SQL Practice Questions & Answers

Name: Hossain Ahmed Madani  
Email: hossainahmed359@gmail.com

## QUESTION 1: Explain the difference between Primary Key and Foreign Key in SQL.

ANS:

Primary key is a unique value of a record in a table. It is used to prevent duplication. A primary key must be unique.

Foreign key is a stored primary key of another table. It is used to establish relation between multiple tables

## QUESTION 2: What is a Self Join? Provide an example using the employees table to list employees who share the same manager ID, showing only their first names and manager IDs.

ANS:

Self Join is a join operation where a table is joined with itself and returns joined table based on the ON clause.  
USE dummydb;  
  
SELECT  
 e1.first\_name,  
 e1.manager\_id  
FROM  
 employees AS e1  
 JOIN (  
 SELECT DISTINCT  
 (manager\_id) AS manager\_id  
 FROM  
 employees  
 WHERE  
 manager\_id IS NOT NULL  
 ) AS e2 ON e1.manager\_id = e2.manager\_id;

## QUESTION 3:

Create a table of Employees which has the following fields

1.Employee\_Id

2.First Name

3.Last Name

4.Date of Birth

5.Department Id

6.Salary

Create a table Projects with the following fields:

1.Project ID

2.Project Name

3.Start Date

4.End Date

5.Budget

Create a table Employee\_Projects with the following fields:

1.Employee ID

2.Project ID

Ensure that each employee can work on multiple projects and a project can have multiple employees.

ANS:   
CREATE TABLE  
 employees (  
 employee\_id INT,  
 first\_name VARCHAR(20),  
 last\_name VARCHAR(20),  
 date\_of\_birth DATE,  
 department\_id INT,  
 salary DECIMAL(8, 0),  
 CONSTRAINT employee\_pk\_rule PRIMARY KEY (employee\_id),  
 CONSTRAINT employee\_date\_of\_birth\_rule CHECK (date\_of\_birth IS NOT NULL),  
 CONSTRAINT employee\_department\_id\_rule CHECK (department\_id IS NOT NULL)  
 );  
  
CREATE TABLE  
 projects (  
 project\_id INT,  
 project\_name VARCHAR(20),  
 start\_date DATE,  
 end\_date DATE,  
 budget DECIMAL(8, 0),  
 CONSTRAINT project\_pk\_rule PRIMARY KEY (project\_id),  
 CONSTRAINT project\_name\_rule CHECK (project\_name IS NOT NULL)  
 );  
  
CREATE TABLE  
 employee\_projects (  
 employee\_id INT,  
 project\_id INT,  
 CONSTRAINT employee\_projects\_pk\_rule PRIMARY KEY (employee\_id, project\_id)  
 );

## QUESTION 4: Using the dummydb, write an SQL query to get the third-highest salary in the employees table.

ANS:   
USE dummydb;  
  
SELECT  
 salary  
FROM  
 employees  
ORDER BY  
 salary DESC  
LIMIT  
 2, 1;

## QUESTION 5: Write a query to show the department names and the number of employees in each department.

ANS:  
USE dummydb;  
  
SELECT  
 d.department\_name,  
 e.number\_of\_employees  
FROM  
 (  
 SELECT  
 COUNT(department\_id) AS number\_of\_employees,  
 department\_id  
 FROM  
 employees  
 WHERE  
 department\_id IS NOT NULL  
 GROUP BY  
 department\_id  
 ) AS e  
 RIGHT JOIN departments AS d ON e.department\_id = d.department\_id;

## QUESTION 6: Illustrate INNER JOIN, LEFT JOIN, RIGHT JOIN, and CROSS JOIN with examples using the employees and departments tables.

ANS:   
USE dummydb;

INNER JOIN  
SELECT  
 e.employee\_id,  
 e.first\_name,  
 d.department\_name  
FROM  
 employees AS e  
 JOIN departments AS d ON e.department\_id = d.department\_id;

LEFT JOIN  
SELECT  
 e.employee\_id,  
 e.first\_name,  
 d.department\_name  
FROM  
 employees AS e  
 JOIN departments AS d ON e.department\_id = d.department\_id;

RIGHT JOIN  
SELECT  
 d.department\_name,  
 e.number\_of\_employees  
FROM  
 (  
 SELECT  
 COUNT(department\_id) AS number\_of\_employees,  
 department\_id  
 FROM  
 employees  
 WHERE  
 department\_id IS NOT NULL  
 GROUP BY  
 department\_id  
 ) AS e  
 RIGHT JOIN departments AS d ON e.department\_id = d.department\_id;

CROSS JOIN  
SELECT  
 e.employee\_id,  
 e.first\_name,  
 d.department\_name  
FROM  
 employees AS e  
 CROSS JOIN departments AS d;

## QUESTION 7: What is a Common Table Expression (CTE)? Write an example query using CTE to show the names of employees whose salary is higher than the average salary

ANS:

CTE OR Common Table Expression a temporary named result set that is defined with in the execution scope  
USE dummydb;  
  
WITH  
 avg\_t AS (  
 SELECT  
 AVG(salary) as avg\_salary  
 FROM  
 employees  
 )  
SELECT  
 CONCAT (first\_name, ' ', last\_name) AS 'Full Name',  
 salary  
FROM  
 employees  
WHERE  
 salary > (  
 SELECT  
 avg\_salary  
 FROM  
 avg\_t  
 );

## QUESTION 8: Write a query to display the names of employees who earn a salary less than the employee "Steven King".

ANS:   
USE dummydb;  
  
SELECT  
 CONCAT (first\_name, ' ', last\_name) AS 'Full Name'  
FROM  
 employees  
WHERE  
 salary < (  
 SELECT  
 salary  
 FROM  
 employees  
 WHERE  
 CONCAT (first\_name, ' ', last\_name) = 'Steven King'  
 );

## QUESTION 9: Write a query to find the department names and the names of the managers for each department.

ANS:   
USE dummydb;  
  
SELECT  
 d.department\_name,  
 CONCAT (e.first\_name, ' ', e.last\_name) AS 'manager\_name'  
FROM  
 departments AS d  
 LEFT JOIN employees AS e ON e.employee\_id = d.manager\_id;

## QUESTION 10: Write a query to display the names of all cities where departments are located.

ANS:   
USE dummydb;  
  
SELECT  
 l.city  
FROM  
 departments AS d  
 LEFT JOIN locations AS l ON d.location\_id = l.location\_id;