

Project Title: Petroleum Company Management System

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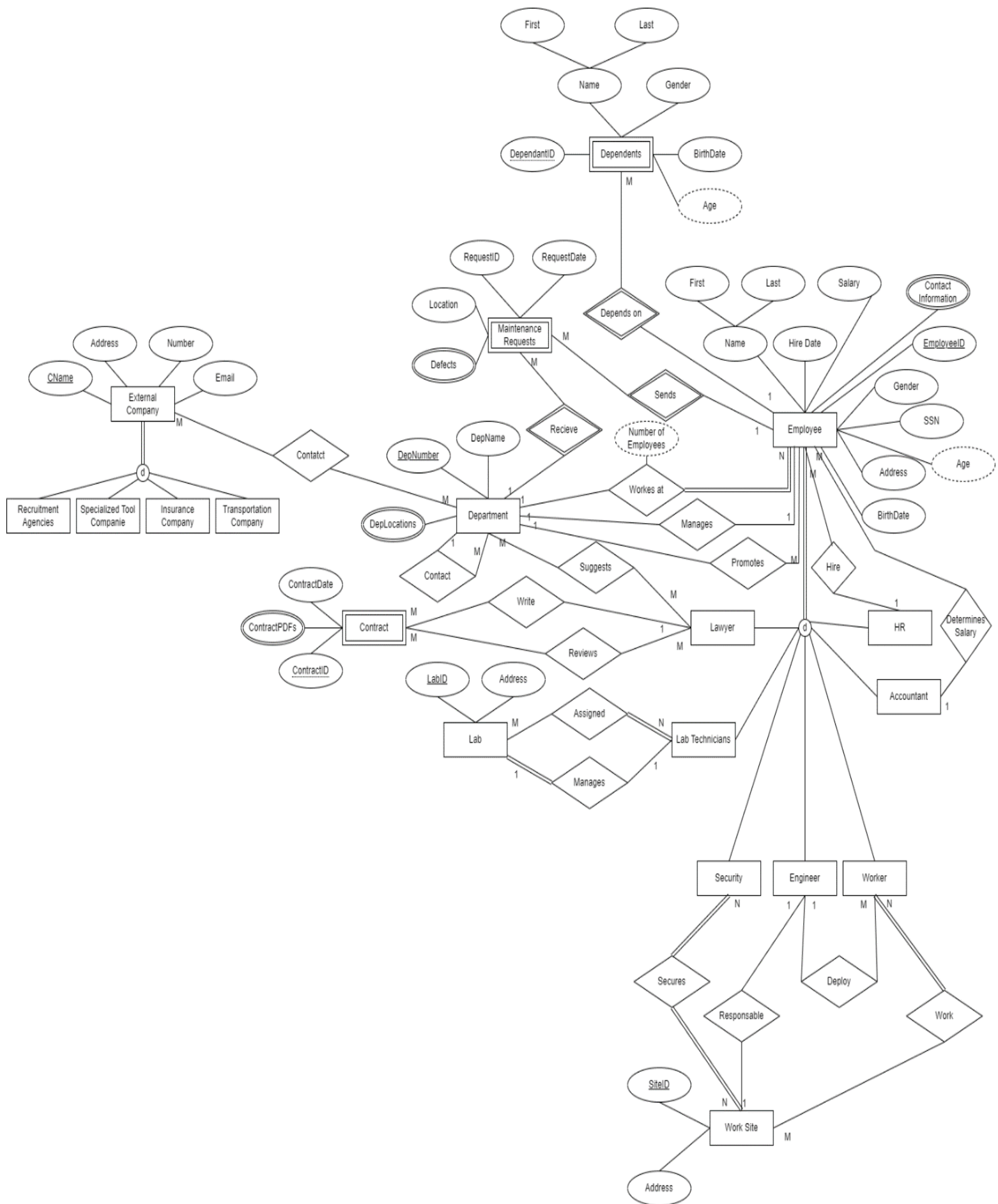
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Project Description:

Aim: increasing the efficiency of operation in the company

This system is made with international standards and according to the company requirements in the petroleum industry to increase the efficiency of operations and monitoring it and to help employees perform tasks in a better way.

The company wants the system to save the Schedule for every employee including the task distribution and times and operation dates and employee's info including name, id, and salary and no of dependents, birthdate, contact info and hire date and the want save maintenance history and reports.

This system will not be fully involved in the production process.

Actors:

Employees:

Eng

Workers

Lab Technicians

HR

Security

Lawyer

Accountant

Departments:

Time Control Management Department

Production Department

Financial Department

Industry Development Department

HR Department

Department of Legal Affairs

Maintenance Department

Laboratory Department

Recycling Department

Insurance Department

Transportation Department

External Actors:

Recruitment Agencies

Specialized Tool Companies

Insurance Companies

Transportation Companies

Locations:

Labs

Work Sites

Weak Entities:

Dependents

Contracts

Requests

Business Rules:

- Dependents have (Name, Related Employee ID)
- Work Sites must have (Location ID, Address, Department name)
- Labs must have (Lab ID, Location)
- Contracts have (Contract ID, Contract Date, Contract PDF)
- Maintenance Requests have (Request ID, Request Date, location, Defect)
- All Employees must have (name, address, birth date, contact information, SSN, hire date, salary, gender, age, Dep number)
- Engs, Workers, Lab Technicians, HR Employees, Security Employees, Lawyers, Accountants are Employees.
- An Eng can Deploy many workers under him.
- Many Workers can be deployed under one Eng.
- An Eng may be responsible for a Work site.
- A Worker Can Work in Many Work Sites.
- A Work Site Can Have Many Workers.
- A Lab Technicians May Works in Many Labs.
- A Lab Has Many Lab Technicians.
- A Lab Technician May Manage only one Lab.
- A Lab can only be managed by one Lab Technician
- A Security Employee must be assigned to a location.
- An HR Employee can Hire many Employees.
- An Employee is Hired by an HR Employee.
- A Department can Request a Lawyers Suggestion.

- A Lawyer can Review Many Contracts.
- A Contract can be Reviewed by Many Lawyers.
- A Lawyer can Write Many Contracts.
- Only one Lawyer can Write a contract.
- An Accountant Assigns many Employees salary.
- An employees' salaries is set by an Accountant.
- All Departments have (Dep number, Dep name, Dep locations, Dep manager, Dep number of employees)
- An Employee can Send Many Maintenance Requests to the Maintenance Department.
- The Maintenance Department can receive many Maintenance Requests from the Employees.
- All External Companies have (Company Name, Company Number, Company Email)
- Recruitment Agencies, Specialized Tool Companies, Insurance Companies, Transportation Companies are All External Companies.
- A Department Can Send a Request to an External Company Each request has An ID and an Attached PDF of the request.
- Employees can Have Dependents Under their insurance plan.
- All Employees belong to a department.
- One Employee manages only one department, each department can only be managed by a single employee.
- One Eng can Assign many Workers a task.
- Many Engineers can make many tool request to the Industry Development Department.
- Departments can contact each other.
- Departments can promote Employees under them.

Potential Queries:

- Which Employees have a salary above (Set amount)
- Which Employees Work at (Set Location)
- Which employees work in department number (enter department number)
- Which Employees have an age above (enter number)
- Who is the manager of department (enter department number)
- What are the insurance companies we are collaborating with
- What are the transportation companies we are collaborating with
- Which Employees are under (Set Department)
- Were there any Maintenance requests during (Set Date)
- Which Employees were Promoted during (Set Date)
- Which Employees were Demoted during (Set Date)
- Which Employees have Dependents
- Which Employees have more than (set amount) Dependents
- Which Employees have less than (set amount) Dependents
- Who are the Dependents of (set Employee)

Initial Relational Schima:

Employee (Employee ID, FirstName, LastName, Hire Date, Salary, Gender, SSN, Address, Birthdate, Accountant ID, Employer ID, Position, Department Number)

Employee ID → FirstName

Employee ID → Last Name

Employee ID → Gender

Employee ID → SSN

Employee ID → Address

Employee ID → Birth Date

Employee ID → Employer

Employee ID → Position

Employee ID → Accountant ID

Employee ID → Salary

Accountant ID → Salary

Employer ID → Hire Date

Department Number → Position

Employee (Employee ID, FirstName, LastName, Hire Date, Salary, Gender, SSN, Address, Birthdate, Accountant ID, Employer ID, Position, Department Number)

Transformed into 3NF:

Employee Salary (Employee ID, Accountant ID, Salary)

Hired Employee (Employee ID, Employer ID, Hire Date)

Employee Position (Employee ID, Department Number, Position)

Employee (Employee ID, FirstName, LastName, Salary, Gender, SSN, Address, Birthdate)

Contact Information → Employee ID

Contact Information (Employee ID, Contact information)

Is already in 3NF.

Dependent (Dependent ID, Employee ID, Birthdate, Gender, FirstName, LastName)

Dependent ID → Employee ID

Dependent ID → Birthdate

Dependent ID → Gender

Dependent ID → FirstName

Dependent ID → LastName

Dependent ID → Employee ID

Dependent (Dependent ID, Employee ID, Birthdate, Gender, FirstName, LastName)

Is already 3NF.

HR (Employee ID)

Is already 3NF.

Accountant (Employee ID)

Is already 3NF.

Employee ID → Engineer ID

Worker (Employee ID, Engineer ID)

Is already 3NF.

Worker ID → Site ID

Worker Working in Work Site (Worker ID, Site ID)

Is already 3NF.

Engineer (Employee ID)

Is already 3NF.

Security (Employee ID)

Is already 3NF.

Security ID → Site ID

Security Securing Worksite (Security ID, Site ID)

Is already 3NF.

Site ID → Address

Site ID → Responsible Engineer ID

Worksite (Site ID, Address, Responsible Engineer ID)

Is already 3NF.

Lab Technicians (Employee ID)

Is already 3NF.

Lab Technicians Assigned Lab (Lab Technician ID, Lab ID)

Is already 3NF.

Lab ID → Address

Lab ID → Lab Manager

Lab (Lab ID, Address, Lab Manager)

Is already 3NF.

Lawyer (Employee ID)

Is already 3NF.

Lawyer ID → Suggestion

Department ID → Suggestion

Lawyer Suggestion (Lawyer ID, Department ID, Suggestion)

Is already 3NF.

Contract ID → Lawyer ID

Contract Review (Lawyer ID, Contract ID)

Is already 3NF.

Contract ID → Lawyer ID

Contract ID → Contract Date

Contract (Contract ID, Lawyer ID, Contract Date)

Is already 3NF.

Contract ID → Contract PDF

Contract PDF (Contract ID, Contract PDF)

Is already 3NF.

Department Number → Department Name

Department Number → Manager

Department (Department Number, Department Name, Manager)

Is already 3NF.

Department Number → Location

Department Location (Department Number, Location)

Is already 3NF.

Maintenance Request (Request ID, Location, Request Date, Department ID, Employee ID)

Request ID → Location

Request ID → Request Date

Employee ID → Request Date

Employee ID → Location

Request ID → Department ID

Maintenance Request (Request ID, Location, Request Date, Department ID, Employee ID)

Transformed into 3NF:

Employee Request (Employee ID, Request ID, Location, Request Date)

Maintenance Request (Request ID, Employee ID, Department ID)

Defect → Request ID

Defects in Maintenance Request (Request ID, Defect)

Is already 3NF.

Department Number → Company Name

Department Contacting External Company (Company Name, Department Number)

Is already 3NF.

Company Name → Address

Company Name → Number

Company Name → Email

External Company (Company Name, Address, Number, Email)

Is already 3NF.

Recruitment agency (Company Name)

Is already 3NF.

Specialized Tool Company (Company Name)

Is already 3NF.

Insurance company (Company Name)

Is already 3NF.

Transportation Company (Company Name)

Is already 3NF.

Final Schema is:

Employee Salary (Employee ID, Accountant ID, Salary)

Accountant ID is a foreign Key for Accountant.

Hired Employee (Employee ID, Employer ID, Hire Date)

Employer ID is a foreign Key for HR Employee.

Employee Position (Employee ID, Department Number, Position)

Department Number is a foreign Key for Department.

Employee (Employee ID, FirstName, LastName, Salary, Gender, SSN, Address, Birthdate)

Contact Information (Employee ID, Contact information)

Dependent (Dependent ID, Employee ID, Birthdate, Gender, FirstName, LastName)

Employee ID is a foreign Key for Employee.

HR (Employee ID)

Accountant (Employee ID)

Worker (Employee ID, Engineer ID)

Engineer ID is a foreign Key for Engineer.

Worker Working in Work Site (Worker ID, Site ID)

Engineer (Employee ID)

Security (Employee ID)

Security Securing Worksite (Security ID, Site ID)

Worksite (Site ID, Address, Responsible Engineer ID)

Responsible Engineer ID is a foreign Key for Engineer.

Lab Technicians (Employee ID)

Lab Technicians Assigned Lab (Lab Technician ID, Lab ID)

Lab (Lab ID, Address, Lab Manager)

Lab Manager is foreign Key for Lab Technician.

Lawyer (Employee ID)

Lawyer Suggestion (Lawyer ID, Department ID, Suggestion)

Contract Review (Lawyer ID, Contract ID)

Contract (Contract ID, Lawyer ID, Contract Date)

Lawyer ID is a foreign Key for Lawyer

Contract PDF (Contract ID, Contract PDF)

Department (Department Number, Department Name, Manager)

Manager is a foreign key for Employee.

Department Location (Department Number, Location)

Employee Request (Employee ID, Request ID, Location, Request Date)

Maintenance Request (Request ID, Employee ID, Department ID)

Defects in Maintenance Request (Request ID, Defect)

Department Contacting External Company (Company Name, Department Number)

External Company (Company Name, Address, Number, Email)

Recruitment agency (Company Name)

Specialized Tool Company (Company Name)

Insurance company (Company Name)

Transportation Company (Company Name)
