Database Design and Management for InfoTech Solutions

TERM PROJECT

In fulfilment of
Database Management System (INFO 605)

Instructor: Stephen Frien

Team:
Meghna Rajbhandari, M.S. Computer Science
Uditi Shah, M.S. Data Science

College of Computing and Informatics
Drexel University
Philadelphia, PA

Table of Contents

1. Requirements 3
2. ER Model 5
3. Database Schema 5
4. Data Dictionary 7
5. Data Dictionary Language (DDL) 9
6. Data Manipulation Language (DML) 13
7. Queries 20

1. Requirements

We are designing a database system for a small tech startup company “InfoTech Solutions” that operates in a dynamic and rapidly changing business environment. This company is characterized by its ability to adapt and respond to varying client needs, with the potential to collaborate with a diverse range of clients, from none to many. Each client is exclusively associated with our company, reflecting the company’s commitment to building strong, one-on-one relationships with its clients.

The company is organized into a flexible structure of departments, with at least one department but the potential for many more. Each department is uniquely linked to the company, underscoring the company’s integrated approach to its operations.

The company’s product line is diverse and adaptable, with the potential to produce a wide range of products, each of which is uniquely produced by our company.

Within each department, the company employs a team of dedicated professionals. Each department is staffed by at least one employee, but there is no upper limit to the number of employees a department can have. However, to ensure clear lines of responsibility and accountability, each employee is dedicated to only one department.

Moreover, each employee has a manager who is also an employee within the same department. This recursive relationship allows for a clear hierarchy within each department, where one employee (the manager) can manage many employees, and each employee is managed by exactly one manager.

The company’s project-based approach to its work is reflected in the potential for each department to be engaged in multiple projects, or none at all. This flexibility allows the company to respond to varying business needs and opportunities. Each project can be worked on by multiple departments, fostering a collaborative approach that enables the company to leverage diverse skills and expertise from across departments.

However, while multiple departments can contribute to a project, each project is supervised by only one department. This ensures clear lines of responsibility and accountability for the successful completion of each project.

To support its employees in their work, the company provides each employee with a unique account and login credentials. This ensures secure and personalized access to the company's systems, protecting the company's data while enabling employees to perform their roles effectively.

Employees have the flexibility to work on multiple tasks or not at all, reflecting the diverse and dynamic nature of the company's operations. Each task is assigned to only one employee, ensuring clear responsibility and accountability for each piece of work.

Finally, to support effective management and oversight, each employee has a unique timesheet that records their working hours and leave. This provides a transparent and efficient system for tracking employee time and attendance, supporting the company's commitment to fair and equitable employment practices.

The goal of this project is to design a database system that accurately captures this information and enforces these business rules. In doing so, we aim to provide a robust and efficient solution for managing the company's operations, supporting its growth and success in the tech startup sector.

The information stored in each entity are:
Company: Details about our company, including contact information, industry type, and more.
Departments: Information about various departments within the company and their functions.
Employees: Comprehensive data about our employees, their roles, and contact information.
Projects: Details about ongoing and completed projects, including timelines, budgets, and status.
Products: Information about the products we develop, their descriptions, categories, and assigned projects.
Clients: Data about our clients, their contact details, and associated projects.
Tasks: Specific tasks within projects, their assignments, and statuses.
Timesheets: Records of employee hours worked on various tasks and projects.

Login Credentials: Secure storage of user login information to ensure data security and integrity.

2. ER Model

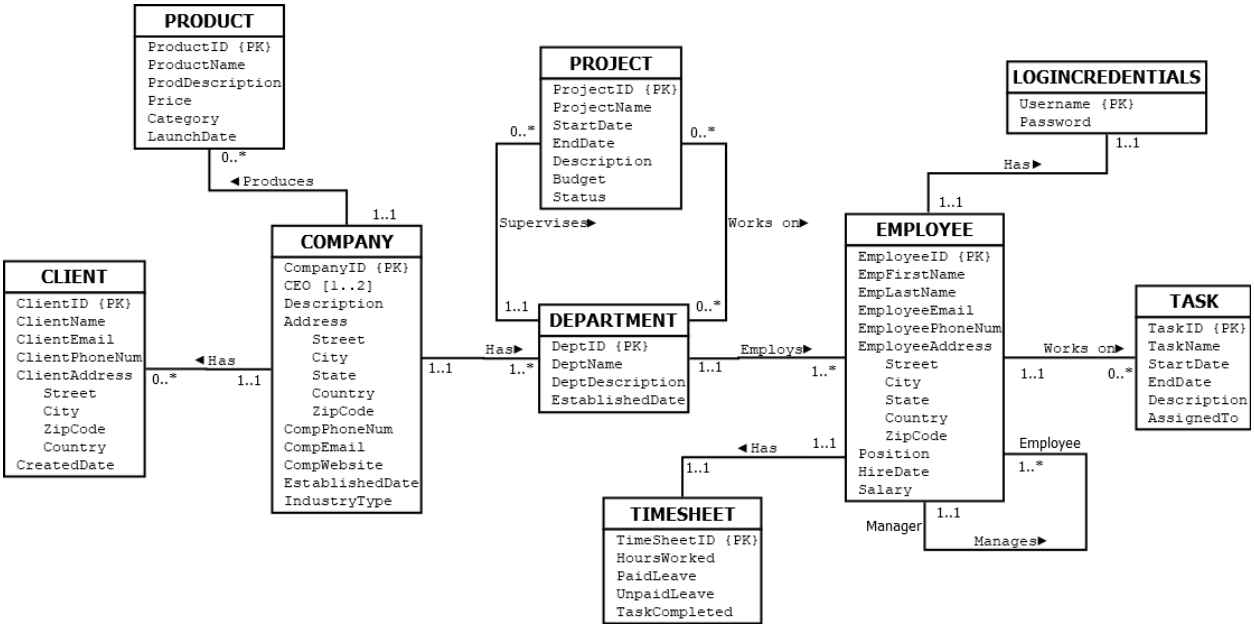

Figure 1: ER Diagram

3. Database Schema

<u>1NF</u>

Initially, our database schema was designed to meet the requirements of the First Normal Form (1NF). This ensured that each table had a primary key, each column contained atomic values, each column contained values of a single type.
We can see from the ER Diagram as mentioned in Figure 1 is that CEO is a multi-valued attribute of the 'Company' entity. In such case, while translating the ERD into relational schema of 1 normal form, these multi-valued attributes will have a separate table with composite primary keys formed from the original PK and the multi-valued attribute. The original primary key, i.e. CompanyID serves as foreign key here.

In addition, we see that department and projects have many to many relationships (works on). In such cases, this relationship will also have a separate table with primary keys of each entity forming a composite primary key for this new entity.

CLIENT (ClientID, CompanyID, ClientName, ClientEmail, ClientPhoneNum, Street, City, ZipCode, Country, CreatedDate) foreign key: CompanyID

COMPANY (CompanyID, Description, Street, City, State, Country, ZipCode, CompPhoneNum, CompEmail, CompWebsite, EstablishedDate, IndustryType)

COMPANY_CEO (CompanyID, CEO) [When there is a multi-valued attribute, then a separate table is created with composite primary key formed from the original primary key and the multi-valued attribute].

PRODUCT (ProductID, CompanyID, ProductName, ProdDescription, Price, Category, LaunchDate) Foreign Key: CompanyID

DEPARTMENT (DeptID, CompanyID, DeptName, DeptDescription, EstablishedDate) Foreign Key: CompanyID.

PROJECT (ProjectID, DeptID, ProjectName, StartDate, EndDate, Description, Budget, Status) Foreign Key: DeptID for the relationship supervises

WORKS_ON (ProjectID, DeptID) [When there are many-many relationships between two entities, then the relationship will have a separate table with primary keys of each entity forming a composite primary key for this table].

EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary) Foreign keys: DeptID, ManagerID

LOGINCREDENTIALS (Username, Password)

TASK (TaskID, EmployeeID, TaskName, StartDate, EndDate, Description, AssignedTo) Foreign Key: EmployeeID

TIMESHEET (TimeSheetID, HoursWorked, PaidLeave, UnpaidLeave, TaskCompleted)

2NF

To be in 2NF, a table must be in 1NF initially, have no partial dependencies, meaning all non-prime attributes must fully functionally depend on all candidate keys. Since there are no partial dependencies, we can say that our relational schema is in 2 NF.

3NF

To be in 3NF, a table/entity must be in 2NF, have no transitive dependencies, meaning non-prime attributes must depend only on candidate keys. We have no transitive dependencies. Hence, the relational schema is in 3 NF.

4. Data Dictionary

CLIENT:

A	B	C	D	E	F	G
Attribute Name	**Description**	**Datatype**	**Domain**	**Nullable**	**PK**	**FK**
ClientID	Unique identifier for the client	CHAR(30)	All	No	Yes	No
CompanyID	Identifier for the company	CHAR(30)	All	No	No	Yes
ClientName	Name of the client	VARCHAR2(255)	All	No	No	No
ClientEmail	Email address of the client	VARCHAR2(55)	All	No	No	No
ClientPhoneNum	Phone number of the client	CHAR(14)	0000000000-9999999999	Yes	No	No
Street	Street address of the client	VARCHAR2(25)	All	Yes	No	No
City	City of the client	VARCHAR2(10)	All	Yes	No	No
ZipCode	Zip code of the client	VARCHAR2(10)	All	Yes	No	No
Country	Country of the client	VARCHAR2(10)	All	Yes	No	No
CreatedDate	Date the client was created	DATE	>= 01/01/2020	Yes	No	No

COMPANY:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
CompanyID	Unique identifier for the company	CHAR(30)	All	No	Yes	No
Description	Description of the company	VARCHAR2(100)	All	Yes	No	No
Street	Street address of the company	VARCHAR2(25)	All	No	No	No
City	City of the company	VARCHAR2(15)	All	No	No	No
State	State of the company	VARCHAR2(15)	All	No	No	No
Country	Country of the company	VARCHAR2(15)	All	No	No	No
ZipCode	Zip code of the company	VARCHAR2(10)	All	No	No	No
CompPhoneNum	Phone number of the company	VARCHAR2(14)	All	Yes	No	No
CompEmail	Email address of the company	VARCHAR2(30)	All	Yes	No	No
CompWebsite	Website of the company	VARCHAR2(30)	All	Yes	No	No

COMPANYCEO:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
CEOID	Unique identifier for the CEO	CHAR(30)	All	No	Yes	No
CEOName	Name of the CEO	VARCHAR2(50)	All	No	No	No
CEOSalary	Salary of the CEO	NUMBER	Between 0 to 200,000,000	Yes	No	No
CEOAddress	Address of the CEO	VARCHAR2(100)	All	Yes	No	No
CompanyID	Identifier for the company	CHAR(30)	All	No	No	Yes

DEPARTMENT:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
DeptID	Unique identifier for the departmen	CHAR(30)	All	No	Yes	No
CompanyID	Identifier for the company	CHAR(30)	All	No	No	Yes
DeptName	Name of the department	VARCHAR2(25)	All	No	No	No
DeptDescription	Description of the department	VARCHAR2(150)	All	Yes	No	No
EstablishedDate	Date the department was establish	DATE	>=01/01/2022	Yes	No	No

EMPLOYEE:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
EmployeeID	Unique identifier for the employee	CHAR(30)	All	No	Yes	No
DeptID	Identifier for the department	CHAR(30)	All	No	No	Yes
ManagerID	Identifier for the manager	CHAR(30)	All	Yes	No	Yes
EmpFirstName	First name of the employee	VARCHAR2(15)	All	No	No	No
EmpLastName	Last name of the employee	VARCHAR2(15)	All	No	No	No
EmployeeEmail	Email address of the employee	VARCHAR2(50)	All	No	No	No
EmployeePhoneN	Phone number of the employee	VARCHAR2(13)	0000000000-9999999999	Yes	No	No
Street	Street address of the employee	VARCHAR2(55)	All	Yes	No	No
City	City of the employee	VARCHAR2(15)	All	Yes	No	No
State	State of the employee	VARCHAR2(15)	All	Yes	No	No
ZipCode	Zip code of the employee	VARCHAR2(10)	All	Yes	No	No
Country	Country of the employee	VARCHAR2(13)	All	Yes	No	No
Position	Position of the employee	VARCHAR2(15)	All	Yes	No	No
HireDate	Hire date of the employee	DATE	>=01/01/2022	Yes	No	No
Salary	Salary of the employee	NUMBER(10,2)	>=45,000	Yes	No	No

LOGINCREDENTIALS:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
Username	Username for login	VARCHAR2(30)	All	No	Yes	No
EmployeeID	Identifier for the employee	CHAR(30)	All	No	No	Yes
Password	Password for login	VARCHAR2(64)	All	No	No	No

PROJECT:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
ProjectID	Unique identifier for the pr	CHAR(30)	All	No	Yes	No
ProjectName	Name of the project	VARCHAR2(50)	All	No	No	No
StartDate	Start date of the project	DATE	>=01/01/2023	Yes	No	No
EndDate	End date of the project	DATE	<=12/31/2024	Yes	No	No
Description	Description of the project	VARCHAR2(150)	All	Yes	No	No
DeptID	Identifier for the departme	CHAR(30)	All	No	No	Yes
Status	Status of the project	VARCHAR2(20)	All	Yes	No	No
Budget	Budget of the project	NUMBER	>0	Yes	No	No

PRODUCT:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
ProductID	Unique identifier for the product	CHAR(30)	All	No	Yes	No
CompanyID	Identifier for the company	CHAR(30)	All	No	No	Yes
ProductName	Name of the product	VARCHAR2(50)	All	No	No	No
ProdDescription	Description of the product	VARCHAR2(150)	All	Yes	No	No
Price	Price of the product	NUMBER(10,2)	>0	Yes	No	No
LaunchDate	Launch date of the product	DATE	>= 01/01/2023	Yes	No	No
Category	Category of the product	VARCHAR2(50)	All	No	No	No

TASK:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
TaskID	Unique identifier for the task	CHAR(30)	All	No	Yes	No
TaskName	Name of the task	VARCHAR2(50)	All	No	No	No
StartDate	Start date of the task	DATE	>=01/01/2024	Yes	No	No
EndDate	End date of the task	DATE	<=12/31/2024	Yes	No	No
Description	Description of the task	VARCHAR2(150)	All	Yes	No	No
AssignedTo	Employee assigned to the task	CHAR(30)	All	Yes	No	Yes

TIMESHEET:

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
TimeSheetID	Unique identifier for the timesheet	CHAR(30)	All	No	Yes	No
EmployeeID	Identifier for the employee	CHAR(30)	All	No	No	Yes
HoursWorked	Hours worked by the employee	NUMBER(5,2)	>=0	Yes	No	No
PaidLeave	Paid leave taken by the employee	NUMBER(5,2)	>=0	Yes	No	No
UnpaidLeave	Unpaid leave taken by the employ	NUMBER(5,2)	>=0	Yes	No	No
TaskCompleted	Tasks completed by the employee	NUMBER(5,0)	>=0	Yes	No	No

WORKS_ON:

Attribute Na	Description	Datatype	Domain	Nullable	PK	FK
ProjectID	Unique identifier for the project	CHAR(30)	All	No	No	Yes
DeptID	Unique identifier for the department	CHAR(30)	All	No	No	Yes

5. Data Dictionary Language (DDL)

```
CREATE TABLE CLIENT
(
   ClientID CHAR(30) CONSTRAINT Client_PK PRIMARY KEY,
```

```
   ClientName VARCHAR2(255) CONSTRAINT CLient_name_nn NOT NULL,
   ClientEmail VARCHAR2(55) CONSTRAINT Client_email_uq UNIQUE,
   ClientPhoneNum CHAR(14),
   Street VARCHAR2(25),
   City VARCHAR2(10),
   State VARCHAR2(10),
   ZipCode VARCHAR2(10),
   Country VARCHAR2(10),
   CreatedDate DATE
   CompanyID CHAR (30) CONSTRAINT Client_companyID_FK REFERENCES
COMPANY(CompanyID)
);

CREATE TABLE COMPANY
(
   CompanyID CHAR(30) CONSTRAINT Company_PK PRIMARY KEY,
   Description VARCHAR2(100),
   Street VARCHAR2(25) CONSTRAINT Company_street_nn NOT NULL,
   City VARCHAR2(15) CONSTRAINT Company_city_nn NOT NULL,
   State VARCHAR2(15) CONSTRAINT Company_state_nn NOT NULL,
   Country VARCHAR2(15) CONSTRAINT Company_country_nn NOT NULL,
   ZipCode VARCHAR2(10) CONSTRAINT Company_postalcode_nn NOT NULL,
   CompPhoneNum VARCHAR2(14),
   CompEmail VARCHAR2(30)CONSTRAINT Company_email_uq UNIQUE,
   CompWebsite VARCHAR2(30)CONSTRAINT Company_website_uq UNIQUE,
   Industry_Type VARCHAR2(15),
   Established_Date DATE
);

CREATE TABLE COMPANYCEO (
   CEOID CHAR(30),
   CEOName VARCHAR2(50) CONSTRAINT Compnay_ceo_nn NOT NULL,
   CEOSalary NUMBER,
   CEOAddress VARCHAR2(100),
   CompanyID CHAR(30),
   CONSTRAINT Company_CEO_PK PRIMARY KEY (CEOID, CompanyID),
   CONSTRAINT Company_CEO_FK FOREIGN KEY (CompanyID) REFERENCES COMPANY
(CompanyID)
);

CREATE TABLE DEPARTMENT
(
   DeptID CHAR(30) CONSTRAINT Department_pk PRIMARY KEY,
   CompanyID CHAR(30) CONSTRAINT Department_fk_Company REFERENCES
COMPANY(CompanyID),
   DeptName VARCHAR2(25) CONSTRAINT Department_name_uq UNIQUE
```

```
                    CONSTRAINT Department_name_nn NOT NULL,
   DeptDescription VARCHAR2(150),
   EstablishedDate DATE
);

CREATE TABLE EMPLOYEE
(
   EmployeeID CHAR(30) CONSTRAINT Employee_PK PRIMARY KEY,
   DeptID CHAR(30) CONSTRAINT Employee_FK_Department REFERENCES DEPARTMENT
(DeptID) ,
   ManagerID CHAR(30) CONSTRAINT Employee_manager_FK REFERENCES
EMPLOYEE(EmployeeID),
   EmpFirstName VARCHAR2(15) CONSTRAINT Emp_firstname_nn NOT NULL,
   EmpLastName VARCHAR2(15) CONSTRAINT Emp_lastname_nn NOT NULL,
   EmployeeEmail VARCHAR2(50) CONSTRAINT Emp_email_nn NOT NULL
                    CONSTRAINT Emp_email_uq UNIQUE,
   EmployeePhoneNum VARCHAR2(13),
   Street VARCHAR2(55),
   City VARCHAR2(15),
   State VARCHAR2(15),
   ZipCode VARCHAR2(10),
   Country VARCHAR2(13),
   Position VARCHAR2(15),
   HireDate DATE,
   Salary NUMBER(10,2)
);

CREATE TABLE LOGINCREDENTIALS
(
   Username VARCHAR2(30) CONSTRAINT Login_username_PK PRIMARY KEY,
   EmployeeID CHAR(30) CONSTRAINT Login_employee_FK REFERENCES
EMPLOYEE(EmployeeID),
   Password VARCHAR2(64) CONSTRAINT Login_password_nn NOT NULL
);

CREATE TABLE PRODUCT
(
   ProductID CHAR (30) CONSTRAINT Product_PK PRIMARY KEY,
   CompanyID CHAR (30) CONSTRAINT Product_company_FK REFERENCES
COMPANY(CompanyID),
   ProductName VARCHAR2(50) CONSTRAINT Product_name_nn NOT NULL,
   ProdDescription VARCHAR2(150),
   Price NUMBER (10,2),
   LaunchDate DATE,
```

```
    Category VARCHAR2(50) CONSTRAINT Product_category_nn NOT NULL
);


CREATE TABLE PROJECT
(
    ProjectID CHAR(30) CONSTRAINT Project_PK PRIMARY KEY,
    ProjectName VARCHAR2(50) CONSTRAINT Project_name_nn NOT NULL,
    StartDate DATE,
    EndDate DATE,
    Description VARCHAR2(150),
    DeptID CHAR(30) CONSTRAINT Project_dept_FK REFERENCES DEPARTMENT(DeptID),
    Status VARCHAR2(20),
    Budget NUMBER
);

CREATE TABLE WORKS_ON (
    ProjectID CHAR(30),
    DeptID CHAR(30),
    CONSTRAINT Works_on_PK PRIMARY KEY (ProjectID, DeptID),
    CONSTRAINT Worsk_on_Project_FK FOREIGN KEY (ProjectID) REFERENCES
PROJECT(ProjectID),
    CONSTRAINT Works_on_Dept_FK FOREIGN KEY (DeptID) REFERENCES
DEPARTMENT(DeptID)
);

CREATE TABLE TIMESHEET
(
    TimeSheetID CHAR(30)CONSTRAINT Timesheet_PK PRIMARY KEY,
    EmployeeID CHAR(30)CONSTRAINT Timesheet_employee_FK REFERENCES
EMPLOYEE(EmployeeID),
    HoursWorked NUMBER(5,2),
    PaidLeave NUMBER(5,2),
    UnpaidLeave NUMBER(5,2),
    TaskCompleted NUMBER(5,0)
);


CREATE TABLE TASK
(
    TaskID CHAR(30) CONSTRAINT Task_PK PRIMARY KEY,
    TaskName VARCHAR2(50) CONSTRAINT Task_name_nn NOT NULL,
    StartDate DATE,
    EndDate DATE,
    Description VARCHAR2(150),
```

AssignedTo CHAR(30) CONSTRAINT Task_employee_FK REFERENCES EMPLOYEE(EmployeeID)
);

6. Data Manipulation Language (DML)

INSERT INTO COMPANY (CompanyID, CEO1, CEO2, Description, Street, City, State, ZipCode, Country, CompPhoneNum, CompEmail, CompWebsite, Industry_Type, Established_Date)
VALUES ('C001', 'Uditi Shah', 'Meghna Rajbhandari', 'A leading tech company', 'Market Street', 'Philadelphia', 'PA', '19192', 'USA', '123-456-7890', 'its@gmail.com', 'www.its.com', 'Software', TO_DATE('2024-05-29', 'YYYY-MM-DD'));

INSERT INTO COMPANYCEO (CEOID, CEOName, CEOSalary, CEOAddress, CompanyID)
VALUES ('CEO1', 'Uditi Shah', 150000, '123 Hamilton Street, Philadelphia, 19104, US', 'C001');
INSERT INTO COMPANYCEO (CEOID, CEOName, CEOSalarY, CEOAddress, CompanyID)
VALUES ('CEO2', 'Meghna Rajbhandari', 150000, '123 Wallace Street, Philadelphia, 19104, US', 'C001');

INSERT INTO CLIENT (ClientID, ClientName, ClientEmail, ClientPhoneNum, Street, City, State, ZipCode, Country)
VALUES ('CL001', 'Suresh Patil', 'spatil@its.com', '987-654-3210', '456 Warren Road', 'Philly', 'PA', '19106', 'USA');
INSERT INTO CLIENT (ClientID, ClientName, ClientEmail, ClientPhoneNum, Street, City, State, ZipCode, Country)
VALUES ('CL002', 'Kavita Rao', 'krao@its.com', '987-654-3211', '789 Fairmont Avenue', 'Philly', 'PA', '19107', 'USA');
INSERT INTO CLIENT (ClientID, ClientName, ClientEmail, ClientPhoneNum, Street, City, State, ZipCode, Country)
VALUES ('CL003', 'Ravi Verma', 'rverma@its.com', '987-654-3212', '123 Joy Boulevard', 'Philly', 'PA', '19108', 'USA');

INSERT INTO DEPARTMENT (DeptID, CompanyID, DeptName, DeptDescription, EstablishedDate)
VALUES ('D001', 'C001', 'Analysis', 'Handles analysis of the products.', TO_DATE('2023-01-01', 'YYYY-MM-DD'));
INSERT INTO DEPARTMENT (DeptID, CompanyID, DeptName, DeptDescription, EstablishedDate)
VALUES ('D002', 'C001', 'Human Resources', 'Manages HR activities', TO_DATE('2023-01-01', 'YYYY-MM-DD'));
INSERT INTO DEPARTMENT (DeptID, CompanyID, DeptName, DeptDescription, EstablishedDate)
VALUES ('D003', 'C001', 'Data Science', 'Handles all the real time data.', TO_DATE ('2023-01-01', 'YYYY-MM-DD'));
INSERT INTO DEPARTMENT (DeptID, CompanyID, DeptName, DeptDescription, EstablishedDate)

VALUES ('D004', 'C001', 'Engineering', 'Software Development', TO_DATE('2023-01-01', 'YYYY-MM-DD'));
INSERT INTO DEPARTMENT (DeptID, CompanyID, DeptName, DeptDescription, EstablishedDate)
VALUES ('D005', 'C001', 'Product Management', 'Management of the product', TO_DATE('2023-01-01', 'YYYY-MM-DD'));

INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('CEO1', NULL, NULL, 'Uditi', 'Shah', 'us35@its.com', '201-345-5344', '3105 Hamilton Lane', 'Philadelphia', 'PA', '19104', 'USA', 'CEO', TO_DATE('2024-01-01', 'YYYY-MM-DD'), NULL);
INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('CEO2', NULL, NULL, 'Meghna', 'Rajbhandari', 'mr345@its.com', '201-345-5344', '40th Wallace Lane', 'Philadelphia', 'PA', '19107', 'USA', 'CEO', TO_DATE('2024-01-01', 'YYYY-MM-DD'), NULL);
INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('E001', 'D001', NULL, 'Amit', 'Sharma', 'amit.sharma@its.com', '123-123-1234', '789 Wallace Lane', 'Philadelphia', 'PA', '19109', 'USA', 'Senior Analyst', TO_DATE('2024-01-01', 'YYYY-MM-DD'), 980000);
INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('E002', 'D001', 'E001', 'Adit', 'Sharma', 'adit.sharma@its.com', '123-454-1234', '656 Wallace Lane', 'Philadelphia', 'PA', '19109', 'USA', 'Data Analyst', TO_DATE('2024-01-09', 'YYYY-MM-DD'), 60000);
INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('E003', 'D002', NULL, 'Thomas', 'Jefforson', 'tj75@its.com', '201-454-1234', '656 Oak Lane', 'Philadelphia', 'PA', '19103', 'USA', 'HR Manager', TO_DATE('2024-01-01', 'YYYY-MM-DD'), 70000);
INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('E004', 'D002', 'E003', 'Alex', 'Vanderbuilt', 'av55@its.com', '201-864-1234', '1235 Fairmont Lane', 'Philadelphia', 'PA', '19112', 'USA', 'Sales Executive', TO_DATE('2024-01-01', 'YYYY-MM-DD'), 50000);
INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('E005', 'D003', NULL, 'Wuan', 'Lien', 'wjl123@its.com', '201-864-4532', 'FMC Lane', 'Philadelphia', 'PA', '19104', 'USA', 'ML Engineer', TO_DATE('2024-04-01', 'YYYY-MM-DD'), 150000);
INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('E006', 'D003', 'E005', 'Jein', 'Chang', 'jc23@its.com', '201-345-4532', '456 FMC Lane', 'Philadelphia', 'PA', '19104', 'USA', 'Intern', TO_DATE('2024-04-01', 'YYYY-MM-DD'), 86000);

INSERT INTO EMPLOYEE (EmployeeID, DeptID, ManagerID, EmpFirstName, EmpLastName, EmployeeEmail, EmployeePhoneNum, Street, City, State, ZipCode, Country, Position, HireDate, Salary)
VALUES ('E007', 'D004', NULL, 'Lee', 'Chang', 'lc43@its.com', '201-345-6524', '456 Hamilton Lane', 'Philadelphia', 'PA', '19104', 'USA', 'Product Manager', TO_DATE('2024-03-01', 'YYYY-MM-DD'), 120000);

INSERT INTO LOGINCREDENTIALS (Username, EmployeeID, Password)
VALUES ('amit.sharma', 'E001', 'amitsharma');
INSERT INTO LOGINCREDENTIALS (Username, EmployeeID, Password)
VALUES ('meghna.rajbhandari', 'CEO2', 'meghnar');
INSERT INTO LOGINCREDENTIALS (Username, EmployeeID, Password)
VALUES ('uditi.shah', 'CEO1', 'uditishah');
INSERT INTO LOGINCREDENTIALS (Username, EmployeeID, Password)
VALUES ('adit.sharma', 'E002', 'aditsharma');
INSERT INTO LOGINCREDENTIALS (Username, EmployeeID, Password)
VALUES ('thomas.jefforson', 'E003', 'thomasj');
INSERT INTO LOGINCREDENTIALS (Username, EmployeeID, Password)
VALUES ('alex.Vanderbuilt', 'E004', 'alexv');

INSERT INTO PRODUCT (ProductID, CompanyID, ProductName, ProdDescription, Price, LaunchDate, Category)
VALUES ('P001', 'C001', 'VisionPro', 'Apple Vision Pro seamlessly blends digital content with your physical space.', 1100, TO_DATE('2024-05-01', 'YYYY-MM-DD'), 'Software');
INSERT INTO PRODUCT (ProductID, CompanyID, ProductName, ProdDescription, Price, LaunchDate, Category)
VALUES ('P002', 'C001', 'AI Chip', 'Chips that help your device use AI.', 6999, TO_DATE('2024-04-01', 'YYYY-MM-DD'), 'AI');
INSERT INTO PRODUCT (ProductID, CompanyID, ProductName, ProdDescription, Price, LaunchDate, Category)
VALUES ('P003', 'C001', 'CLoud Storage', 'provides upto 2TB storage on cloud.',30, TO_DATE('2024-04-01', 'YYYY-MM-DD'), 'Cloud Computing');

INSERT INTO PROJECT (ProjectID, ProjectName, StartDate, EndDate, Description, DeptID, Status, Budget)
VALUES ('PR001', 'Project VisionPro', TO_DATE('2024-01-01', 'YYYY-MM-DD'), TO_DATE('2024-12-31', 'YYYY-MM-DD'), 'Initial project', 'D005', 'Ongoing', 50000);
INSERT INTO PROJECT (ProjectID, ProjectName, StartDate, EndDate, Description, DeptID, Status, Budget)

VALUES ('PR002', 'AI', TO_DATE('2024-01-01', 'YYYY-MM-DD'), TO_DATE('2024-05-31', 'YYYY-MM-DD'), 'Second project', 'D003', 'Completed', 100000000);
INSERT INTO PROJECT (ProjectID, ProjectName, StartDate, EndDate, Description, DeptID, Status, Budget)
VALUES ('PR003', 'CLoud', TO_DATE('2024-01-01', 'YYYY-MM-DD'), TO_DATE('2024-04-01', 'YYYY-MM-DD'), 'Cloud project', 'D004', 'Few bugs', 50000000);

INSERT INTO WORKS_ON (ProjectID, DeptID)
VALUES ('PR001', 'D005');
INSERT INTO WORKS_ON (ProjectID, DeptID)
VALUES ('PR003', 'D004');
INSERT INTO WORKS_ON (ProjectID, DeptID)
VALUES ('PR002', 'D003');

INSERT INTO TASK (TaskID, TaskName, StartDate, EndDate, Description, AssignedTo)
VALUES ('T001', 'Task 1', TO_DATE('2024-03-01', 'YYYY-MM-DD'), TO_DATE('2024-05-31', 'YYYY-MM-DD'), 'Ongoing', 'E001');
INSERT INTO TASK (TaskID, TaskName, StartDate, EndDate, Description, AssignedTo)
VALUES ('T002', 'Task 2', TO_DATE('2024-04-01', 'YYYY-MM-DD'), TO_DATE('2024-04-30', 'YYYY-MM-DD'), 'Approved', 'E001');
INSERT INTO TASK (TaskID, TaskName, StartDate, EndDate, Description, AssignedTo)
VALUES ('T003', 'Task 3', TO_DATE('2024-06-01', 'YYYY-MM-DD'), TO_DATE('2024-06-30', 'YYYY-MM-DD'), 'Yet to begin', 'E004');
INSERT INTO TASK (TaskID, TaskName, StartDate, EndDate, Description, AssignedTo)
VALUES ('T004', 'Find more resources.', TO_DATE('2024-05-01', 'YYYY-MM-DD'), TO_DATE('2024-05-15', 'YYYY-MM-DD'), 'Completed', 'E003');
INSERT INTO TASK (TaskID, TaskName, StartDate, EndDate, Description, AssignedTo)
VALUES ('T005', 'Fixing of bugs in search bar', TO_DATE('2024-05-01', 'YYYY-MM-DD'), TO_DATE('2024-05-15', 'YYYY-MM-DD'), 'Rejected', 'E007');

INSERT INTO TIMESHEET (TimesheetID, EmployeeID, HoursWorked, PaidLeave, UnpaidLeave, TaskCompleted)
VALUES ('TS001', 'E001', 160, 8, 2, 5);
INSERT INTO TIMESHEET (TimesheetID, EmployeeID, HoursWorked, PaidLeave, UnpaidLeave, TaskCompleted)
VALUES ('TS002', 'E002', 150, 7, 3, 4);
INSERT INTO TIMESHEET (TimesheetID, EmployeeID, HoursWorked, PaidLeave, UnpaidLeave, TaskCompleted)
VALUES ('TS003', 'E003', 70.56, 7, 5, 4);
INSERT INTO TIMESHEET (TimesheetID, EmployeeID, HoursWorked, PaidLeave, UnpaidLeave, TaskCompleted)
VALUES ('TS004', 'E004', 80.6, 7, 0, 11);

INSERT INTO TIMESHEET (TimesheetID, EmployeeID, HoursWorked, PaidLeave, UnpaidLeave, TaskCompleted)
VALUES ('TS005', 'E005', 150.87, 1, 0, 9);

COMPANY:

TERMPROJECT | COMPANY

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	COMPANYID	DESCRIPTION	STREET	CITY	STATE	COUNTRY
1	C001	A leading tech company	Market Street	Philadelphia	PA	USA

riggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

COUNTRY	ZIPCODE	COMPPHONENUM	COMPEMAIL	COMPWEBSITE	INDUSTRY_TYPE	ESTABLISHED_DATE
USA	19192	123-456-7890	its@gmail.com	www.its.com	Software	29-MAY-24

COMPANYCEO:

TERMPROJECT | COMPANYCEO

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter: | Actions...

	CEOID	CEONAME	CEOSALARY	CEOADDRESS	COMPANYID
1	CEO1	Uditi Shah	150000	123 Hamilton Street, Philadelphia, 19104, US	C001
2	CEO2	Meghna Rajbhandari	150000	123 Wallace Street, Philadelphia, 19104, US	C001

CLIENT:

	CLIENTID	CLIENTNAME	CLIENTEMAIL	CLIENTPHONENUM	STREET	CITY	STATE	ZIPCODE
1	CL001 ...	Suresh Patil	spatil@its.com	987-654-3210	456 Warren Road	Philly	PA	19106
2	CL002 ...	Kavita Rao	krao@its.com	987-654-3211	789 Fairmont Avenue	Philly	PA	19107
3	CL003 ...	Ravi Verma	rverma@its.com	987-654-3212	123 Joy Boulevard	Philly	PA	19108

STATE	ZIPCODE	COUNTRY	CREATEDDATE	COMPANYID
PA	19106	USA	01-JAN-23	C001
PA	19107	USA	01-JAN-24	C001
PA	19108	USA	07-JAN-24	C001

DEPARTMENT:

TERM Project.sql | DEPARTMENT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	DEPTID	COMPANYID	DEPTNAME	DEPTDESCRIPTION	ESTABLISHEDDATE
1	D001	C001	Analysis	Handles analysis of the products.	01-JAN-23
2	D002	C001	Human Resources	Manages HR activities	01-JAN-23
3	D003	C001	Data Science	Handles all the real time data.	01-JAN-23
4	D004	C001	Engineering	Software Development	01-JAN-23
5	D005	C001	Product Management	Management of the product	01-JAN-23

EMPLOYEE:

TERM Project.sql | EMPLOYEE

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	EMPLOYEEID	DEPTID	MANAGERID	EMPFIRSTNAME	EMPLASTNAME	EMPLOYEEEMAIL
1	CEO1 ...	(null)	(null)	Uditi	Shah	us35@its.com
2	CEO2 ...	(null)	(null)	Meghna	Rajbhandari	mr345@its.com
3	E003 ...	D002	(null)	Thomas	Jefferson	tj75@its.com
4	E001 ...	D001	(null)	Amit	Sharma	amit.sharma...
5	E002 ...	D001	E001	Adit	Sharma	adit.sharma...
6	E004 ...	D002	E003	Alex	Vanderbuilt	av55@its.com
7	E005 ...	D003	(null)	Wuan	Lien	wjl123@its.com
8	E006 ...	D003	E005	Jein	Chang	jc23@its.com
9	E007 ...	D004	(null)	Lee	Chang	lc43@its.com

tatistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

EMPLOYEEEMAIL	EMPLOYEEPHONENUM	STREET	CITY	STATE	ZIPCODE	COUNTRY	POSITION	HIREDATE	SALARY
us35@its.com	201-345-5344	3105 Hamilton Lane	Philadelphia	PA	19104	USA	CEO	01-JAN-24	(null)
mr345@its.com	201-345-5344	40th Wallace Lane	Philadelphia	PA	19107	USA	CEO	01-JAN-24	(null)
tj75@its.com	201-454-1234	656 Oak Lane	Philadelphia	PA	19103	USA	HR Manager	01-JAN-24	70000
amit.sharma...	123-123-1234	789 Wallace Lane	Philadelphia	PA	19109	USA	Senior Analyst	01-JAN-24	980000
adit.sharma...	123-454-1234	656 Wallace Lane	Philadelphia	PA	19109	USA	Data Analyst	09-JAN-24	60000
av55@its.com	201-864-1234	1235 Fairmont Lane	Philadelphia	PA	19112	USA	Sales Executive	01-JAN-24	50000
wjl123@its.com	201-864-4532	FMC Lane	Philadelphia	PA	19104	USA	ML Engineer	01-APR-24	150000
jc23@its.com	201-345-4532	456 FMC Lane	Philadelphia	PA	19104	USA	Intern	01-APR-24	86000
lc43@its.com	201-345-6524	456 Hamilton Lane	Philadelphia	PA	19104	USA	Product Manager	01-MAR-24	120000

LOGINCREDENTIALS

TERM Project.sql | LOGINCREDENTIALS

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details |

Sort.. | Filter:

	USERNAME	EMPLOYEEID	PASSWORD
1	amit.sharma	E001	amitsharma
2	uditi.shah	CEO1	uditishah
3	meghna.rajbhandari	CEO2	meghnar
4	adit.sharma	E002	aditsharma
5	thomas.jefferson	E003	thomasj
6	alex.Vanderbuilt	E004	alexv

PRODUCT:

TERM Project.sql | PRODUCT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Index

Sort.. | Filter:

	PRODUCTID	COMPANYID	PRODUCTNAME
1	P001	C001	VisionPro
2	P002	C001	AI Chip
3	P003	C001	CLoud Storage

rs | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

PRODDESCRIPTION	PRICE	LAUNCHDATE	CATEGORY
Apple Vision Pro seamlessly blends digital content with your physical space.	1100	01-MAY-24	Software
Chips that help your device use AI.	6999	01-APR-24	AI
e provides upto 2TB storage on cloud.	30	01-APR-24	Cloud Computing

PROJECT:

TERM Project.sql | PROJECT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	PROJECTID	PROJECTNAME	STARTDATE	ENDDATE	DESCRIPTION	DEPTID	STATUS	BUDGET
1	PR001	Project VisionPro	01-JAN-24	31-DEC-24	Initial project	D005	Ongoing	50000
2	PR002	AI	01-JAN-24	31-MAY-24	Second project	D003	Completed	100000000
3	PR003	CLoud	01-JAN-24	01-APR-24	Cloud project	D004	Few bugs	50000000

WORKS_ON:

TERMPROJECT | WORKS_ON

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Par

Sort.. | Filter:

	PROJECTID	DEPTID
1	PR001	D005
2	PR003	D004
3	PR002	D003

TASK:

TERM Project.sql | TASK

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	TASKID	TASKNAME	STARTDATE	ENDDATE	DESCRIPTION	ASSIGNEDTO
1	T001	Task 1	01-MAR-24	31-MAY-24	Ongoing	E001
2	T002	Task 2	01-APR-24	30-APR-24	Approved	E001
3	T004	Find more resources.	01-MAY-24	15-MAY-24	Completed	E003
4	T005	Fixing of bugs in search bar	01-MAY-24	15-MAY-24	Rejected	E007
5	T003	Task 3	01-JUN-24	30-JUN-24	Yet to begin	E004

TIMESHEET:

TERM Project.sql | TIMESHEET

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	TIMESHEETID	EMPLOYEEID	HOURSWORKED	PAIDLEAVE	UNPAIDLEAVE	TASKCOMPLETED
1	TS001	E001	160	8	2	5
2	TS002	E002	150	7	3	4
3	TS003	E003	70.56	7	5	4
4	TS004	E004	80.6	7	0	11
5	TS005	E005	150.87	1	0	9

7. Queries

1. Employees who took more than a 5 number of paid leaves

```
SELECT e.EmpFirstName, e.EmpLastName, ts.PaidLeave
FROM TIMESHEET ts
JOIN EMPLOYEE e ON ts.EmployeeID = e.EmployeeID
WHERE ts.PaidLeave > 5;
```

Script Output | Query Result

SQL | All Rows Fetched: 4 in 0.025 seconds

	EMPFIRSTNAME	EMPLASTNAME	PAIDLEAVE
1	Amit	Sharma	8
2	Adit	Sharma	7
3	Thomas	Jefferson	7
4	Alex	Vanderbuilt	7

2. Total hours worked by employees in a specific project

```
SELECT e.EmpFirstName, e.EmpLastName, SUM(ts.HoursWorked) AS TotalHours
FROM TIMESHEET ts
JOIN EMPLOYEE e ON ts.EmployeeID = e.EmployeeID
JOIN WORKS_ON w ON e.DeptID = w.DeptID
WHERE w.ProjectID = 'PR001'
GROUP BY e.EmpFirstName, e.EmpLastName;
```

Script Output × Query Result ×

SQL | All Rows Fetched: 0 in 0.041 seconds

EMPFIRST...	EMPLAST...	TOTALHO...

3. All projects supervised by a specific department

```
SELECT pr.ProjectName, pr.StartDate, pr.EndDate, pr.Status
FROM PROJECT pr
WHERE pr.DeptID = 'D003';
```

Script Output × Query Result ×

SQL | All Rows Fetched: 1 in 0.021 seconds

	PROJECTNAME	STARTDATE	ENDDATE	STATUS
1	AI	01-JAN-24	31-MAY-24	Completed

4. Average project duration (days) per department

```
SELECT d.DeptName, AVG(pr.EndDate - pr.StartDate) AS AvgProjectDuration
FROM PROJECT pr
JOIN DEPARTMENT d ON pr.DeptID = d.DeptID
GROUP BY d.DeptName;
```

Script Output × Query Result ×

SQL | All Rows Fetched: 3 in 0.023 seconds

	DEPTNAME	AVGPROJECTDURATION
1	Data Science	151
2	Engineering	91
3	Product Management	365

5. List of Employees with Their Manager's Name and Department

```
SELECT e1.EmpFirstName || ' ' || e1.EmpLastName AS Employee_Name,
       e2.EmpFirstName || ' ' || e2.EmpLastName AS Manager_Name,
       d.DeptName AS Department
FROM EMPLOYEE e1
JOIN DEPARTMENT d ON e1.DeptID = d.DeptID
LEFT JOIN EMPLOYEE e2 ON e1.ManagerID = e2.EmployeeID;
```

Script Output | Query Result

SQL | All Rows Fetched: 7 in 0.029 seconds

	EMPLOYEE_NAME	MANAGER_NAME	DEPARTMENT
1	Alex Vanderbuilt	Thomas Jefforson	Human Resources
2	Adit Sharma	Amit Sharma	Analysis
3	Jein Chang	Wuan Lien	Data Science
4	Thomas Jefforson		Human Resources
5	Amit Sharma		Analysis
6	Wuan Lien		Data Science
7	Lee Chang		Engineering

The last four employees do not have manager name because they are the manager themselves and one of them is a freelancer.

6. List of Employees Who Are Also Managers

```
SELECT e1.EmpFirstName || ' ' || e1.EmpLastName AS Employee_Name,
    d.DeptName AS Department
FROM EMPLOYEE e1
JOIN DEPARTMENT d ON e1.DeptID = d.DeptID
WHERE e1.EmployeeID IN (SELECT DISTINCT ManagerID FROM EMPLOYEE WHERE
ManagerID IS NOT NULL);
```

Script Output | Query Result

SQL | All Rows Fetched: 3 in 0.033 seconds

	EMPLOYEE_NAME	DEPARTMENT
1	Amit Sharma	Analysis
2	Thomas Jefforson	Human Resources
3	Wuan Lien	Data Science

7. List of Employees Who Are Not Assigned to Any Task

```
SELECT e.EmpFirstName || ' ' || e.EmpLastName AS Employee_Name,
    d.DeptName AS Department
FROM EMPLOYEE e
JOIN DEPARTMENT d ON e.DeptID = d.DeptID
WHERE e.EmployeeID NOT IN (SELECT DISTINCT AssignedTo FROM TASK);
```

Script Output x | Query Result x

SQL | All Rows Fetched: 3 in 0.021 seconds

	EMPLOYEE_NAME	DEPARTMENT
1	Adit Sharma	Analysis
2	Wuan Lien	Data Science
3	Jein Chang	Data Science