

# SQL COMMANDS

## Basic Search & Filtering

1. SELECT \* FROM EMP;
  2. SELECT ENAME, SAL FROM EMP WHERE SAL > 3000;
  3. SELECT ENAME FROM EMP WHERE JOB = 'MANAGER';
  4. SELECT ENAME, DEPTNO FROM EMP WHERE DEPTNO = 10;
  5. SELECT ENAME FROM EMP WHERE HIREDATE BETWEEN '1981-01-01' AND '1981-12-31';
- 

## Pattern Matching with LIKE

6. SELECT ENAME FROM EMP WHERE ENAME LIKE 'S%';
  7. SELECT ENAME FROM EMP WHERE ENAME LIKE '%N';
  8. SELECT ENAME FROM EMP WHERE ENAME LIKE '\_A%';
  9. SELECT ENAME FROM EMP WHERE ENAME LIKE '%A%';
  10. SELECT ENAME FROM EMP WHERE ENAME NOT LIKE '%R%';
- 

## Grouping & Aggregation

11. SELECT DEPTNO, COUNT(\*) FROM EMP GROUP BY DEPTNO;
  12. SELECT JOB, AVG(SAL) FROM EMP GROUP BY JOB;
  13. SELECT DEPTNO, MAX(SAL), MIN(SAL) FROM EMP GROUP BY DEPTNO;
  14. SELECT JOB, SUM(SAL) FROM EMP GROUP BY JOB;
  15. SELECT DEPTNO, COUNT(\*) AS EMP\_COUNT FROM EMP GROUP BY DEPTNO;
- 

## HAVING Clause

16. SELECT DEPTNO, AVG(SAL) FROM EMP GROUP BY DEPTNO HAVING AVG(SAL) > 3000;
17. SELECT JOB, COUNT(\*) FROM EMP GROUP BY JOB HAVING COUNT(\*) > 2;

18. SELECT DEPTNO, SUM(SAL) FROM EMP GROUP BY DEPTNO HAVING SUM(SAL) < 10000;

19. SELECT JOB, MAX(SAL) FROM EMP GROUP BY JOB HAVING MAX(SAL) > 4000;

20. SELECT DEPTNO, COUNT(\*) FROM EMP GROUP BY DEPTNO HAVING COUNT(\*) BETWEEN 2 AND 5;

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### **Joins (LEFT, RIGHT, FULL)**

21. SELECT E.ENAME, D.DNAME FROM EMP E LEFT JOIN DEPT D ON E.DEPTNO = D.DEPTNO;

22. SELECT E.ENAME, D.DNAME FROM EMP E RIGHT JOIN DEPT D ON E.DEPTNO = D.DEPTNO;

23. SELECT E.ENAME, D.DNAME FROM EMP E FULL OUTER JOIN DEPT D ON E.DEPTNO = D.DEPTNO;

24. SELECT E.ENAME, D.LOC FROM EMP E LEFT JOIN DEPT D ON E.DEPTNO = D.DEPTNO WHERE D.LOC = 'NEW YORK';

25. SELECT D.DNAME, COUNT(E.EMPNO) FROM DEPT D LEFT JOIN EMP E ON D.DEPTNO = E.DEPTNO GROUP BY D.DNAME;

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### **Ordering Results**

26. SELECT ENAME, SAL FROM EMP ORDER BY SAL DESC;

27. SELECT ENAME, HIREDATE FROM EMP ORDER BY HIREDATE ASC;

28. SELECT ENAME, JOB FROM EMP ORDER BY JOB, ENAME;

29. SELECT ENAME, DEPTNO FROM EMP ORDER BY DEPTNO, ENAME;

30. SELECT ENAME, SAL FROM EMP ORDER BY SAL DESC LIMIT 5;

## SQL WITH PYTHON

```
import sqlite3

# Connect to in-memory SQLite database
conn = sqlite3.connect(":memory:")
cursor = conn.cursor()

# Create DEPT table
cursor.execute("""
CREATE TABLE DEPT (
    DEPTNO INTEGER PRIMARY KEY,
    DNAME TEXT,
    LOC TEXT
)
""")

# Create EMP table
cursor.execute("""
CREATE TABLE EMP (
    EMPNO INTEGER PRIMARY KEY,
    ENAME TEXT,
    JOB TEXT,
    MGR INTEGER,
    HIREDATE TEXT,
    SAL REAL,
    COMM REAL,
    DEPTNO INTEGER,
    FOREIGN KEY (DEPTNO) REFERENCES DEPT(DEPTNO)
)
""")
```

```
# Insert sample data into DEPT
```

```
dept_data = [
```

```
    (10, 'ACCOUNTING', 'NEW YORK'),
```

```
    (20, 'RESEARCH', 'DALLAS'),
```

```
    (30, 'SALES', 'CHICAGO'),
```

```
    (40, 'OPERATIONS', 'BOSTON')
```

```
]
```

```
cursor.executemany("INSERT INTO DEPT VALUES (?, ?, ?)", dept_data)
```

```
# Insert sample data into EMP
```

```
emp_data = [
```

```
    (7839, 'KING', 'PRESIDENT', None, '1981-11-17', 5000, None, 10),
```

```
    (7566, 'JONES', 'MANAGER', 7839, '1981-04-02', 2975, None, 20),
```

```
    (7698, 'BLAKE', 'MANAGER', 7839, '1981-05-01', 2850, None, 30),
```

```
    (7782, 'CLARK', 'MANAGER', 7839, '1981-06-09', 2450, None, 10),
```

```
    (7902, 'FORD', 'ANALYST', 7566, '1981-12-03', 3000, None, 20),
```

```
    (7369, 'SMITH', 'CLERK', 7902, '1980-12-17', 800, None, 20),
```

```
    (7499, 'ALLEN', 'SALESMAN', 7698, '1981-02-20', 1600, 300, 30),
```

```
    (7521, 'WARD', 'SALESMAN', 7698, '1981-02-22', 1250, 500, 30),
```

```
    (7654, 'MARTIN', 'SALESMAN', 7698, '1981-09-28', 1250, 1400, 30),
```

```
    (7844, 'TURNER', 'SALESMAN', 7698, '1981-06-09', 1500, 0, 30),
```

```
    (7876, 'ADAMS', 'CLERK', 7788, '1983-01-12', 1100, None, 20),
```

```
    (7934, 'MILLER', 'CLERK', 7782, '1982-01-23', 1300, None, 10)
```

```
]
```

```
cursor.executemany("INSERT INTO EMP VALUES (?, ?, ?, ?, ?, ?, ?, ?)", emp_data)
```

```
# List of 30 SQL commands
```

```
sql_commands = [
```

#### # Basic Search & Filtering

```
"SELECT * FROM EMP",  
"SELECT ENAME, SAL FROM EMP WHERE SAL > 3000",  
"SELECT ENAME FROM EMP WHERE JOB = 'MANAGER'",  
"SELECT ENAME, DEPTNO FROM EMP WHERE DEPTNO = 10",  
"SELECT ENAME FROM EMP WHERE HIREDATE BETWEEN '1981-01-01' AND  
'1981-12-31'",
```

#### # Pattern Matching with LIKE

```
"SELECT ENAME FROM EMP WHERE ENAME LIKE 'S%'",  
"SELECT ENAME FROM EMP WHERE ENAME LIKE '%N'",  
"SELECT ENAME FROM EMP WHERE ENAME LIKE '_A%'",  
"SELECT ENAME FROM EMP WHERE ENAME LIKE '%A%'",  
"SELECT ENAME FROM EMP WHERE ENAME NOT LIKE '%R%'",
```

#### # Grouping & Aggregation

```
"SELECT DEPTNO, COUNT(*) FROM EMP GROUP BY DEPTNO",  
"SELECT JOB, AVG(SAL) FROM EMP GROUP BY JOB",  
"SELECT DEPTNO, MAX(SAL), MIN(SAL) FROM EMP GROUP BY DEPTNO",  
"SELECT JOB, SUM(SAL) FROM EMP GROUP BY JOB",  
"SELECT DEPTNO, COUNT(*) AS EMP_COUNT FROM EMP GROUP BY  
DEPTNO",
```

#### # HAVING Clause

```
"SELECT DEPTNO, AVG(SAL) FROM EMP GROUP BY DEPTNO HAVING  
AVG(SAL) > 3000",  
"SELECT JOB, COUNT(*) FROM EMP GROUP BY JOB HAVING COUNT(*) > 2",  
"SELECT DEPTNO, SUM(SAL) FROM EMP GROUP BY DEPTNO HAVING  
SUM(SAL) < 10000",  
"SELECT JOB, MAX(SAL) FROM EMP GROUP BY JOB HAVING MAX(SAL) >  
4000",
```

```
"SELECT DEPTNO, COUNT(*) FROM EMP GROUP BY DEPTNO HAVING  
COUNT(*) BETWEEN 2 AND 5",
```

```
# Joins (LEFT, RIGHT, FULL)
```

```
"SELECT E.ENAME, D.DNAME FROM EMP E LEFT JOIN DEPT D ON  
E.DEPTNO = D.DEPTNO",
```

```
# RIGHT JOIN not supported in SQLite, simulate using LEFT JOIN + UNION
```

```
"SELECT E.ENAME, D.DNAME FROM DEPT D LEFT JOIN EMP E ON  
E.DEPTNO = D.DEPTNO",
```

```
# FULL OUTER JOIN not supported, simulate using UNION of LEFT and RIGHT
```

```
""SELECT E.ENAME, D.DNAME FROM EMP E LEFT JOIN DEPT D ON  
E.DEPTNO = D.DEPTNO
```

```
UNION
```

```
SELECT E.ENAME, D.DNAME FROM DEPT D LEFT JOIN EMP E ON  
E.DEPTNO = D.DEPTNO""",
```

```
"SELECT E.ENAME, D.LOC FROM EMP E LEFT JOIN DEPT D ON E.DEPTNO =  
D.DEPTNO WHERE D.LOC = 'NEW YORK'",
```

```
"SELECT D.DNAME, COUNT(E.EMPNO) FROM DEPT D LEFT JOIN EMP E ON  
D.DEPTNO = E.DEPTNO GROUP BY D.DNAME",
```

```
# Ordering Results
```

```
"SELECT ENAME, SAL FROM EMP ORDER BY SAL DESC",
```

```
"SELECT ENAME, HIREDATE FROM EMP ORDER BY HIREDATE ASC",
```

```
"SELECT ENAME, JOB FROM EMP ORDER BY JOB, ENAME",
```

```
"SELECT ENAME, DEPTNO FROM EMP ORDER BY DEPTNO, ENAME",
```

```
"SELECT ENAME, SAL FROM EMP ORDER BY SAL DESC LIMIT 5"
```

```
]
```

```
# Execute and display results
```

```
for i, query in enumerate(sql_commands, start=1):
```

```
    print(f"\nQuery {i}: {query}")
```

```
cursor.execute(query)
for row in cursor.fetchall():
    print(row)
```

```
# Close connection
conn.close()
```