# SQL: PART II

# Example: Employee Database

| EMPLOYEE | | | | |
|---|---|---|---|---|
| **emp_id** | **name** | **dept_id** | **mgr_id** | **salary** |
| 57 | Alex | 1 | - | 84000 |
| 23 | Jen | 1 | 57 | 72000 |
| 85 | Max | 3 | 19 | 51000 |
| 44 | Tim | 2 | 37 | 63000 |

| DEPARTMENT | |
|---|---|
| **dept_id** | **name** |
| 1 | Sales |
| 2 | Accounting |
| 3 | HR |

# Query #1

- *Find all employees in the Sales and HR departments.*

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■ *Find all employees in the Sales and HR departments.*

```
select e.name
from employee as e, department as d
where e.dept_id = d.dept_id
  and (d.name = 'Sales'
    or d.name = 'HR')
```

## OR

```
select e.name
from employee as e
join department as d
  on d.dept_id = e.dept_id
where d.name = 'Sales'
  or d.name = 'HR'
```

# Query #1

■ *Find all employees in the Sales and HR departments.*

```
select e.name
from employee as e
where e.dept_id in (
            select d.dept_id
            from department as d
            where d.name = 'Sales'
                or d.name = 'HR')
```

# IN + SUBQUERY
# (WHERE CLAUSE)

# Query #2

■ *Find all employees with the maximum salary.*

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```
select e.name
from employee as e
where e.salary = (
            select max(e2.salary)
            from employee as e2)
```

## SCALAR SUBQUERY (WHERE CLAUSE)

# Query #2

- *Find all employees with the maximum salary.*

```
select e.name
from employee as e
join (
    select max(e2.salary) as maxsal
    from employee as e2)
  on e.salary = maxsal
```

# SUBQUERY
# (FROM CLAUSE)

# Query #3

■ *Find the average salary for each department.*

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```
select d.name,
        avg(e.salary) as avgsal
from department as d
join employee as e
  on e.dept_id = d.dept_id
group by d.name
```

# Query #3

■ *Find the average salary for each department.*

```
select d.name,
          (select avg(e.salary)
           from employee e
           where e.dept_id = d.dept_id)
        as avgsal
from department as d
```

## SCALAR SUBQUERY (SELECT CLAUSE)

# Query #4

- *Find the departments with at most one manager.*

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- *Find the departments with at most one manager.*

```
select d.name
from department as d
join employee as e
  on e.dept_id = d.dept_id
where e.mgr_id is null
group by d.name
having count(e.emp_id) <= 1
```

# Query #4

■ *Find the departments with at most one manager.*

```
select d.name
from department as d
where unique (
            select e.dept_id
            from employee as e
            where e.dept_id = d.dept_id
              and e.mgr_id is null)
```

# UNIQUE

# Query #5

- *Find all managers who supervise at least one employee.*

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- *Find all managers who supervise at least one employee.*

```
select e.name
from employee as e
where exists (
            select *
            from employee as e2
            where e2.mgr_id = e.emp_id)
```

## EXISTS

# Query #6

- *Find the names of all employees and their manager.*

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■ *Find the names of all employees and their manager.*

```
select e.name as emp,
         m.name as mgr
from employee as e
join employee as m
  on m.emp_id = e.mgr_id
```

# PROBLEM?

# Query #6

■ *Find the names of all employees and their manager.*

| EMPLOYEE | | | | |
|---|---|---|---|---|
| **emp_id** | **name** | **dept_id** | **mgr_id** | **salary** |
| 57 | Alex | 1 | - | 84000 |
| 23 | Jen | 1 | 57 | 72000 |
| 85 | Max | 3 | 19 | 51000 |
| 44 | Tim | 2 | 37 | 63000 |

# Query #6

■ *Find the names of all employees and their manager.*

```
select e.name as emp,
        m.name as mgr
from employee as e
join employee as m
  on m.emp_id = e.mgr_id
union
select e.name,
        'n/a'
from employee as e
where e.mgr_id is null
```

# Query #6

■ *Find the names of all employees and their manager.*

```
select e.name as emp,
        m.name as mgr
from employee as e
left outer join employee as m
  on m.emp_id = e.mgr_id
```

# LEFT OUTER JOIN

# Query #7

- *Find all departments where the total salary is greater than the average total salary for all departments.*

# Query #7

■ *Find all departments where the total salary is greater than the average total salary for all departments.*

```
with dept_ttl as (
   select dept_id, sum(salary) as dttl
   from employee group by dept_id),
with dept_avg as (
   select avg(dttl) as davg
   from dept_ttl)
select dept_id
from dept_ttl as t1,dept_avg as t2
where t1.dttl > t2.davg
```

# WITH CLAUSE

# Modifying a Table

- **insert** – add new records

- **delete** – remove some (or all) records

- **update** – change some (or all) existing records

# Insert

- Add a new record to the `EMPLOYEE` table:

  **insert into employee(id,name,dept_id,mgr_id,salary) values(99,'Amy',2,16,95000)**

# Insert

- Add a new record to the `EMPLOYEE` table:

```
insert into
employee
values(99,'Amy',2,16,95000)
```

# Insert

- Add a new record to the `EMPLOYEE` table:

  **insert into**
  **employee**
  **values(99,'Amy',2,null,95000)**

# Insert

- Add all managers to the new MANAGER table:

```
insert into manager
    select *
    from employee
    where mgr_id is null
```

# Delete

■ Delete all employees from the EMPLOYEE table:

**delete from employee**

# Delete

- Delete employee #44:

```
delete from employee
where emp_id = 44
```

# Delete

- Delete all employees in the Sales department:

```
delete from employee
where dept_id = (
            select dept_id
            from department
            where name = 'Sales')
```

# Delete

- Delete all employees whose salary is greater than the average salary:

```
delete from employee
where salary > (
            select avg(salary)
            from employee)
```

# PROBLEM?

# Update

- Make employee #23 a manager:

    ```
    update employee
    set mgr_id = null
    where emp_id = 23
    ```

# Update

■ Give all employees a 5% raise:

```
update employee
set salary = salary * 1.05
```

# Update

■ Give all employees with a salary greater than $100,000 a 3% raise and all others a 5% raise:

```
update employee
set salary = salary * 1.05
where salary <= 100000

update employee
set salary = salary * 1.03
where salary > 100000
```

## PROBLEM?

# Update

■ Give all employees with a salary greater than $100,000 a 3% raise and all others a 5% raise:

```
update employee
set salary = case
        when salary > 100000
          then salary * 1.03
        else
          salary * 1.05
        end
```

## CASE STATEMENT

# If you disliked the lecture, please forward all complaints to: