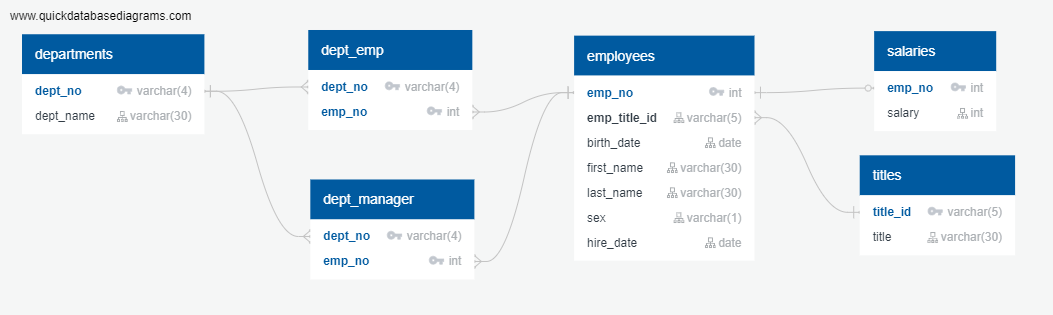
# ER Diagram of the Employee Database



# Employee Database – table design

## Table **Department**

departments

| Field | Description | Type | Default | Other |
| --- | --- | --- | --- | --- |
| dept\_no | Department No | varchar(4) |  | PK |
| dept\_name | Department Name | varchar(30) |  | INDEX |

## **Table** Title

titles

| Field | Description | Type | Default | Other |
| --- | --- | --- | --- | --- |
| title\_id | Title ID | varchar(5) |  | PK |
| title | Title | varchar(30) |  | INDEX |

## Table **Employee**

employees

| Field | Description | Type | Default | Other |
| --- | --- | --- | --- | --- |
| emp\_no | Employee No | int |  | PK |
| emp\_title\_id | Employee title ID | varchar(5) |  | FK, INDEX |
| birth\_date | Employee Birth Date | date |  | INDEX |
| first\_name | Employee First Name | varchar(30) |  | INDEX |
| last\_name | Employee Last Name | varchar(30) |  | INDEX |
| sex | Employee Gender (M/F) | varchar(1) |  | INDEX |
| hire\_date | Employee Hire Date | date |  | INDEX |

## Table **Department-Employee** (Intersection table) holds only IDs

dept-emp

| Field | Description | Type | Default | Other |
| --- | --- | --- | --- | --- |
| dept\_no | Employee department No | varchar(4) |  | PK, FK |
| emp\_no | Employee No | int |  | PK, FK |

## Table **Department-Manager** (Intersection table) holds only IDs

dept-manager

| Field | Description | Type | Default | Other |
| --- | --- | --- | --- | --- |
| dept\_no | Manager Department No | varchar(4) |  | PK, FK |
| emp\_no | Employee No of the Manager | int |  | PK, FK |

## Table Employee Salary

salaries

| Field | Description | Type | Default | Other |
| --- | --- | --- | --- | --- |
| emp\_no | Employee No | int |  | PK, FK |
| salary | Employee Salary | int |  | INDEX |

# Schemata SQL for the database objects (Tables, etc.)

-- Departments

-- Table Departments

CREATE TABLE "departments" (

-- Department No

"dept\_no" varchar(4) NOT NULL,

-- Department Name

"dept\_name" varchar(30) NOT NULL,

CONSTRAINT "pk\_departments" PRIMARY KEY (

"dept\_no"

)

);

-- Titles

-- Table Titles

CREATE TABLE "titles" (

-- Title ID

"title\_id" varchar(5) NOT NULL,

-- Title

"title" varchar(30) NOT NULL,

CONSTRAINT "pk\_titles" PRIMARY KEY (

"title\_id"

)

);

-- Employees

-- Table Employees

CREATE TABLE "employees" (

-- Employee No

"emp\_no" int NOT NULL,

-- Employee title ID

"emp\_title\_id" varchar(5) NOT NULL,

-- Employee Birth Date

"birth\_date" date NOT NULL,

-- Employee First Name

"first\_name" varchar(30) NOT NULL,

-- Employee Last Name

"last\_name" varchar(30) NOT NULL,

-- Employee Gender (M/F)

"sex" varchar(1) NOT NULL,

-- Employee Hire Date

"hire\_date" date NOT NULL,

CONSTRAINT "pk\_employees" PRIMARY KEY (

"emp\_no"

)

);

-- Department-Employee

-- Table Department-Employee (Intersection table) holds only IDs

CREATE TABLE "dept\_emp" (

-- Employee department No

"dept\_no" varchar(4) NOT NULL,

-- Employee No

"emp\_no" int NOT NULL,

CONSTRAINT "pk\_dept\_emp" PRIMARY KEY (

"dept\_no","emp\_no"

)

);

-- Department-Managers

-- Table Department-Managers (Intersection Table)

CREATE TABLE "dept\_manager" (

-- Manager Department No

"dept\_no" varchar(4) NOT NULL,

-- Employee No of the Manager

"emp\_no" int NOT NULL,

CONSTRAINT "pk\_dept\_manager" PRIMARY KEY (

"dept\_no","emp\_no"

)

);

-- Salaries

-- Table Employee Salary

CREATE TABLE "salaries" (

-- Employee No

"emp\_no" int NOT NULL,

-- Employee Salary

"salary" int NOT NULL,

CONSTRAINT "pk\_salaries" PRIMARY KEY (

"emp\_no"

)

);

ALTER TABLE "employees" ADD CONSTRAINT "fk\_employees\_emp\_title\_id" FOREIGN KEY("emp\_title\_id")

REFERENCES "titles" ("title\_id");

ALTER TABLE "dept\_emp" ADD CONSTRAINT "fk\_dept\_emp\_dept\_no" FOREIGN KEY("dept\_no")

REFERENCES "departments" ("dept\_no");

ALTER TABLE "dept\_emp" ADD CONSTRAINT "fk\_dept\_emp\_emp\_no" FOREIGN KEY("emp\_no")

REFERENCES "employees" ("emp\_no");

ALTER TABLE "dept\_manager" ADD CONSTRAINT "fk\_dept\_manager\_dept\_no" FOREIGN KEY("dept\_no")

REFERENCES "departments" ("dept\_no");

ALTER TABLE "dept\_manager" ADD CONSTRAINT "fk\_dept\_manager\_emp\_no" FOREIGN KEY("emp\_no")

REFERENCES "employees" ("emp\_no");

ALTER TABLE "salaries" ADD CONSTRAINT "fk\_salaries\_emp\_no" FOREIGN KEY("emp\_no")

REFERENCES "employees" ("emp\_no");

CREATE INDEX "idx\_departments\_dept\_name"

ON "departments" ("dept\_name");

CREATE INDEX "idx\_titles\_title"

ON "titles" ("title");

CREATE INDEX "idx\_employees\_emp\_title\_id"

ON "employees" ("emp\_title\_id");

CREATE INDEX "idx\_employees\_birth\_date"

ON "employees" ("birth\_date");

CREATE INDEX "idx\_employees\_first\_name"

ON "employees" ("first\_name");

CREATE INDEX "idx\_employees\_last\_name"

ON "employees" ("last\_name");

CREATE INDEX "idx\_employees\_sex"

ON "employees" ("sex");

CREATE INDEX "idx\_employees\_hire\_date"

ON "employees" ("hire\_date");

CREATE INDEX "idx\_salaries\_salary"

ON "salaries" ("salary");

# SQL Queries used to extract data as per the requirements.

* 1. **List the following details of each employee: employee number, last name, first name, sex, and salary.**

select e.emp\_no as "Employee Number"

,e.last\_name as "Last Name"

,e.first\_name as "First Name"

,e.sex as "Gender"

,s.salary as "Salary"

from public.employees as e

left join public.salaries as s on (e.emp\_no = s.emp\_no)

order by e.emp\_no;

* 1. **List first name, last name, and hire date for employees who were hired in 1986.**

select e.first\_name as "First Name"

,e.last\_name as "Last Name"

,e.hire\_date as "Hire Date"

from public.employees as e

where e.hire\_date between '01/01/1986' and '12/31/1986' -- The boundary condition is inclusive

order by e.hire\_date;

* 1. **List the manager of each department with the following information: department number, department name, the manager's employee number, last name, first name.**

select d.dept\_no as "Deparment Number"

,d.dept\_name as "Department Name"

,dm.emp\_no "Manager Employee Number"

,e.last\_name as "Manager Last Name"

,e.first\_name as "Manager First Name"

from public.departments as d

left join public.dept\_manager as dm on (d.dept\_no = dm.dept\_no)

left join public.employees as e on (dm.emp\_no = e.emp\_no)

order by d.dept\_no;

* 1. **List the department of each employee with the following information: employee number, last name, first name, and department name.**

select e.emp\_no as "Employee Number"

,e.last\_name as "Last Name"

,e.first\_name as "First Name"

,d.dept\_name as "Department Name"

from public.employees as e

left join public.dept\_emp as de on (e.emp\_no = de.emp\_no)

left join public.departments as d on (de.dept\_no = d.dept\_no)

order by e.emp\_no;

* 1. **List first name, last name, and sex for employees whose first name is "Hercules" and last names begin with "B."**

select e.first\_name as "First Name"

,e.last\_name as "Last Name"

,e.sex as "Gender"

from public.employees as e

where e.first\_name = 'Hercules'

and e.last\_name like ('B%')

order by e.emp\_no;

* 1. **List all employees in the Sales department, including their employee number, last name, first name, and department name.**

select de.emp\_no as "Employee Number"

,e.last\_name as "Last Name"

,e.first\_name as "First Name"

,d.dept\_name as "Department"

from public.dept\_emp as de

-- Outer join as the employee has to be in the "Sales" Department

join public.departments as d on (de.dept\_no = d.dept\_no)

-- Outer join as the employee has to exist in the "Employees" table.

join public.employees as e on (de.emp\_no = e.emp\_no)

where d.dept\_name = 'Sales'

order by de.emp\_no;

* 1. **List all employees in the Sales and Development departments, including their employee number, last name, first name, and department name.**

select de.emp\_no as "Employee Number"

,e.last\_name as "Last Name"

,e.first\_name as "First Name"

,d.dept\_name as "Department"

from public.dept\_emp as de

-- Outer join as the employee has to be in the "Sales" or "Development" Departments

join public.departments as d on (de.dept\_no = d.dept\_no)

-- Outer join as the employee has to exist in the "Employees" table.

join public.employees as e on (de.emp\_no = e.emp\_no)

where d.dept\_name in ('Sales', 'Development')

order by de.emp\_no;

* 1. **In descending order, list the frequency count of employee last names, i.e., how many employees share each last name.**

select count(e.last\_name) as "Frequency Count"

,e.last\_name as "Last Name"

from public.employees as e

group by e.last\_name

order by count(e.last\_name) desc;