DBMS Project Report

DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING
SCHOOL OF TECHNOLOGY
PANDIT DEENDAYAL ENERGY UNIVERSITY, GANDHINAGAR

Subject: Database Management Systems LAB Course

Code: 20CP208P

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Problem Statement:

the petrol pump management system aims to address the operational inefficiencies and data management challenges faced by petrol pump owners and managers, empowering them to make informed decisions, enhance customer satisfaction, and drive business success in the competitive oil and gas industry.

Short Description and Scope of the Project:

Oil and gas (O&G) industry contributes to the economic as one of the most important sectors by taking into advantages as being the most demanding, challenging and exciting engineering and technological advances which interests the engineers at large. As the O&G industry has become financially attractive yet risky to be implemented, it is important to look into the effective way of managing the O&G projects.

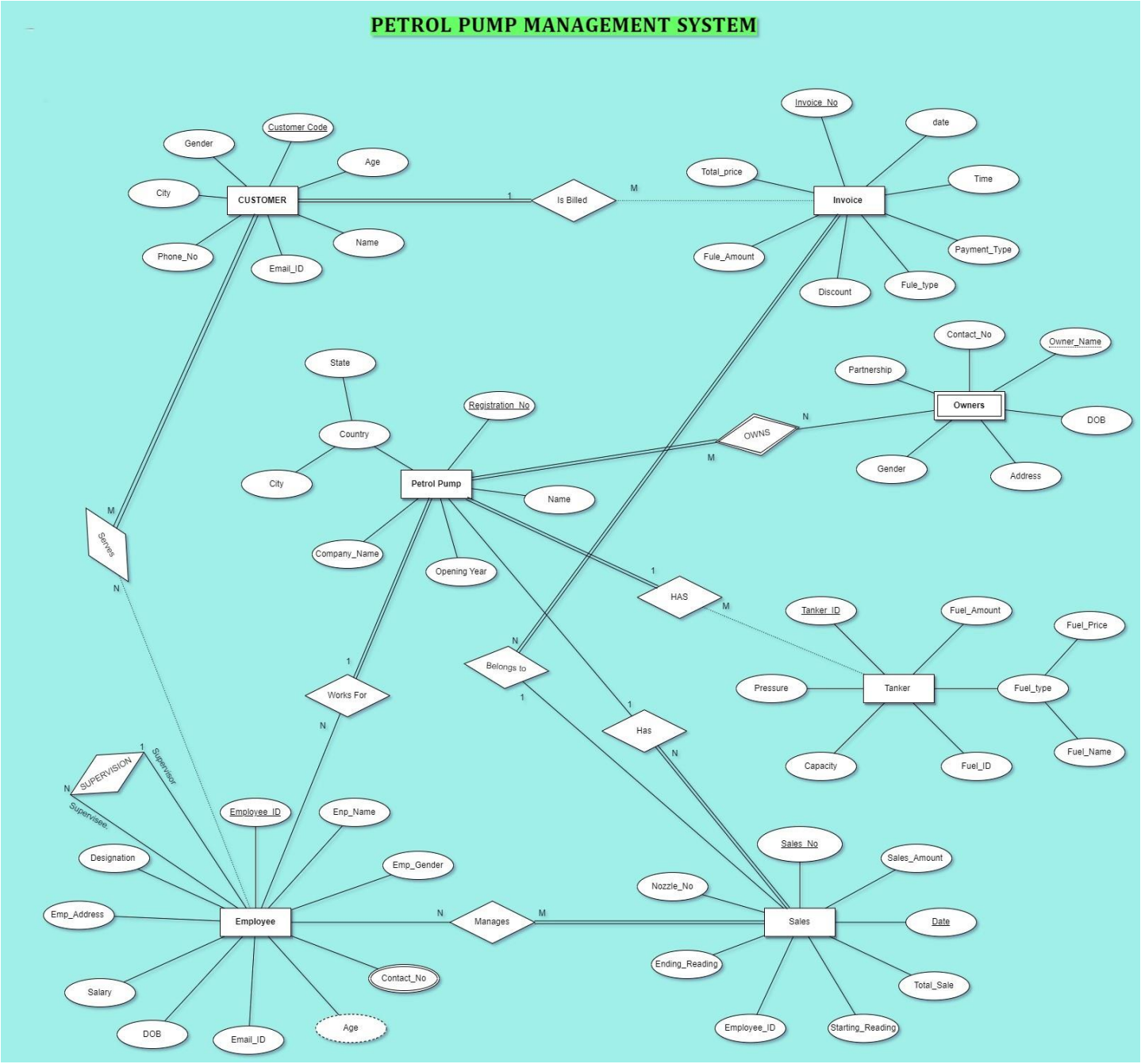
My Project is to maintain petrol pump data which will help Managers to manager their work with ease convenience.

Database management System (DBMS) is a software for creating and managing database. It provides users and programmers with a systematic way to create, retrieve, update and manage data.

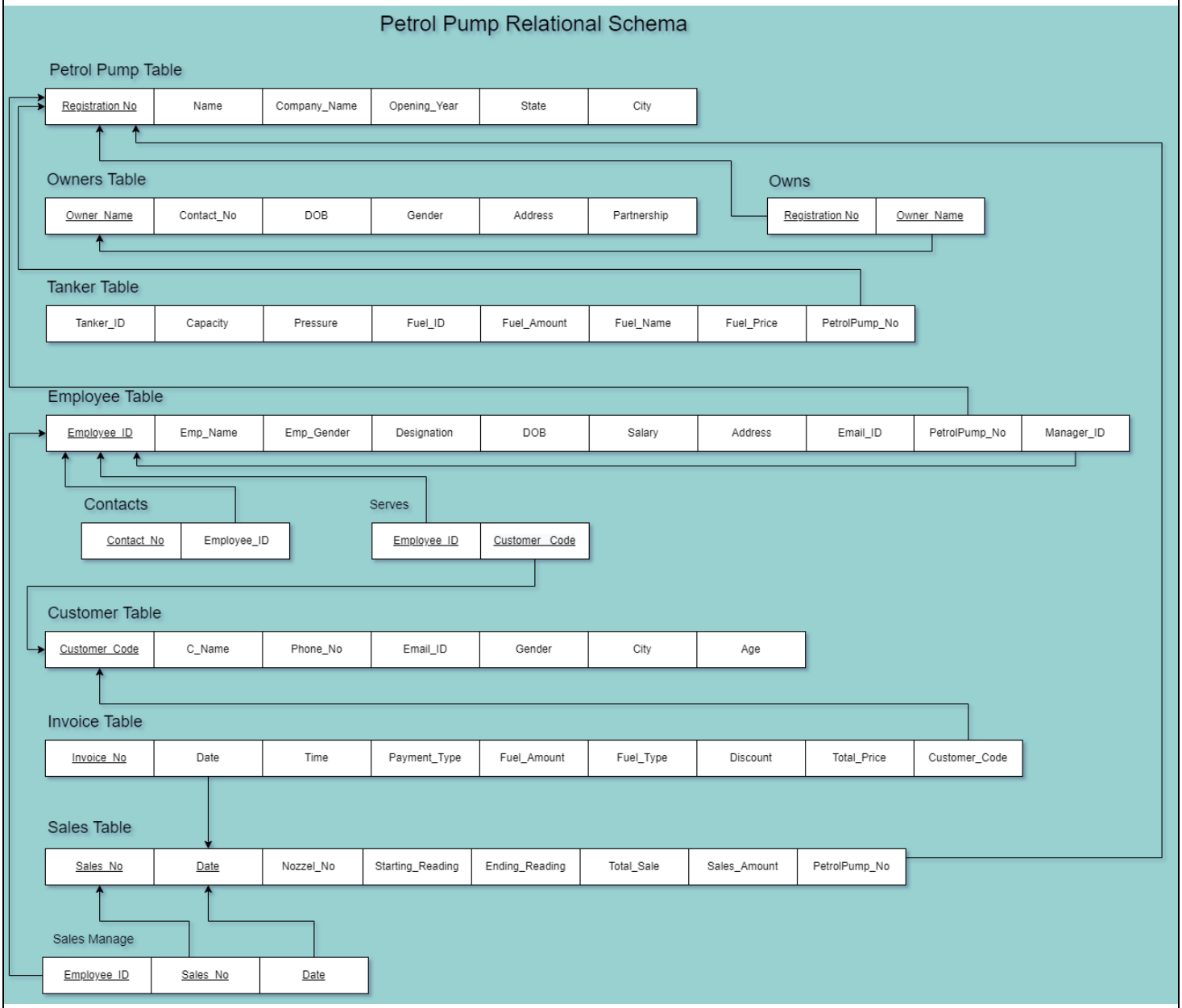
This project will maintain data about Petrol Pumps in an area, their owners, Employees details working in that petrol, Customer detail so that a regular customer will get Goodies & Discount, Tanker details as well as Sales of a particular Petrol Pump.

This project uses MYSQL to store data and perform CRUD operations and Some of the famous libraries such as pandas and streamlit library for frontend to make User Interface interactive.

ER Diagram:


PETROL PUMP MANAGEMENT SYSTEM
CUSTOMER
Customer Code
Gender
Age
City
Phone_No
Email_ID
Name
Is Billed
Invoice
Invoice_No
date
Time
Total_price
Fule_Amount
Payment_Type
Discount
Fule_type
Owners
Contact_No
Owner_Name
Partnership
DOB
Gender
Address
OWNS
Petrol Pump
State
Country
City
Registration_No
Name
Company_Name
Opening Year
Serves
HAS
Belongs to
Works For
Has
Tanker
Tanker_ID
Fuel_Amount
Fuel_Price
Pressure
Fuel_type
Capacity
Fuel_ID
Fuel_Name
SUPERVISION
Supervisor
Supervisee
Employee
Employee_ID
Enp_Name
Designation
Emp_Gender
Emp_Address
Salary
DOB
Email_ID
Age
Contact_No
Manages
Sales
Sales_No
Sales_Amount
Nozzle_No
Date
Ending_Reading
Total_Sale
Employee_ID
Starting_Reading

Relational Schema:



LIST OF TABLES:

1. PetrolPump
2. Owners
3. Tanker
4. Employee
5. Customer
6. Invoice
7. Sales
8. Owns
9. Contacts
10. Serves
11. Sales_Manage

DDL statements:

Building the database & Populating the Database:

```
SET SQL_MODE = "NO_AUTO_VALUE_ON_ZERO";
START TRANSACTION;
SET time_zone = "+00:00";


CREATE TABLE IF NOT EXISTS `PetrolPump`(
  `Registration_No` varchar(10) NOT NULL,
  `Petrolpump_Name` varchar(50) NOT NULL,
  `Company_Name` varchar(30) DEFAULT NULL,
  `Opening_Year` int(5) DEFAULT NULL,
  `State` varchar(30) DEFAULT NULL,
  `City` varchar(40) NOT NULL,
  PRIMARY KEY(`Registration_No`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `PetrolPump` (`Registration_No`, `Petrolpump_Name`,`Company_Name`,
`Opening_Year`, `State`, `City`) VALUES
('HPC805103', 'Sumaraj Petroleum', 'Hindustan Petroleum Corporation',2016,'Bihar','Hisua'),
('BP110054', 'Rajinder Service Station', 'Bharat Petroleum',2012,'Delhi','CENTRAL DELHI'),
('IOC560008', 'Madhu Enterprises', 'Indian Oil Corporation',2008,'Karnataka','Banglore'),
('OIL380013', 'Perusahaan Minyak and Gas Bumi', 'Oil India Limited',2006,'Gujarat','Ahmedabad'),
('RPL673573','Tamarassery Reliance Retail Outlet','Reliance Petroleum
Limited',2013,'Kerala','Thamarasserry');


CREATE TABLE IF NOT EXISTS `Owners`(
  `Owner_Name` varchar(20) NOT NULL,
  `Contact_NO` char(10) NOT NULL,
  `DOB` date DEFAULT NULL,
  `Gender` char DEFAULT NULL,
  `Address` varchar(255) DEFAULT NULL,
  `Partnership` int(5) NOT NULL,
  PRIMARY KEY(`Owner_Name`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Owners` (`Owner_Name`, `Contact_NO`, `DOB`, `Gender`, `Address`, `Partnership`)
VALUES
('Pawan Kumar','9431073500', '1971-01-03', 'M', 'Friends colony more,Patna,Bihar',35 ),
('Avinash Shankar','8783249500','1973-07-15', 'M', 'Buddha colony,Patna,Bihar',25),
('Vikash Kumar Tarun', '7486249500', '1975-02-05','M','Tapeshwer Path,Boring road,Patna,Bihar',45),
('Nirmal Sethi', '6427894500', '1999-09-11','F','Pritam Nagar, Paldi, Ahmedabad, Gujarat',70),
('Neerja Bhanot', '5963154800','2000-02-24', 'F', 'Quarters, Sarojini Nagar,New Delhi',55);


CREATE TABLE IF NOT EXISTS `Tanker`(
```

```
  `Tanker_ID` varchar(10) NOT NULL,
  `Capacity` float(10) DEFAULT NULL,
  `pressure` float(10) DEFAULT NULL,
  `Fuel_ID` varchar(10) NOT NULL,
  `Fuel_Amount` float(15) DEFAULT NULL,
  `Fuel_Name` varchar(20) DEFAULT NULL,
  `Fuel_Price` float(5) NOT NULL,
  `Petrolpump_No`varchar(10) DEFAULT NULL,
  PRIMARY KEY(`Tanker_ID`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Tanker` (`Tanker_ID`, `Capacity`, `pressure`, `Fuel_ID`,`Fuel_Amount`,
`Fuel_Name`,  `Fuel_Price`, `Petrolpump_No`) VALUES
('BR6872', 5000,550,'A1234',513.50,'PetrolE10',101.72,'HPC805103'),
('JK2611', 1000,845,'L7363',238.24,'Kerosene',77.03,'OIL380013'),
('MP4928', 5000,1545,'K5363',1200.95,'CNG',99.50,'BP110054'),
('JH7523', 10000,3500,'Z6353',751.89,'Diesel',87.89,'HPC805103'),
('UP9875', 15000,785,'R4743',576.26,'Gasoline91',107.05,'OIL380013');


CREATE TABLE IF NOT EXISTS `Employee`(
  `Employee_ID` varchar(10) NOT NULL,
  `Emp_Name` varchar(30) NOT NULL,
  `Emp_Gender`char DEFAULT NULL,
  `Designation` varchar(10) DEFAULT NULL,
  `DOB` date DEFAULT NULL,
  `Salary` int(20) DEFAULT NULL,
  `Emp_Address` varchar(255) NOT NULL,
  `Email_ID`varchar(100) NOT NULL,
  `Petrolpump_No`varchar(10) DEFAULT NULL,
  `Manager_ID` varchar(10) DEFAULT NULL,
  PRIMARY KEY(`Employee_ID`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Employee` (`Employee_ID`, `Emp_Name`, `Emp_Gender`, `Designation`, `DOB`,
`Salary`, `Emp_Address`, `Email_ID`, `Petrolpump_No`, `Manager_ID`) VALUES
('FOED452','Sheela Reddy','F','FOOD MANAGEMENT','1989-11-28',45000,'dakbangla
choraha,patna','sheela@gmail.com','HPC805103','MANG957'),
('DRHD746','Hima Ullal','F','COOKING','1995-04-18',25000,'Bikram Road,
Patna','hima@gmail.com','HPC805103','FOED452'),
('MANG957','Aman kumar','M','MANAGER','1992-01-21',65000,'Boaring road,
patna','Aman@outlook.com','HPC805103','MANG957'),
('FDNG652','Hradha Nayar','F','NOZZEL PERSON','1987-08-09',35000,'Pandit Bigha,
Gaya','hradha@hotmail.com','HPC805103','FDEW353'),
('FDSNG43','Hemant','M','CLEANING','1995-01-23',20000,'Kanvada, Magrol road,
Surat','hemant@gmail.com','OIL380013',NULL),
('SNGED76','Animesh','M','NOZZEL PERSON','1982-08-13',45000,'Industrial Development Area, Sector
16, Gurugram, Haryana' ,'animesh@gmail.com','OIL380013',NULL),
```

```
('FDEW353','Saideepak Reddy','M','NOZZEL PERSON','2000-06-30',40000,'Lodwadih, Topchanchi,
Jharkhand','saideepak@outlook.com','HPC805103','MANG957');


CREATE TABLE IF NOT EXISTS `Customer`(
  `Customer_Code` varchar(10) NOT NULL,
  `C_Name` varchar(30) NOT NULL,
  `Phone_No`char(10) DEFAULT NULL,
  `Email_ID`varchar(100) DEFAULT NULL,
  `Gender`char DEFAULT NULL,
  `City` varchar(50) DEFAULT NULL,
  `Age` int(3) DEFAULT NULL,
  PRIMARY KEY(`Customer_Code`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Customer` (`Customer_Code`, `C_Name`, `Phone_No`, `Email_ID`, `Gender`, `City`,
`Age`) VALUES
('SFG252','Akash','6542589700','akash@gmail.com','M','Bihar', 27),
('GHE785','Praneet','7539514600','praneet@yahoo.com','M','Orissa',59),
('FJD253','Chetan','8426951300','chetan@hotmail.com','M','Bengalore', 24),
('OUI325','Ayush','7618425500','ayush@outlook.com','M','Kota',18),
('CGM235','Vinesh','6794324600','vines@pesu.pes.edu','M','Kolkata',54),
('BFR426','Anamika',9569731800,'anamika@gmai.com','F','Jharkhand',26);


CREATE TABLE IF NOT EXISTS `Invoice`(
  `Invoice_No` varchar(10) NOT NULL,
  `Date` date NOT NULL,
  `Payment_Type` varchar(20) NOT NULL,
  `Fuel_Amount` float(15) DEFAULT NULL,
  `Fuel_Type` varchar(15) DEFAULT NULL,
  `Discount` int(5) DEFAULT NULL,
  `Total_Price` float(10) NOT NULL,
  `Customer_Code` varchar(10) NULL,
  PRIMARY KEY(`Invoice_No`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Invoice` (`Invoice_No`, `Date`, `Payment_Type`, `Fuel_Amount`, `Fuel_Type`,
`Discount`, `Total_Price`, `Customer_Code`) VALUES
('XC34','2022-11-20','Cash',7,'PetrolE10',10,640.83,'BFR426'),
('NR43','2022-11-20','UPI', 5.4,'Gasoline91',NULL, 578.07,'GHE785'),
('MN34','2020-06-30','Credit Card', 15.8,'Diesel',7.5, 1284.51,'OUI325'),
('FG43','2022-10-27','UPI', 4.9,'Gasoline91',5, 498.32,'SFG252'),
('DS85','2019-08-19','Debit Card', 6.8,'Diesel',NULL, 597.65,'OUI325');


CREATE TABLE IF NOT EXISTS `Sales`(
  `Sales_No` varchar(10) NOT NULL,
  `Date` date NOT NULL,
```

```
  `Nozzel_No` int(4) NOT NULL,
  `Starting_Reading` int(7) NOT NULL,
  `Ending_Reading` int(7) NOT NULL,
  `Total_Sales` float(10) NOT NULL,
  `Sales_Amount` float(10) NOT NULL,
  `Petrolpump_No`varchar(10) DEFAULT NULL,
  PRIMARY KEY(`Sales_No`,`Date`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Sales` (`Sales_No`, `Date`, `Nozzel_No`, `Starting_Reading`, `Ending_Reading`,
`Total_Sales`, `Sales_Amount`, `Petrolpump_No`) VALUES
('FGHGE32','2022-11-20', 1, 45687,49782 , 17584.45, 106.52,'HPC805103'),
('MVBER67','2022-11-20', 2, 48325, 53842, 4253.45, 205.5,'OIL380013'),
('IUOSF98','2019-08-19', 2, 12757, 23454, 1254.71, 89.45,'HPC805103'),
('GDZJD24','2019-08-19', 1, 62725,68725 , 5466.45, 125.85,'OIL380013'),
('QWRGH87','2022-11-22', 3, 12758, 19758, 7854.65, 425.25,'HPC805103');


CREATE TABLE IF NOT EXISTS `Owns`(
  `Registration_No` varchar(10) NOT NULL,
  `Owner_Name` varchar(20) NOT NULL,
  PRIMARY KEY(`Registration_No`, `Owner_Name`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Owns` (`Registration_No`,`Owner_Name`) VALUES
('HPC805103','Pawan Kumar'),
('HPC805103','Avinash Shankar'),
('HPC805103','Vikash Kumar Tarun'),
('OIL380013','Nirmal Sethi'),
('OIL380013','Vikash Kumar Tarun'),
('BP110054','Neerja Bhanot'),
('BP110054','Pawan Kumar');




CREATE TABLE IF NOT EXISTS `Contacts`(
  `Employee_ID` varchar(10) NOT NULL,
  `Contact_NO` char(10) NOT NULL,
  PRIMARY KEY(`Employee_ID`, `Contact_NO`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Contacts` (`Employee_ID`, `Contact_NO`) VALUES
('MANG957','6299337300'),
('MANG957','8540074600'),
('FOED452','6256575800'),
('FOED452','9678225400'),
('FDSNG43','8312243800'),
('FDNG652','5249785500');
```

```sql
CREATE TABLE IF NOT EXISTS `Serves`(
  `Employee_ID` varchar(10) NOT NULL,
  `Customer_Code` varchar(10) NOT NULL,
  PRIMARY KEY(`Employee_ID`, `Customer_Code`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Serves` (`Employee_ID`, `Customer_Code`) VALUES
('FDEW353','SFG252'),
('FDEW353','CGM235'),
('FDEW353','BFR426'),
('FDNG652','SFG252'),
('FDNG652','CGM235');

CREATE TABLE IF NOT EXISTS `Sales_Manage`(
  `Employee_ID` varchar(10) NOT NULL,
  `Sales_No` varchar(10) NOT NULL,
  `Date` date NOT NULL,
  PRIMARY KEY(`Employee_ID`, `Sales_No`, `Date`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

INSERT INTO `Sales_Manage`(`Employee_ID`, `Sales_No`, `Date`) VALUES
('FDEW353','FGHGE32','2022-11-20'),
('FDEW353','IUOSF98','2019-08-19'),
('FDNG652','QWRGH87','2022-11-22'),
('SNGED76','GDZJD24','2019-08-19'),
('SNGED76','MVBER67','2022-11-20');

COMMIT;
```

Structure Of the Tables:

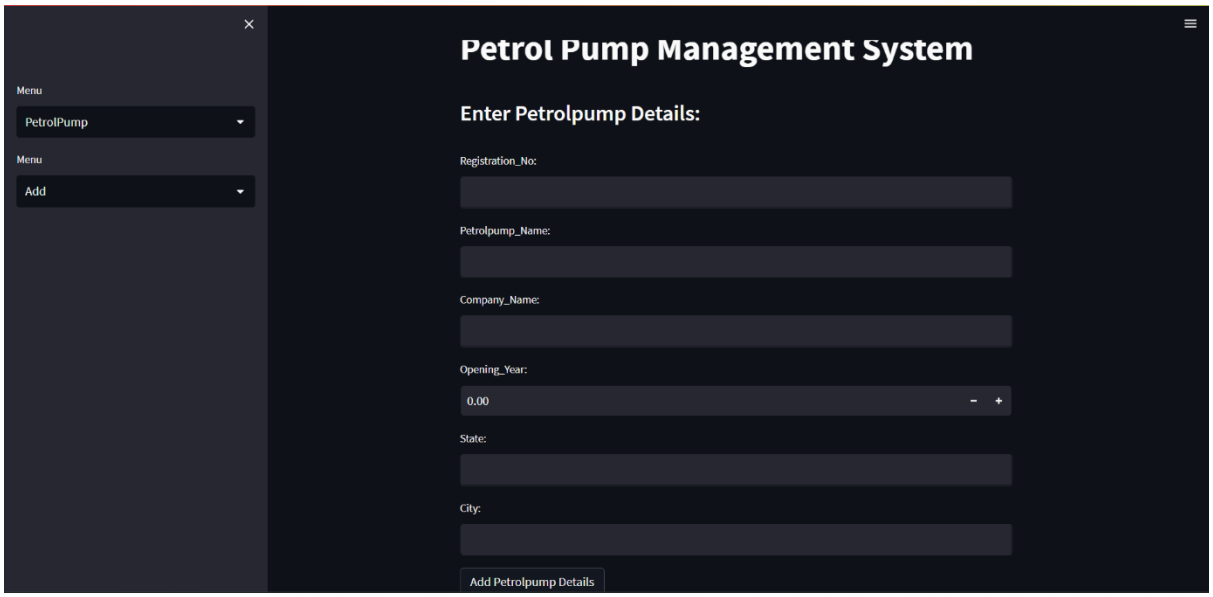
```
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| Sales_No        | varchar(10) | NO   | PRI | NULL    |       |
| Date            | date        | NO   | PRI | NULL    |       |
| Nozzel_No       | int(4)      | NO   |     | NULL    |       |
| Starting_Reading| int(7)      | NO   |     | NULL    |       |
| Ending_Reading  | int(7)      | NO   |     | NULL    |       |
| Total_Sales     | float       | NO   |     | NULL    |       |
| Sales_Amount    | float       | NO   |     | NULL    |       |
| Petrolpump_No   | varchar(10) | YES  |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
8 rows in set (0.018 sec)

MariaDB [petrolpump_management]> desc petrolpump
    -> ;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| Registration_No | varchar(10) | NO   | PRI | NULL    |       |
| Petrolpump_Name | varchar(50) | NO   |     | NULL    |       |
| Company_Name    | varchar(30) | YES  |     | NULL    |       |
| Opening_Year    | int(5)      | YES  |     | NULL    |       |
| State           | varchar(30) | YES  |     | NULL    |       |
| City            | varchar(40) | NO   |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
6 rows in set (0.014 sec)

MariaDB [petrolpump_management]> desc tanker;
+---------------+-------------+------+-----+---------+-------+
| Field         | Type        | Null | Key | Default | Extra |
+---------------+-------------+------+-----+---------+-------+
| Tanker_ID     | varchar(10) | NO   | PRI | NULL    |       |
| Capacity      | float       | YES  |     | NULL    |       |
| pressure      | float       | YES  |     | NULL    |       |
| Fuel_ID       | varchar(10) | NO   |     | NULL    |       |
| Fuel_Amount   | float       | YES  |     | NULL    |       |
| Fuel_Name     | varchar(20) | YES  |     | NULL    |       |
| Fuel_Price    | float       | NO   |     | NULL    |       |
| Petrolpump_No | varchar(10) | YES  |     | NULL    |       |
+---------------+-------------+------+-----+---------+-------+
```

```
MariaDB [Petrolpump_management]> INSERT INTO Invoice (Invoice_No, Date, Time, Payment_Type, Fuel_Amount, Fuel_Type, Discount, Total_Price, Customer_Code) VALUES
    -> ('NR43','2021-10-12','14:24:34','UPI', 5.4,'Gasoline91',NULL, 578.07,'GHE785'),
    -> ('MN34','2020-06-30','21:26:09','Credit Card', 15.8,'Diesel',7.5, 1284.51,'OUI325'),
    -> ('FG43','2022-10-27','16:06:34','UPI', 4.9,'Gasoline91',5, 498.32,'SFG252'),
    -> ('DS85','2019-08-19','09:38:49','Debit Card', 6.8,'Diesel',NULL, 597.65,'OUI325');
Query OK, 4 rows affected (0.009 sec)
Records: 4  Duplicates: 0  Warnings: 0

MariaDB [Petrolpump_management]> select * from Invoice;
+------------+------------+----------+--------------+-------------+-----------+----------+-------------+---------------+
| Invoice_No | Date       | Time     | Payment_Type | Fuel_Amount | Fuel_Type | Discount | Total_Price | Customer_Code |
+------------+------------+----------+--------------+-------------+-----------+----------+-------------+---------------+
| DS85       | 2019-08-19 | 09:38:49 | Debit Card   |         6.8 | Diesel    |     NULL |      597.65 | OUI325        |
| FG43       | 2022-10-27 | 16:06:34 | UPI          |         4.9 | Gasoline91|        5 |      498.32 | SFG252        |
| MN34       | 2020-06-30 | 21:26:09 | Credit Card  |        15.8 | Diesel    |        8 |     1284.51 | OUI325        |
| NR43       | 2021-10-12 | 14:24:34 | UPI          |         5.4 | Gasoline91|     NULL |      578.07 | GHE785        |
| XC34       | 2022-11-20 | 22:55:10 | Cash         |           7 | PetrolE10 |       10 |      640.83 | BFR426        |
+------------+------------+----------+--------------+-------------+-----------+----------+-------------+---------------+
5 rows in set (0.001 sec)

MariaDB [Petrolpump_management]> INSERT INTO `Sales` (`Sales_No`, `Date`, `Nozzel_No`, `Starting_Reading`, `Ending_Reading`, `Total_Sales`, `Sales_Amount`, `Petrolpump_No`) VALUES
    -> ('FGHGE32','2022-11-20', 1, 45687,49782 , 17584.45, 106.52,'HPC805103'),
    -> ('MVBER67','2022-11-20', 2, 48325, 53842, 4253.45, 205.5,'OIL380013'),
    -> ('IUOSF98','2019-08-19', 2, 12757, 23454, 1254.71, 89.45,'HPC805103'),
    -> ('GDZJD24','2019-08-19', 1, 62725,68725 , 5466.45, 125.85,'OIL380013'),
    -> ('QWRGH87','2022-11-22', 3, 12758, 19758, 7854.65, 425.25,'HPC805103');
Query OK, 5 rows affected (0.010 sec)
Records: 5  Duplicates: 0  Warnings: 0

MariaDB [Petrolpump_management]> select * from Sales;
+----------+------------+-----------+-----------------+-----------------+-------------+--------------+----------------+
| Sales_No | Date       | Nozzel_No | Starting_Reading | Ending_Reading | Total_Sales | Sales_Amount | Petrolpump_No |
+----------+------------+-----------+-----------------+-----------------+-------------+--------------+----------------+
| FGHGE32  | 2022-11-20 |         1 |           45687 |           49782 |     17584.4 |       106.52 | HPC805103      |
| GDZJD24  | 2019-08-19 |         1 |           62725 |           68725 |     5466.45 |       125.85 | OIL380013      |
| IUOSF98  | 2019-08-19 |         2 |           12757 |           23454 |     1254.71 |        89.45 | HPC805103      |
| MVBER67  | 2022-11-20 |         2 |           48325 |           53842 |     4253.45 |        205.5 | OIL380013      |
| QWRGH87  | 2022-11-22 |         3 |           12758 |           19758 |     7854.65 |       425.25 | HPC805103      |
+----------+------------+-----------+-----------------+-----------------+-------------+--------------+----------------+
```

Developing a Frontend:

The frontend should support

1. Addition, Modification and Deletion of records from any chosen table



	Registration_No	Petrolpump_Name	Company_Name	Opening_Year	State	City
0	abc	pumpertump	BPL	1968	karnataka	bengaluru
1	BP110054	Rajinder Service Station	Bharat Petroleume	2015	Delhi	CENTRAL_DELHI
2	HPC805103	Sumaraj Petroleum	Hindustan Petroleum Corporatio	2016	Bihar	Hisua
3	IOC560008	Madhu Enterprises	Indian Oil Corporation	2008	Karnataka	Banglore
4	OIL380013	Perusahaan Minyak and Gas Bumi	Oil India Limited	2006	Gujarat	Ahmedabad
5	RPL673573	Tamarassery Reliance Retail Outlet	Reliance Petroleum Limited	2013	Kerala	Thamarasserry
6	sfdg	fdgh	relience	1485	fgjh	xbcvgn

NORMALISATION

Normalization is the process of reducing data redundancy in a table and improving data integrity. The goal of normalization is to create a database structure that is efficient, robust, and resistant to anomalies such as insertion, update, and deletion anomalies.

Need for normalization:
1) It eliminates redundant data.
2) It reduces chances of data error.
3) The normalization is important because it allows database to take up less disk space.
4) It also helps in increasing the performance.
5) It improves the data integrity and consistency.

There are several normal forms, each representing a higher level of normalization:

1. First Normal Form (1NF): Ensures that each column contains atomic values, meaning no multi-valued attributes or repeating groups.
2. Second Normal Form (2NF): Requires that every non-key attribute is fully functionally dependent on the primary key. It means eliminating partial dependencies where part of the primary key determines a non-key attribute.
3. Third Normal Form (3NF): Builds on the 2NF by eliminating transitive dependencies. In 3NF, every non-key attribute is dependent only on the primary key and not on any other non-key attributes.

- **1NF (First Normal Form):** All tables, including PetrolPump, Owners, Tanker, Employee, Customer, Invoice, Sales, Owns, Contacts, Serves, and Sales_Manage, demonstrate compliance with 1NF requirements. Each table possesses a primary key ensuring uniqueness, and attributes contain atomic values without repeating groups or arrays.

- **2NF (Second Normal Form**): The tables, PetrolPump, Owners, Tanker, Employee, Customer, Invoice, Sales, Owns, Contacts, Serves, and Sales_Manage, further satisfy the conditions of 2NF. All non-key attributes are fully functionally dependent on the primary key(s), eliminating any partial dependencies.

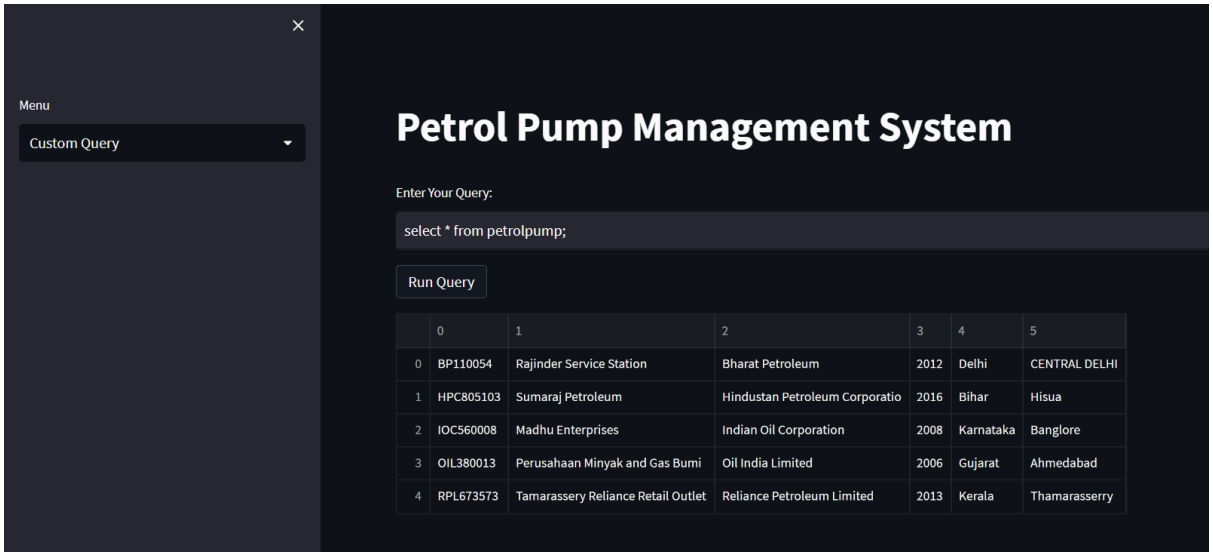
- **3NF (Third Normal Form):** Additionally, the tables uphold the principles of 3NF. There are no transitive dependencies observed, indicating that all non-key attributes are fully functionally dependent on the primary key(s), enhancing data integrity and minimizing redundancy.

Here are all the tables are in upto 3NF:

- Petrol_Pump(registration_number, name, company_name, opening_year, state, city)
- Owners(registration_number, owner_name, contact_number, date_of_birth, address, partnership_info)
- Tanker(tanker_ID, capacity, pressure, fuel_ID, fuel_amount, fuel_name, fuel_price, petrol_pump_number)
- Employee(employee_ID, employee_name, employee_gender, designation, date_of_birth, salary, address, email_ID, petrol_pump_number, manager_ID)
- Customer(customer_code, customer_name, phone_number, email_ID, gender, city, age)
- Invoice(date, time, payment_type, fuel_amount, fuel_type, discount, total_price, customer_code)
- Sales(sales_number, date, nozzle_number, starting_meter_reading, ending_meter_reading, total_sale, sales_amount, petrol_pump_number)
- Sales_Manage(table_attributes) (assuming some attributes exist for Sales_Manage)

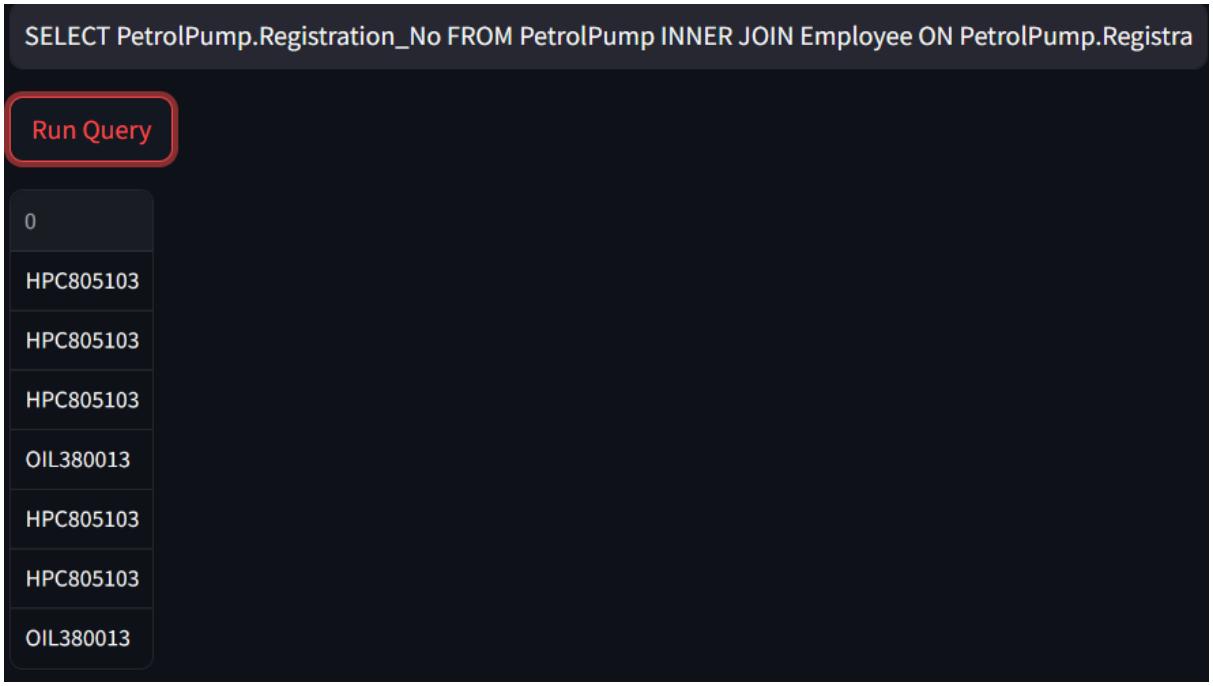
Query

- There should be a window to accept and run any SQL statement and display the result

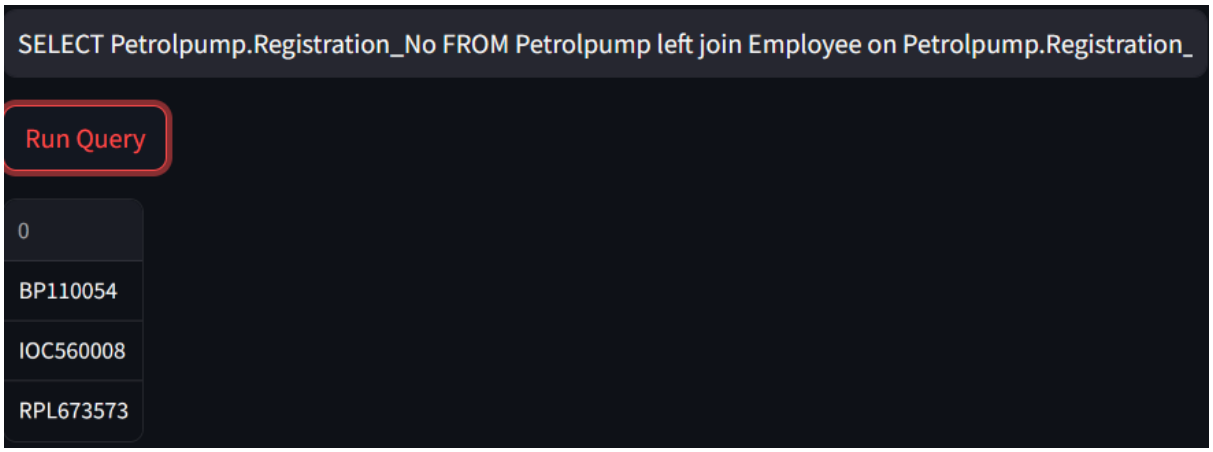


	0	1	2	3	4	5
0	BP110054	Rajinder Service Station	Bharat Petroleum	2012	Delhi	CENTRAL DELHI
1	HPC805103	Sumaraj Petroleum	Hindustan Petroleum Corporatio	2016	Bihar	Hisua
2	IOC560008	Madhu Enterprises	Indian Oil Corporation	2008	Karnataka	Banglore
3	OIL380013	Perusahaan Minyak and Gas Bumi	Oil India Limited	2006	Gujarat	Ahmedabad
4	RPL673573	Tamarassery Reliance Retail Outlet	Reliance Petroleum Limited	2013	Kerala	Thamarasserry

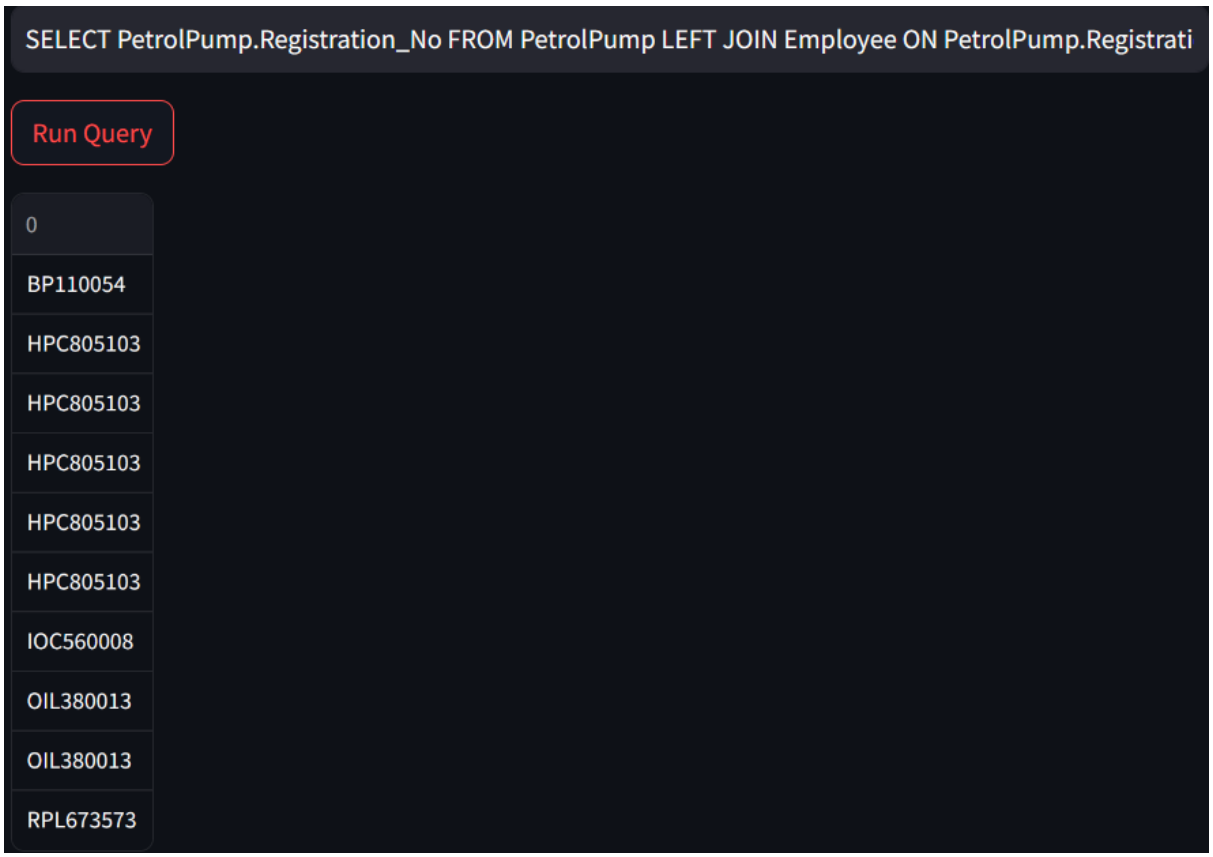
Query: SELECT PetrolPump.Registration_No FROM PetrolPump INNER JOIN Employee ON PetrolPump.Registration_No = Employee.Petrolpump_No;



Query: SELECT Petrolpump.Registration_No FROM Petrolpump left join Employee on Petrolpump.Registration_No = Employee.Petrolpump_No WHERE Employee.Petrolpump_No is NULL;



Query: SELECT PetrolPump.Registration_No FROM PetrolPump LEFT JOIN Employee ON PetrolPump.Registration_No = Employee.Petrolpump_No;



Query: SELECT avg(Age) from Customer where Gender='M';

```
SELECT avg(Age) from Customer where Gender='M';
```

Run Query

0
36.4

Query: SELECT Emp_Name, TIMESTAMPDIFF (YEAR, DOB, CURDATE()) AS age FROM Employee;

```
SELECT Emp_Name, TIMESTAMPDIFF (YEAR, DOB, CURDATE()) AS age FROM Employee;
```

Run Query

0	1
Hima Ullal	28
Saideepak Reddy	23
Hradha Nayar	36
Hemant	29
Sheela Reddy	34
Aman kumar	32
Animesh	41

Conclusion:

In conclusion, the development of this database management system (DBMS) tailored for the petrol pump industry has been a significant endeavor aimed at addressing the complexities and challenges faced by managers in efficiently managing their operations. Through the implementation of a robust relational database model, encompassing tables such as PetrolPump, Owners, Tanker, Employee, Customer, Invoice, and others, we have achieved a structured and organized approach to data management.

The normalization process, which ensured compliance with the first, second, and third normal forms, has played a crucial role in enhancing data integrity, minimizing redundancy, and promoting efficiency in database operations. By eliminating anomalies such as insertion, update, and deletion anomalies, we have established a solid foundation for the database's reliability and consistency.

`Moreover, the incorporation of SQL queries for data retrieval and manipulation, along with the development of a frontend interface for user interaction, has empowered users with the capability to perform CRUD operations seamlessly and execute custom SQL statements as needed. This interactive interface adds a layer of flexibility and usability to the system, catering to diverse user requirements and preferences.

In essence, this DBMS project represents a significant step towards enhancing the management of petrol pump operations, offering managers a comprehensive toolset for data management, analysis, and decision-making. Moving forward, continuous refinement and optimization of the system will be essential to adapt to evolving industry needs and technological advancements, ensuring its continued relevance and effectiveness in the dynamic landscape of the oil and gas sector.