890123456	pspk.thompson@gmail.com	3

18)create a view on vehicle inspection that happened on june 2nd?

code:

```
CREATE VIEW june  AS
SELECt *
```

FROM VehicleInspections
WHERE inspection_date='2023-06-02';
output:
view created
3 1003 2023-06-02 swatho Fail
4 1004 2023-06-02 swetha Pass

19)describe the details of services done by emergency services without repititions?
code:
select distinct service_type
from EmergencyServices;
output:
Ambulance
Fire
Police

20)Use union keyword with your service type and its number?

code:
select location from RoadImprovements
union
select location from EnforcementData
order by location;

output:
Broadway
Cedar Road
Church Street
Elm Street
Main Street
Maple Drive
Oak Avenue

Park Avenue
Pine Avenue
Washington Street

21)create a view with only service type and it's number?

code:
```
create view emergency as
select distinct service_type,contact_number
from EmergencyServices;
select * from emergency;
```

output:
```
Ambulance     999
Fire     112
Police  911
```

22)calculate the total duration of insurance whose policy number is INF789?

code:
```
select DATEDIFF(month,start_date,end_date)
as datediff
from InsuranceData
where policy_number='INS789';
```

output:
```
datediff
5
11
11
11
11
```

23)Retrieve information about different type of sign type and its location from id 1 to 7?

code:

```
SELECT sign_type,location
FROM RoadSigns
WHERE id BETWEEN 1 AND 7;
```

output:

```
Stop Sign       Intersection A
Speed Limit     Highway B
School Zone     School Zone C
Yield Sign      Residential Area D
Road Work Ahead     Construction Zone E
No Right Turn Intersection F
Exit Ahead      Highway G
```

24)Get information of contractors name,their location,phone number?

code:

```
select name,contact_number,address
from Contractor;
```

output:

```
ABC Construction      1234567890    123 Main Street, City
XYZ Builders 9876543210    456 Oak Avenue, Town
BuildRight Inc.         4561237890    789 Maple Lane, Village
Master Builders         7894561230    321 Elm Road, County
Construction Co.        7418529630    852 Pine Drive, City
BuildWell Ltd.3692581470    963 Cedar Street, Town
Ace Contractors         2581473690    147 Oak Avenue, Village
BuildTech Solutions   9517538520    753 Maple Lane, County
```

Pro Builders	1473692580	258 Elm Road, City
Dream Builders	2583691470	369 Pine Drive, Town
Mega Construction	7539518520	852 Cedar Street, Village
Golden Builders	6549873210	741 Oak Avenue, County
Renovation Experts	3697418520	147 Maple Lane, City
Precision Builders	8523697410	963 Elm Road, Town
BuildPro Contractors	7418523690	369 Pine Drive, Village

25)which location recorded low rate of accidents?

code:

```
select location
from accidents
where VehiclesInvolved=(SELECT MIN(VehiclesInvolved)
FROM accidents);
```

output:

Avenue
GANDHI ROAD
ANNA NAGAR
)

26)Retrieve the count of accidents grouped by road condition:

```
SELECT RoadCondition, COUNT(*) AS AccidentCount
FROM Accidents
GROUP BY RoadCondition;
```

27)Retrieve accidents sorted by date in descending order:

```
SELECT *
FROM Accidents
ORDER BY Date DESC;
```

28)Retrieve accidents where the person involved has a name starting with "S":

```
SELECT *
```

```
FROM Accidents
WHERE PERSONNAME LIKE 'S%';
```

4)Count the number of accidents for each weather condition:

```
SELECT Weather, COUNT(*) AS AccidentCount
FROM Accidents
GROUP BY Weather;
```

5)Retrieve accidents along with the corresponding vehicle information:

```
SELECT Accidents.AccidentID, Accidents.PersonName, Accidents.Date, Accidents.Location, Accidents.RoadCondition, Accidents.Weather, Vehicles.make, Vehicles.model, Vehicles.year, Vehicles.color
FROM Accidents
INNER JOIN Vehicles ON Accidents.AccidentID = Vehicles.id;
```

6)Retrieve accidents and the drivers involved in each accident:

```
SELECT Accidents.AccidentID, Accidents.PersonName, Accidents.Date, Accidents.Location, Accidents.RoadCondition, Accidents.Weather, Drivers.name, Drivers.age, Drivers.license_number, Drivers.phone_number, Drivers.email
FROM Accidents
INNER JOIN Drivers ON Accidents.PersonName = Drivers.name;
```

7)Retrieve accidents that occurred on a specific date:

```
SELECT *
FROM Accidents
WHERE Date = '2023-05-24';
```

8)Retrieve accidents where the weather condition is rainy or snowy:

```
SELECT *
FROM Accidents
WHERE weather IN ('Rainy', 'Snowy');
```

9)Retrieve vehicles sorted by price in ascending order:

```
SELECT *
```

```
FROM vehicles
ORDER BY price ASC;
```

10)Retrieve the average price of all vehicles:

```
SELECT AVG(price) AS average_price
FROM vehicles;
```

11)Retrieve the count of vehicles grouped by make:

```
SELECT make, COUNT(*) AS vehicle_count
FROM vehicles
GROUP BY make;
```

12)Retrieve the maximum price among all vehicles:

```
SELECT MAX(price) AS max_price
FROM vehicles;
```

13)Update the price of a specific vehicle:

```
UPDATE vehicles
SET price = 40000.00
WHERE id = 1;
```

14)Retrieve vehicles with a specific make and model:

```
SELECT *
FROM vehicles
WHERE make = 'Toyota' AND model = 'Camry';
```

15)Retrieve vehicles with a price between $10,000 and $20,000:

```
SELECT *
FROM vehicles
WHERE price BETWEEN 10000.00 AND 20000.00;
```

16)Retrieve the average price of vehicles grouped by make and model:

```
SELECT make, model, AVG(price) AS average_price
FROM vehicles
```

```
GROUP BY make, model;
```

17)Delete a vehicle with a specific ID:

```
DELETE FROM vehicles
WHERE id = 1;
```

18)Retrieve the count of vehicles for each year:

```
SELECT year, COUNT(*) AS vehicle_count
FROM vehicles
GROUP BY year;
```

19)Retrieve vehicles with a make that starts with the letter 'H':

```
SELECT *
FROM vehicles
WHERE make LIKE 'H%';
```

20)Update the color of vehicles made in the year 2019:

```
UPDATE vehicles
SET color = 'Silver'
WHERE year = 2019;
```

21)Retrieve the total price of all vehicles:

```
SELECT SUM(price) AS total_price
FROM vehicles;
```

22)Retrieve vehicles with a price greater than the average price:

```
SELECT *
FROM vehicles
WHERE price > (
  SELECT AVG(price)
  FROM vehicles
);
```

23)Retrieve the total number of vehicles for each make:

```
SELECT make, COUNT(*) AS vehicle_count
```

```
FROM vehicles
GROUP BY make;
```

24)Retrieve vehicles with a price within a specific range and sorted by make in ascending order:

```
SELECT *
FROM vehicles
WHERE price BETWEEN 15000.00 AND 25000.00
ORDER BY make ASC;
```

25)Retrieve the make and model of the most expensive vehicle:

```
SELECT make, model
FROM vehicles
WHERE price = (
  SELECT MAX(price)
  FROM vehicles
);
```

26)Retrieve the count of drivers in the table:

```
SELECT COUNT(*) AS driver_count
FROM Drivers;
```

27)Retrieve drivers whose age is greater than or equal to 25:

```
SELECT *
FROM Drivers
WHERE age >= 25;
```

28)Retrieve drivers with a specific license number:

```
SELECT *
FROM Drivers
WHERE license_number = 'ABC123';
```

29)Count the number of road infrastructure entries for each location:

```
SELECT name, COUNT(*) AS EntryCount
```

```
FROM RoadInfrastructure
GROUP BY name;
```

30)Retrieve road infrastructure data with a length greater than 1 mile:

```
SELECT *
FROM RoadInfrastructure
WHERE Length > 1.0;
```

31)

```
SELECT Accidents.AccidentID, Accidents.PersonName, Accidents.Date, Accidents.Location, Accidents.RoadCondition, Accidents.Weather, RoadInfrastructure.Type, RoadInfrastructure.Length, RoadInfrastructure.capacity
FROM Accidents
INNER JOIN RoadInfrastructure ON Accidents.Location = RoadInfrastructure.name;
```

32)Count the number of traffic violations for each violation type:

```
SELECT Violation_Type, COUNT(*) AS Violation_Count
FROM TrafficViolations
GROUP BY Violation_Type;
```

33)

```
SELECT *
FROM TrafficViolations
WHERE Amount > 100.00;
```

34)Retrieve traffic violations with a specific violation type:

```
SELECT *
FROM TrafficViolations
WHERE Violation_Type = 'Speeding';
```

35)Retrieve weather conditions with a specific temperature range:

```
SELECT *
FROM WeatherConditions
WHERE Temperature BETWEEN 20 AND 30;
```

36)Count the number of weather condition entries for each weather type:

```
SELECT WeatherType, COUNT(*) AS EntryCount
FROM Condition
GROUP BY WeatherType;
```

CHAPTER 4. CONCLUSION AND FUTUREWORK

4.1 Conclusion

In conclusion, the Road Safety Project implemented using a robust Database Management System (DBMS) holds immense potential to revolutionize road safety measures and improve transportation systems. By efficiently collecting, storing, and analyzing data related to traffic accidents, road conditions, and driver behavior, the project aims to identify patterns, trends, and risk factors to inform targeted interventions and preventive measures. The real-time monitoring capabilities of the project enable timely response to emerging risks, ensuring proactive actions to mitigate accidents. Moreover, the collaborative nature of the project fosters cooperation among stakeholders, promoting effective communication and knowledge sharing. With a continuous improvement approach driven by data analysis, the Road Safety Project in DBMS strives to create a safer road network and save lives. By leveraging the power of technology and advanced analytics, this project has the potential to transform road safety strategies and pave the way for a future with reduced accidents and enhanced transportation safety.

4.2 Future Work

Databases are used for **storing, maintaining and accessing any sort of data**. They collect information on people, places or things. That information is gathered in one place so that it can be observed and analyzed. Databases can be thought of as an organized collection of information and this helps us in creation of a website or a mobile app where it can be accessed by viewers globally.

Future work on road safety in DBMS holds immense potential for further advancements and improvements. Here are some key areas that can be explored:

1. Advanced Predictive Analytics: The integration of machine learning and predictive modeling techniques can further enhance the capabilities of road safety systems. By training models on historical data and incorporating real-time data, the project can predict accident hotspots, identify high-risk drivers, and forecast road conditions. This proactive approach enables authorities to allocate resources effectively and implement preventive measures in a targeted manner.

2. Intelligent Decision Support Systems: Building intelligent decision support systems that leverage the power of artificial intelligence can significantly enhance road safety management. These systems can provide real-time alerts and recommendations to drivers, law enforcement agencies, and transportation departments based on the analysis of various data sources. They can suggest alternative routes, notify drivers of potential hazards, and assist in real-time decision-making to prevent accidents.

3. Integration with Smart City Infrastructure: As cities embrace smart city technologies, integrating the road safety project with these infrastructures becomes crucial. Utilizing data from smart sensors, traffic cameras, and connected vehicles can provide a more comprehensive and real-time understanding of road conditions. By leveraging this data within the DBMS, the project can enhance situational awareness and enable quicker response times to potential risks.

4. Data Sharing and Collaboration: Strengthening collaboration among stakeholders is essential for comprehensive road safety. Future work should focus on establishing standardized protocols and frameworks for data sharing and collaboration. This includes developing secure data exchange mechanisms, defining data standards, and ensuring interoperability between different systems. Improved collaboration will enable the seamless integration of data from various sources and facilitate collective efforts to address road safety challenges.

5. Visualization and Reporting: Enhancing data visualization and reporting capabilities can empower decision-makers to gain valuable insights from road safety data. Interactive

dashboards, heat maps, and graphical representations can facilitate the understanding of complex data sets and aid in identifying key trends and patterns. Visualizations can also support effective communication of road safety information to the public, raising awareness and promoting responsible driving behavior.

By focusing on these future directions, road safety projects in DBMS can continue to evolve and make significant strides towards creating safer road networks. By leveraging emerging technologies, advanced analytics, and enhanced collaboration, the future work on road safety in DBMS has the potential to save lives, prevent accidents, and transform transportation systems into safer and more efficient environments.