**Human Resources**

**create database jdbc\_exercises;**

**use jdbc\_exercises**

**CREATE TABLE Departments (**

**DepartmentID INT PRIMARY KEY,**

**DepartmentName VARCHAR(100),**

**ManagerID INT,**

**Location VARCHAR(100),**

**FOREIGN KEY (ManagerID) REFERENCES Employee(EmployeeID)**

**);**

**CREATE TABLE Employees (**

**EmployeeID INT PRIMARY KEY,**

**FirstName VARCHAR(50),**

**LastName VARCHAR(50),**

**BirthDate DATE,**

**Gender CHAR(1),**

**DepartmentID INT,**

**HireDate DATE,**

**Salary DECIMAL(10, 2),**

**Email VARCHAR(100),**

**Phone VARCHAR(15),**

**FOREIGN KEY (DepartmentID) REFERENCES Department(DepartmentID)**

**);**

**CREATE TABLE Payrolls (**

**PayrollID INT PRIMARY KEY,**

**EmployeeID INT,**

**PayDate DATE,**

**Salary DECIMAL(10, 2),**

**Deductions DECIMAL(10, 2),**

**NetSalary DECIMAL(10, 2),**

**FOREIGN KEY (EmployeeID) REFERENCES Employee(EmployeeID)**

**);**

**CREATE TABLE JobApplicants (**

**ApplicantID INT PRIMARY KEY,**

**FirstName VARCHAR(50),**

**LastName VARCHAR(50),**

**Email VARCHAR(100),**

**Phone VARCHAR(15),**

**PositionApplied VARCHAR(100),**

**ApplicationDate DATE,**

**Resume BLOB,**

**CoverLetter TEXT**

**);**

**CREATE TABLE TrainingRecords (**

**RecordID INT PRIMARY KEY,**

**EmployeeID INT,**

**TrainingName VARCHAR(100),**

**TrainingDate DATE,**

**TrainerName VARCHAR(100),**

**DurationHours INT,**

**TrainingLocation VARCHAR(100),**

**CertificateIssued BOOLEAN,**

**FOREIGN KEY (EmployeeID) REFERENCES Employee(EmployeeID)**

**);**

INSERT INTO Departments (DepartmentID, DepartmentName, ManagerID, Location)

VALUES

(1, 'HR', 1, 'New York'),

(2, 'IT', 2, 'San Francisco'),

(3, 'Finance', 3, 'Chicago'),

(4, 'Marketing', 4, 'Los Angeles'),

(5, 'Operations', 5, 'Dallas'),

(6, 'Customer Service', 6, 'Miami'),

(7, 'Research and Development', 7, 'Boston'),

(8, 'Sales', 8, 'Seattle'),

(9, 'Quality Assurance', 9, 'Denver'),

(10, 'Legal', 10, 'Phoenix'),

(11, 'Supply Chain', 11, 'Atlanta'),

(12, 'Public Relations', 12, 'San Diego'),

(13, 'Product Management', 13, 'Austin'),

(14, 'Facilities', 14, 'Houston'),

(15, 'Training', 15, 'San Jose'),

(16, 'Warehouse', 16, 'Detroit'),

(17, 'Security', 17, 'Portland'),

(18, 'Information Security', 18, 'Minneapolis'),

(19, 'Logistics', 19, 'Tampa'),

(20, 'Procurement', 20, 'St. Louis');

INSERT INTO Employees (EmployeeID, FirstName, LastName, BirthDate, Gender, DepartmentID, HireDate, Salary, Email, Phone)

VALUES

(1, 'John', 'Doe', '1985-05-15', 'M', 1, '2010-03-20', 65000.00, 'john.doe@example.com', '555-123-4567'),

(2, 'Jane', 'Smith', '1990-11-25', 'F', 2, '2012-07-10', 55000.00, 'jane.smith@example.com', '555-987-6543'),

(3, 'David', 'Johnson', '1988-08-10', 'M', 1, '2011-02-15', 62000.00, 'david.j@example.com', '555-456-7890'),

(4, 'Sarah', 'Williams', '1992-03-05', 'F', 3, '2014-05-30', 58000.00, 'sarah.w@example.com', '555-789-0123'),

(5, 'Michael', 'Brown', '1987-12-20', 'M', 2, '2013-09-12', 60000.00, 'michael.b@example.com', '555-234-5678'),

(6, 'Emily', 'Davis', '1991-06-18', 'F', 1, '2015-11-05', 63000.00, 'emily.d@example.com', '555-345-6789'),

(7, 'Daniel', 'Lee', '1986-02-28', 'M', 3, '2016-04-22', 58000.00, 'daniel.l@example.com', '555-456-7890'),

(8, 'Olivia', 'Martinez', '1994-09-14', 'F', 2, '2018-03-17', 59000.00, 'olivia.m@example.com', '555-567-8901'),

(9, 'William', 'Garcia', '1989-07-07', 'M', 1, '2019-08-29', 64000.00, 'william.g@example.com', '555-678-9012'),

(10, 'Sophia', 'Harris', '1993-04-03', 'F', 2, '2020-12-10', 55000.00, 'sophia.h@example.com', '555-789-0123'),

(11, 'Alexander', 'Walker', '1990-01-12', 'M', 3, '2017-06-07', 60000.00, 'alex.w@example.com', '555-890-1234'),

(12, 'Ava', 'Thompson', '1988-10-26', 'F', 1, '2014-08-14', 61000.00, 'ava.t@example.com', '555-901-2345'),

(13, 'James', 'Lopez', '1987-03-17', 'M', 2, '2012-09-25', 59000.00, 'james.l@example.com', '555-012-3456'),

(14, 'Mia', 'Wilson', '1995-07-30', 'F', 1, '2016-01-30', 57000.00, 'mia.w@example.com', '555-123-4567'),

(15, 'Benjamin', 'Anderson', '1986-11-08', 'M', 3, '2013-05-18', 63000.00, 'benjamin.a@example.com', '555-234-5678'),

(16, 'Ella', 'Thomas', '1991-04-22', 'F', 2, '2019-02-01', 56000.00, 'ella.t@example.com', '555-345-6789'),

(17, 'Joseph', 'Hill', '1989-09-03', 'M', 1, '2017-10-12', 61000.00, 'joseph.h@example.com', '555-456-7890'),

(18, 'Sofia', 'Clark', '1993-02-19', 'F', 2, '2015-12-05', 58000.00, 'sofia.c@example.com', '555-567-8901'),

(19, 'Samuel', 'Young', '1988-06-14', 'M', 3, '2018-04-20', 59000.00, 'samuel.y@example.com', '555-678-9012'),

(20, 'Chloe', 'Adams', '1994-01-07', 'F', 1, '2019-09-15', 62000.00, 'chloe.a@example.com', '555-789-0123');

INSERT INTO Payroll (PayrollID, EmployeeID, PayDate, Salary, Deductions, NetSalary)

VALUES

(1, 1, '2023-01-31', 6500.00, 500.00, 6000.00),

(2, 2, '2023-01-31', 5500.00, 400.00, 5100.00),

(3, 3, '2023-01-31', 6200.00, 600.00, 5600.00),

(4, 4, '2023-01-31', 5800.00, 450.00, 5350.00),

(5, 5, '2023-01-31', 6000.00, 550.00, 5450.00),

(6, 6, '2023-01-31', 6300.00, 500.00, 5800.00),

(7, 7, '2023-01-31', 5800.00, 400.00, 5400.00),

(8, 8, '2023-01-31', 5900.00, 450.00, 5450.00),

(9, 9, '2023-01-31', 6400.00, 550.00, 5850.00),

(10, 10, '2023-01-31', 5500.00, 400.00, 5100.00),

(11, 11, '2023-01-31', 6000.00, 500.00, 5500.00),

(12, 12, '2023-01-31', 6100.00, 450.00, 5650.00),

(13, 13, '2023-01-31', 5900.00, 400.00, 5500.00),

(14, 14, '2023-01-31', 5700.00, 350.00, 5350.00),

(15, 15, '2023-01-31', 6300.00, 550.00, 5750.00),

(16, 16, '2023-01-31', 5600.00, 400.00, 5200.00),

(17, 17, '2023-01-31', 6100.00, 450.00, 5650.00),

(18, 18, '2023-01-31', 5800.00, 400.00, 5400.00),

(19, 19, '2023-01-31', 5900.00, 450.00, 5450.00),

(20, 20, '2023-01-31', 6200.00, 500.00, 5700.00);

INSERT INTO JobApplicants (ApplicantID, FirstName, LastName, Email, Phone, PositionApplied, ApplicationDate, Resume, CoverLetter)

VALUES

(1, 'Mark', 'Johnson', 'mark.johnson@example.com', '555-222-3333', 'Software Engineer', '2023-08-15', NULL, 'I am excited to join your team.'),

(2, 'Emily', 'Davis', 'emily.davis@example.com', '555-444-5555', 'Data Analyst', '2023-08-20', NULL, 'I have a strong analytical background.'),

(3, 'Daniel', 'Brown', 'daniel.brown@example.com', '555-666-7777', 'HR Specialist', '2023-08-25', NULL, 'I am passionate about HR.'),

(4, 'Olivia', 'Miller', 'olivia.miller@example.com', '555-888-9999', 'Marketing Manager', '2023-08-30', NULL, 'I have a proven track record in marketing.'),

(5, 'James', 'Smith', 'james.smith@example.com', '555-111-2222', 'IT Analyst', '2023-09-05', NULL, 'I am skilled in IT operations.'),

(6, 'Sophia', 'Garcia', 'sophia.garcia@example.com', '555-333-4444', 'Financial Analyst', '2023-09-10', NULL, 'I have a finance background.'),

(7, 'William', 'Johnson', 'william.johnson@example.com', '555-555-6666', 'Software Engineer', '2023-09-15', NULL, 'I have coding experience.'),

(8, 'Mia', 'Harris', 'mia.harris@example.com', '555-777-8888', 'Data Scientist', '2023-09-20', NULL, 'I am a data analysis expert.'),

(9, 'Benjamin', 'Thompson', 'benjamin.thompson@example.com', '555-999-0000', 'HR Specialist', '2023-09-25', NULL, 'I have HR experience.'),

(10, 'Ella', 'Davis', 'ella.davis@example.com', '555-222-3333', 'Marketing Coordinator', '2023-09-30', NULL, 'I am creative in marketing.'),

(11, 'Joseph', 'Smith', 'joseph.smith@example.com', '555-444-5555', 'IT Specialist', '2023-10-05', NULL, 'I am a problem solver in IT.'),

(12, 'Sofia', 'Lopez', 'sofia.lopez@example.com', '555-666-7777', 'Finance Manager', '2023-10-10', NULL, 'I am experienced in finance.'),

(13, 'Samuel', 'Williams', 'samuel.williams@example.com', '555-888-9999', 'Software Developer', '2023-10-15', NULL, 'I am passionate about coding.'),

(14, 'Chloe', 'Martin', 'chloe.martin@example.com', '555-111-2222', 'Data Analyst', '2023-10-20', NULL, 'I am detail-oriented in data analysis.'),

(15, 'David', 'Johnson', 'david.johnson@example.com', '555-333-4444', 'HR Specialist', '2023-10-25', NULL, 'I am dedicated to HR.'),

(16, 'Oliver', 'Brown', 'oliver.brown@example.com', '555-555-6666', 'Marketing Coordinator', '2023-10-30', NULL, 'I am a marketing enthusiast.'),

(17, 'Sophia', 'Walker', 'sophia.walker@example.com', '555-777-8888', 'IT Specialist', '2023-11-05', NULL, 'I am an IT expert.'),

(18, 'Ella', 'Hill', 'ella.hill@example.com', '555-999-0000', 'Financial Analyst', '2023-11-10', NULL, 'I am a financial expert.'),

(19, 'Liam', 'Clark', 'liam.clark@example.com', '555-222-3333', 'Software Engineer', '2023-11-15', NULL, 'I am skilled in software development.'),

(20, 'Ava', 'Garcia', 'ava.garcia@example.com', '555-444-5555', 'Data Scientist', '2023-11-20', NULL, 'I am a data science professional.');

INSERT INTO TrainingRecords (RecordID, EmployeeID, TrainingName, TrainingDate, TrainerName, DurationHours, TrainingLocation, CertificateIssued)

VALUES

(1, 1, 'Java Programming', '2023-03-10', 'John Trainer', 40, 'New York', TRUE),

(2, 2, 'SQL Fundamentals', '2023-04-05', 'Emily Trainer', 32, 'San Francisco', TRUE),

(3, 3, 'HR Policies', '2023-04-15', 'David Trainer', 24, 'Chicago', TRUE),

(4, 4, 'Marketing Strategies', '2023-05-02', 'Sarah Trainer', 36, 'Los Angeles', TRUE),

(5, 5, 'IT Security', '2023-05-20', 'Michael Trainer', 28, 'San Francisco', TRUE),

(6, 6, 'Financial Analysis', '2023-06-08', 'Emily Trainer', 40, 'New York', TRUE),

(7, 7, 'Leadership Skills', '2023-06-25', 'Daniel Trainer', 32, 'Chicago', TRUE),

(8, 8, 'Digital Marketing', '2023-07-12', 'Olivia Trainer', 36, 'Los Angeles', TRUE),

(9, 9, 'Conflict Resolution', '2023-07-30', 'William Trainer', 24, 'San Francisco', TRUE),

(10, 10, 'Database Administration', '2023-08-10', 'Sophia Trainer', 40, 'New York', TRUE),

(11, 11, 'Agile Development', '2023-08-28', 'Alexander Trainer', 32, 'Chicago', TRUE),

(12, 12, 'Performance Evaluation', '2023-09-15', 'Ava Trainer', 36, 'Los Angeles', TRUE),

(13, 13, 'Networking Fundamentals', '2023-09-30', 'James Trainer', 28, 'San Francisco', TRUE),

(14, 14, 'Data Visualization', '2023-10-15', 'Mia Trainer', 40, 'New York', TRUE),

(15, 15, 'Project Management', '2023-10-28', 'Benjamin Trainer', 32, 'Chicago', TRUE),

(16, 16, 'Web Development', '2023-11-10', 'Ella Trainer', 36, 'Los Angeles', TRUE),

(17, 17, 'Financial Modeling', '2023-11-25', 'Joseph Trainer', 24, 'San Francisco', TRUE),

(18, 18, 'Software Testing', '2023-12-10', 'Sofia Trainer', 40, 'New York', TRUE),

(19, 19, 'Data Mining', '2023-12-22', 'Samuel Trainer', 32, 'Chicago', TRUE),

(20, 20, 'Cloud Computing', '2024-01-05', 'Chloe Trainer', 36, 'Los Angeles', TRUE);

**Exercise 1: Establish a JDBC Connection** Write a Java program to establish a JDBC connection to your HR database. Use the appropriate JDBC driver and connection URL.

**Exercise 2: Retrieve Employee Data** Write a Java program that connects to the HR database, retrieves all employee records from the Employee table, and displays them in the console.

**Exercise 3: Insert Employee Data** Write a Java program to insert a new employee record into the Employee table of the HR database. Prompt the user for employee details.

**Exercise 4: Update Employee Data** Write a Java program that updates the salary of an employee in the Employee table. Prompt the user for the employee's ID and the new salary.

**Exercise 5: Delete Employee Data** Write a Java program that deletes an employee record from the Employee table based on the employee's ID. Prompt the user for the ID of the employee to be deleted.

**Exercise 6: Retrieve Employee Data by Department** Write a Java program that connects to the HR database and retrieves all employee records from the "Employee" table for a specific department. Prompt the user to enter the department name, and then display the employee records for that department.

**Exercise 7: Calculate Total Salary Expense** Write a Java program that connects to the HR database and calculates the total salary expense for a given department. Prompt the user to enter the department name, and then display the total salary expense.

**Exercise 8: Retrieve Job Applicants** Write a Java program that connects to the HR database and retrieves all job applicants from the "JobApplicants" table. Display the applicant details.

**Exercise 9: Insert Job Applicant** Write a Java program that inserts a new job applicant record into the "JobApplicants" table. Prompt the user for applicant details.

**Exercise 10: Retrieve Training Records** Write a Java program that connects to the HR database and retrieves all training records from the "TrainingRecords" table. Display the training details.

**Exercise 11: Retrieve Employee with Highest Salary**

**Question: Write a Java program that connects to the HR database and retrieves the employee with the highest salary. Display the details of that employee.**

**Exercise 12: Average Salary by Department**

**Question: Write a Java program that connects to the HR database and calculates the average salary for each department. Display the department name and its average salary.**

**Exercise 13: Update Employee Email**

**Question: Write a Java program that connects to the HR database and updates the email of an employee. Prompt the user for the employee's ID and the new email.**

**Exercise 14: Delete Training Record**

**Question: Write a Java program that connects to the HR database and deletes a training record based on the training record ID. Prompt the user for the ID of the training record to be deleted.**

**Exercise 15: Retrieve Employees without Training Certificate**

**Question: Write a Java program that connects to the HR database and retrieves employees who do not have a training certificate. Display their details.**

**Exercise 16: Total Deductions by Employee**

**Question: Write a Java program that connects to the HR database and calculates the total deductions for a given employee. Prompt the user for the employee's ID and display the total deductions.**

**Exercise 17: Employee Birthdays This Month**

**Question: Write a Java program that connects to the HR database and retrieves employees whose birthdays fall in the current month. Display their details.**

**Exercise 18: Employees with Most Training Certificates**

**Question: Write a Java program that connects to the HR database and retrieves employees with the most training certificates. Display their details.**

**Exercise 19: Retrieve Employees by Gender**

**Question: Write a Java program that connects to the HR database and retrieves employees based on their gender. Prompt the user for the gender and display the employee details.**

**Exercise 20: Retrieve Employees with No Training**

**Question: Write a Java program that connects to the HR database and retrieves employees who have not undergone any training. Display their details.**