Practice

TASK

- We want to compare the number of male and female department heads for each year
    - First: Define a function of emp_no and year that tells us whether that employee was a manager that year
        - Task 1: Find the year of the dates of a contract for an employee with emp_no 109990

Solution

- We can use YEAR to extract the year from a date
-
```
SELECT YEAR(from_date), YEAR(to_date)
FROM salaries
WHERE emp_no = 109990;
```

TASK

- Now, let's create a table with
  - 0 when the contract does not cover parts of 1990
  - 1 when it does
  - for employee with emp_no 109990

Solution

- For this, we can use the CASE or the IF Statement

```
SELECT CASE
      WHEN 1990 BETWEEN YEAR(from_date) AND YEAR
(to_date) THEN 1
          ELSE 0
    END
      from_date,
      to_date
FROM salaries
WHERE emp_no = 109990;
```

Solution

- For this, we can use the CASE or the IF Statement

```
SELECT IF(1990 BETWEEN YEAR(from_date) AND YEAR
(to_date),  1, 0),
    from_date,
    to_date
FROM salaries
WHERE emp_no = 109990;
```

TASK

- Create a function of an emp_no and a year that tells us whether that employee had a manager position for this year
  - Hint: Look up ANY

Solution

```
CREATE FUNCTION isActive(p_emp_no INT, p_year INT)
RETURNS BOOLEAN
    READS SQL DATA
BEGIN
   DECLARE p_retVal BOOLEAN;
   SELECT
    TRUE = ANY (
    SELECT
    p_year BETWEEN YEAR(from_date) AND YEAR(to_date)
        FROM
            dept_manager
        WHERE
            emp_no = p_emp_no)
   INTO p_retVal;

RETURN p_retVal;
END
```

Solution

```
CREATE FUNCTION isActive(p_emp_no INT, p_year INT)
RETURNS BOOLEAN
    READS SQL DATA
BEGIN
   DECLARE p_retVal BO
   SELECT
     TRUE = ANY (
     SELECT
     p_year BETWEEN YEAR(from_date) AND YEAR(to_date)
         FROM
             dept_manager
         WHERE
             emp_no = p_emp_no)
INTO p_retVal;

RETURN p_retVal;
END
```

Use of ANY is tricky since it needs to be in conjunction with a comparison operation!

Solution

```
CREATE FUNCTION isActive(p_emp_no INT, p_year INT)
RETURNS BOOLEAN
    READS SQL DATA
BEGIN
   DECLARE p_retVal BO
   SELECT
     TRUE = ANY (
     SELECT
     p_year BETWEEN YEAR(from_date) AND YEAR(to_date)
         FROM
             dept_manager
         WHERE
             emp_no = p_emp_no)
   INTO p_retVal;

RETURN p_retVal;
END
```

This is the select statement at the core of the function

TASK

- With this function, find the department managers that were active in 1990

Solution

- Functions can be used in SQL statements

```
SELECT *
FROM dept_manager
WHERE isActive(emp_no, 1990);
```

TASK

- Now get statistics on gender of managers for 1990

Solution

```
SELECT gender, COUNT(employees.gender)
FROM dept_manager JOIN employees
        ON dept_manager.emp_no = employees.emp_no
WHERE isActive(dept_manager.emp_no, 1990)
GROUP BY employees.gender;
```

TASK

- Now we have a problem:
  - We want to run this query, but with a number of different years
  - SQL has a range function, but it is not implemented in MySQL
  - We can use:
    - A while loop in a stored procedure
    - Or create a table with the years

TASK

- Create a table that contains all the years in which employees where hired

Solution

```
CREATE TABLE calyear
(  SELECT YEAR(hire_date) AS calyear
   FROM employees
   GROUP BY calyear
   ORDER BY  calyear);
```

TASK

- Write a query that uses this table in order to find the gender counts of managers per year

Solution

```
SELECT
    calyear.calyear,
    gender,
    COUNT(employees.gender)
FROM dept_manager JOIN employees
      ON dept_manager.emp_no = employees.emp_no,
     calyear
WHERE isActive(dept_manager.emp_no, calyear.calyear)
GROUP BY calyear.calyear, employees.gender
ORDER BY calyear.calyear, employees.gender;
```

Further Practice

- Here are some challenges
  - Create a stored procedure that uses the WHILE loop
  - Notice that the results are not that great.
    - This is because we count both when a manager is replaced by another
    - Rewrite / alter to use July 1 of the year as the selection criteria
      - I.e.: How many male / female managers were there on July 1 of the year

Further Practice

- Find out the same gender statistics for
  - employees with a salary over 80000
  - employees with a title of 'engineer' or 'senior engineer'