CO527 Advanced Database Systems

LAB 01

R.B.Abeysinghe

E/19/004

1.

```
MariaDB [company]> SELECT 'employees' AS `Table Name`, COUNT(*) AS `Expected Records` FROM employees
    -> UNION ALL
    -> SELECT 'dept_manager' AS `Table Name`, COUNT(*) AS `Expected Records` FROM dept_manager
    -> UNION ALL
    -> SELECT 'dept_emp' AS `Table Name`, COUNT(*) AS `Expected Records` FROM dept_emp
    -> UNION ALL
    -> SELECT 'titles' AS `Table Name`, COUNT(*) AS `Expected Records` FROM titles
    -> UNION ALL
    -> SELECT 'salaries' AS `Table Name`, COUNT(*) AS `Expected Records` FROM salaries
    -> UNION ALL
    -> SELECT 'departments' AS `Table Name`, COUNT(*) AS `Expected Records` FROM departments;
+--------------+------------------+
| Table Name   | Expected Records |
+--------------+------------------+
| employees    |           300024 |
| dept_manager |               24 |
| dept_emp     |           331603 |
| titles       |           443306 |
| salaries     |          1876717 |
| departments  |                9 |
+--------------+------------------+
6 rows in set (1.453 sec)
```

2.

```
MariaDB [company]> SELECT last_name, COUNT(*) AS last_name_count
    -> FROM employees
    -> GROUP BY last_name
    -> ORDER BY last_name_count DESC
    -> LIMIT 10;
+-----------+-----------------+
| last_name | last_name_count |
+-----------+-----------------+
| Baba      |             226 |
| Gelosh    |             223 |
| Coorg     |             223 |
| Sudbeck   |             222 |
| Farris    |             222 |
| Adachi    |             221 |
| Osgood    |             220 |
| Masada    |             218 |
| Neiman    |             218 |
| Mandell   |             218 |
+-----------+-----------------+
10 rows in set (1.143 sec)
```

3.

```
MariaDB [company]> SELECT d.dept_no, d.dept_name, COUNT(*) AS engineer_count

    -> FROM departments d
    -> JOIN dept_emp de ON d.dept_no = de.dept_no
    -> JOIN titles t ON de.emp_no = t.emp_no
    -> WHERE t.title LIKE '%Engineer%'
    -> GROUP BY d.dept_no, d.dept_name
    -> ORDER BY engineer_count DESC;
+---------+--------------------+----------------+
| dept_no | dept_name          | engineer_count |
+---------+--------------------+----------------+
| d005    | Development        |         115230 |
| d004    | Production         |          98299 |
| d006    | Quality Management |          27547 |
| d008    | Research           |           5934 |
| d009    | Customer Service   |           4687 |
+---------+--------------------+----------------+
5 rows in set (4.193 sec)
```

4.

```
MariaDB [company]> SELECT e.emp_no, e.first_name, e.last_name, e.sex, d.dept
_name
    -> FROM employees e
    -> JOIN dept_manager dm ON e.emp_no = dm.emp_no
    -> JOIN titles t ON e.emp_no = t.emp_no
    -> JOIN departments d ON dm.dept_no = d.dept_no
    -> WHERE e.sex = 'F'
    -> AND dm.from_date <= CURRENT_DATE() AND (dm.to_date IS NULL OR dm.to_d
ate >= CURRENT_DATE())
    -> AND t.title = 'Senior Engineer' AND t.from_date <= CURRENT_DATE() AND
 (t.to_date IS NULL OR t.to_date >= CURRENT_DATE());
Empty set (0.053 sec)
```

5.

```
MariaDB [company]> SELECT d.dept_no, d.dept_name, t.title, COUNT(*) AS employee_count
    -> FROM departments d
    -> JOIN dept_emp de ON d.dept_no = de.dept_no
    -> JOIN employees e ON de.emp_no = e.emp_no
    -> JOIN titles t ON e.emp_no = t.emp_no
    -> JOIN salaries s ON e.emp_no = s.emp_no
    -> WHERE s.salary > 115000
    -> GROUP BY d.dept_no, d.dept_name, t.title
    -> ORDER BY d.dept_no, d.dept_name, t.title;
+---------+--------------------+--------------------+----------------+
| dept_no | dept_name          | title              | employee_count |
+---------+--------------------+--------------------+----------------+
| d001    | Marketing          | Senior Staff       |           1061 |
| d001    | Marketing          | Staff              |            855 |
| d002    | Finance            | Senior Staff       |            771 |
| d002    | Finance            | Staff              |            653 |
| d003    | Human Resources    | Senior Staff       |             42 |
| d003    | Human Resources    | Staff              |             27 |
| d004    | Production         | Assistant Engineer |             16 |
| d004    | Production         | Engineer           |            183 |
| d004    | Production         | Senior Engineer    |            207 |
| d004    | Production         | Technique Leader   |             32 |
| d005    | Development        | Assistant Engineer |             52 |
| d005    | Development        | Engineer           |            258 |
| d005    | Development        | Senior Engineer    |            277 |
| d005    | Development        | Senior Staff       |              2 |
| d005    | Development        | Technique Leader   |             21 |
| d006    | Quality Management | Assistant Engineer |              1 |
| d006    | Quality Management | Engineer           |             17 |
| d006    | Quality Management | Senior Engineer    |             17 |
| d006    | Quality Management | Technique Leader   |              6 |
| d007    | Sales              | Senior Staff       |           8638 |
| d007    | Sales              | Staff              |           7117 |
| d008    | Research           | Assistant Engineer |              4 |
| d008    | Research           | Engineer           |             12 |
| d008    | Research           | Senior Engineer    |             17 |
| d008    | Research           | Senior Staff       |             54 |
| d008    | Research           | Staff              |             51 |
| d008    | Research           | Technique Leader   |              7 |
| d009    | Customer Service   | Engineer           |             11 |
| d009    | Customer Service   | Senior Engineer    |             16 |
| d009    | Customer Service   | Senior Staff       |            447 |
| d009    | Customer Service   | Staff              |            356 |
+---------+--------------------+--------------------+----------------+
31 rows in set (16.329 sec)
```

6.

```
MariaDB [(none)]> use company;
Database changed
MariaDB [company]> SELECT first_name, last_name, TIMESTAMPDIFF(YEAR, birth_date, CURDATE())
 AS age,
    ->        TIMESTAMPDIFF(YEAR, hire_date, CURDATE()) AS years_of_service, hire_date
    -> FROM employees
    -> HAVING age > 50 AND years_of_service > 10
    -> ORDER BY hire_date;
+---------------+-----------------+------+------------------+------------+| first_name
  | last_name       | age  | years_of_service | hire_date  |
+---------------+-----------------+------+------------------+------------+
| Margareta     | Markovitch      |   67 |               39 | 1985-01-01 |
| Ebru          | Alpin           |   64 |               39 | 1985-01-01 |
| Shirish       | Ossenbruggen    |   70 |               39 | 1985-01-01 |
| Krassimir     | Wegerle         |   67 |               39 | 1985-01-01 |
| DeForest      | Hagimont        |   66 |               39 | 1985-01-01 |
| Peternela     | Onuegbe         |   63 |               39 | 1985-01-01 |
| Przemyslawa   | Kaelbling       |   62 |               39 | 1985-01-01 |
| Arie          | Staelin         |   64 |               39 | 1985-01-01 |
| Tonny         | Butterworth     |   69 |               39 | 1985-01-01 |
| Isamu         | Legleitner      |   66 |               39 | 1985-01-14 |
| Jaques        | Kalefeld        |   67 |               39 | 1985-02-01 |
| Poorav        | Gecsei          |   60 |               39 | 1985-02-01 |
| Shir          | Munck           |   63 |               39 | 1985-02-01 |
| Yongdong      | Pileggi         |   68 |               39 | 1985-02-01 |
| Kannan        | Mahnke          |   71 |               39 | 1985-02-01 |
| Arvin         | Birdsall        |   65 |               39 | 1985-02-01 |
| Mona          | Beutelspacher   |   72 |               39 | 1985-02-01 |
| Divier        | Marrakchi       |   69 |               39 | 1985-02-01 |
| Adil          | Furedi          |   63 |               39 | 1985-02-01 |
| Zhilian       | Piveteau        |   62 |               39 | 1985-02-01 |
| Taizo         | Orsini          |   71 |               39 | 1985-02-01 |
| Shounak       | Selenyi         |   64 |               39 | 1985-02-01 |
| Zdislav       | Ferriere        |   68 |               39 | 1985-02-01 |
| Jayesh        | Minakawa        |   62 |               39 | 1985-02-01 |
| Gian          | Rothe           |   63 |               39 | 1985-02-01 |
| Honglan       | Angelov         |   66 |               39 | 1985-02-02 |
| Spyrose       | Litzkow         |   69 |               39 | 1985-02-02 |
| Moriyoshi     | Kalloufi        |   64 |               39 | 1985-02-02 |
| Xinglin       | Marakhovsky     |   67 |               39 | 1985-02-02 |
| Peternela     | Cromarty        |   61 |               39 | 1985-02-02 |
| Lihong        | Denis           |   70 |               39 | 1985-02-02 |
| Bluma         | Comellas        |   64 |               39 | 1985-02-02 |
| Aris          | Coombs          |   71 |               39 | 1985-02-02 |
| Muzhong       | Schmiedel       |   69 |               39 | 1985-02-02 |
```

7.

```
MariaDB [company]> SELECT CONCAT(first_name, ' ', last_name) AS employee_name
    -> FROM employees
    -> WHERE emp_no NOT IN (
    ->     SELECT emp_no
    ->     FROM dept_emp
    ->     WHERE dept_no = (SELECT dept_no FROM departments WHERE dept_name = 'Human Resour
ces')
    -> );
+-------------------------------+
| employee_name                 |
+-------------------------------+
| Georgi Facello                |
| Bezalel Simmel                |
| Parto Bamford                 |
| Chirstian Koblick             |
| Anneke Preusig                |
| Tzvetan Zielinski             |
| Saniya Kalloufi               |
| Sumant Peac                   |
| Duangkaew Piveteau            |
| Mary Sluis                    |
| Patricio Bridgland            |
| Berni Genin                   |
| Guoxiang Nooteboom            |
| Kazuhito Cappelletti          |
| Cristinel Bouloucos           |
| Kazuhide Peha                 |
| Lillian Haddadi               |
| Mayuko Warwick                |
| Ramzi Erde                    |
| Shahaf Famili                 |
| Bojan Montemayor              |
| Suzette Pettey                |
| Prasadram Heyers              |
| Yongqiao Berztiss             |
| Divier Reistad                |
| Domenick Tempesti             |
| Otmar Herbst                  |
| Elvis Demeyer                 |
| Karsten Joslin                |
| Jeong Reistad                 |
| Arif Merlo                    |
| Bader Swan                    |
```

8.

```
WHERE s1.salary > ...' at line 2
MariaDB [company]> SELECT CONCAT(e.first_name, ' ', e. last_name) AS employee_name
    -> FROM employees e
    -> JOIN salaries s ON e.emp_no = s.emp_no
    -> WHERE s.salary > (
    -> SELECT MAX(salary)
    -> FROM salaries
    -> JOIN dept_emp de ON salaries.emp_no = de.emp_no
    -> WHERE de.dept_no = 'd002');
+-----------------------+
| employee_name         |
+-----------------------+
| Charmane Griswold     |
| Charmane Griswold     |
| Charmane Griswold     |
| Charmane Griswold     |
| Boalin Rosen          |
| Nikolaus Businaro     |
| JoAnne Matheson       |
| JoAnne Matheson       |
| Wonhee Pagter         |
| Wonhee Pagter         |
| Tadanori Sudbeck      |
| Tadanori Sudbeck      |
| Tadanori Sudbeck      |
| Weicheng Hatcliff     |
| Weicheng Hatcliff     |
| Weicheng Hatcliff     |
| Weicheng Hatcliff     |
| Chaitali Baik         |
| Chaitali Baik         |
| Mitsuyuki Stanfel     |
| Mitsuyuki Stanfel     |
| Mitsuyuki Stanfel     |
| Dines Giaccio         |
| Arnd Junot            |
| Arnd Junot            |
| Arnd Junot            |
| Heping Brender        |
| Sanjai Luders         |
| Sanjai Luders         |
| Sanjai Luders         |
| Sanjai Luders         |
| Sanjai Luders         |
| Sanjai Luders         |
| Honesty Mukaidono     |
| Honesty Mukaidono     |
| Honesty Mukaidono     |
| Honesty Mukaidono     |
```

9.

```
MariaDB [company]> SELECT CONCAT(e. first_name, ' ', e. last_name) as full_name
    -> FROM employees e
    -> JOIN salaries s1 ON e.emp_no = s1.emp_no
    -> WHERE s1. salary > (
    -> SELECT AVG(s2. salary)
    -> FROM salaries s2
    -> WHERE s2.emp_no = s1.emp_no);
+-------------------------------+
| full_name                     |
+-------------------------------+
| Guenter Hatcliff              |
| Guenter Hatcliff              |
| Krassimir Linares             |
| Krassimir Linares             |
| Krassimir Linares             |
| Krassimir Linares             |
| Krassimir Linares             |
| Luise Tchuente                |
| Luise Tchuente                |
| Luerbio Itschner              |
| Luerbio Itschner              |
| Luerbio Itschner              |
| Luerbio Itschner              |
| Luerbio Itschner              |
| Luerbio Itschner              |
| Nobuyoshi Arlazarov           |
| Nobuyoshi Arlazarov           |
| Nobuyoshi Arlazarov           |
| Nobuyoshi Arlazarov           |
| Nobuyoshi Arlazarov           |
| Nobuyoshi Arlazarov           |
| Wonhee Perl                   |
| Wonhee Perl                   |
| Wonhee Perl                   |
| Wonhee Perl                   |
| Wonhee Perl                   |
| Wonhee Perl                   |
| Wonhee Perl                   |
| Wonhee Perl                   |
| Kshitij Kropp                 |
| Kshitij Kropp                 |
| Reinhard Vitiello             |
| Reinhard Vitiello             |
| Franziska Pardalos            |
| Franziska Pardalos            |
| Toong Kaiserswerth            |
| Toong Kaiserswerth            |
```

10.

```
MariaDB [company]> SELECT
    -> (SELECT AVG(salary)
    -> FROM salaries
    -> WHERE emp_no IN (SELECT emp_no FROM titles WHERE title = 'Senior Engineer'))
    -> AS avg_senior_engineer_salary,
    -> (SELECT AVG(salary) FROM salaries) AS avg_all_employees_salary,
    -> (SELECT AVG(salary)
    -> FROM salaries
    -> WHERE emp_no IN (SELECT emp_no FROM titles WHERE title = 'Senior Engineer'))
    -> - (SELECT AVG(salary) FROM salaries) AS salary_difference;
+----------------------------+---------------------------+-------------------+
| avg_senior_engineer_salary | avg_all_employees_salary | salary_difference |
+----------------------------+---------------------------+-------------------+
|                 60538.5293 |               63836.2799 |        -3297.7505 |
+----------------------------+---------------------------+-------------------+
1 row in set (4.399 sec)
```

11.

```
MariaDB [company]> CREATE VIEW current_dept AS
    -> SELECT emp_no, dept_no, MAX(from_date) AS max_from_date
    -> FROM dept_emp
    -> GROUP BY emp_no, dept_no;
Query OK, 0 rows affected (0.012 sec)

MariaDB [company]> CREATE VIEW current_dept_emp AS
    -> SELECT c.emp_no, c.dept_no, d.dept_name AS department, c.max_from_date AS from_date,
 e.hire_date AS to_date
    -> FROM current_dept c
    -> JOIN departments d ON c.dept_no = d.dept_no
    -> JOIN employees e ON c.emp_no = e.emp_no;
Query OK, 0 rows affected (0.010 sec)
```

12

```
MariaDB [company]> SELECT * FROM current_dept_emp;
+--------+---------+--------------------+------------+------------+
| emp_no | dept_no | department         | from_date  | to_date    |
+--------+---------+--------------------+------------+------------+
|  10017 | d001    | Marketing          | 1993-08-03 | 1993-08-03 |
|  10055 | d001    | Marketing          | 1992-04-27 | 1992-04-27 |
|  10058 | d001    | Marketing          | 1988-04-25 | 1987-04-13 |
|  10108 | d001    | Marketing          | 1999-12-06 | 1986-10-02 |
|  10140 | d001    | Marketing          | 1991-03-14 | 1991-03-14 |
|  10175 | d001    | Marketing          | 1988-09-24 | 1988-01-11 |
|  10208 | d001    | Marketing          | 1995-02-05 | 1991-12-23 |
|  10228 | d001    | Marketing          | 1993-01-28 | 1991-08-26 |
|  10239 | d001    | Marketing          | 1996-05-04 | 1995-05-08 |
|  10259 | d001    | Marketing          | 1987-07-25 | 1986-06-25 |
|  10340 | d001    | Marketing          | 1988-03-30 | 1987-06-05 |
|  10353 | d001    | Marketing          | 1989-08-24 | 1989-08-24 |
|  10367 | d001    | Marketing          | 1991-06-24 | 1991-06-24 |
|  10384 | d001    | Marketing          | 1986-01-16 | 1986-01-16 |
|  10418 | d001    | Marketing          | 1996-10-04 | 1989-04-20 |
|  10449 | d001    | Marketing          | 1996-03-12 | 1987-03-28 |
|  10491 | d001    | Marketing          | 1990-01-17 | 1990-01-17 |
|  10499 | d001    | Marketing          | 1996-07-31 | 1989-11-23 |
|  10548 | d001    | Marketing          | 1991-10-04 | 1986-05-04 |
|  10567 | d001    | Marketing          | 1997-02-17 | 1992-10-18 |
|  10591 | d001    | Marketing          | 1987-06-18 | 1987-06-18 |
|  10602 | d001    | Marketing          | 1989-04-23 | 1988-03-12 |
|  10658 | d001    | Marketing          | 1994-04-29 | 1994-04-29 |
|  10661 | d001    | Marketing          | 1988-01-12 | 1988-01-12 |
|  10681 | d001    | Marketing          | 2002-01-08 | 1992-10-25 |
|  10694 | d001    | Marketing          | 1988-01-26 | 1988-01-26 |
|  10722 | d001    | Marketing          | 1989-01-17 | 1989-01-17 |
|  10741 | d001    | Marketing          | 1989-01-06 | 1989-01-06 |
|  10765 | d001    | Marketing          | 1994-05-08 | 1994-05-07 |
|  10778 | d001    | Marketing          | 1986-07-04 | 1986-07-04 |
|  10787 | d001    | Marketing          | 1991-07-19 | 1991-04-16 |
|  10820 | d001    | Marketing          | 1992-06-26 | 1986-02-23 |
|  10824 | d001    | Marketing          | 1995-08-01 | 1985-03-18 |
|  10830 | d001    | Marketing          | 1991-08-24 | 1991-08-24 |
|  10859 | d001    | Marketing          | 1996-05-21 | 1993-01-03 |
|  10877 | d001    | Marketing          | 1986-06-06 | 1986-06-06 |
|  10885 | d001    | Marketing          | 1997-09-29 | 1991-08-19 |
|  10893 | d001    | Marketing          | 1989-08-23 | 1989-08-23 |
|  10899 | d001    | Marketing          | 1990-04-05 | 1989-10-06 |
|  10919 | d001    | Marketing          | 1999-10-30 | 1987-04-19 |
|  10927 | d001    | Marketing          | 1986-09-12 | 1985-10-26 |
|  10928 | d001    | Marketing          | 1991-04-07 | 1991-04-07 |
```

13.

```
MariaDB [(none)]> use company;
Database changed
MariaDB [company]> CREATE TABLE change_log (
    -> id INT AUTO_INCREMENT PRIMARY KEY,
    -> emp_no INT,
    -> old_salary INT,
    -> new_salary INT,
    -> salary_diff INT);
Query OK, 0 rows affected (0.431 sec)
```

```
MariaDB [company]> DELIMITER //
MariaDB [company]> CREATE TRIGGER salary_change
    -> AFTER UPDATE ON salaries
    -> FOR EACH ROW
    -> BEGIN
    ->     DECLARE new_salary INT;
    ->     DECLARE old_salary INT;
    ->     DECLARE salary_diff INT;
    ->
    ->     SET new_salary = NEW.salary;
    ->     SET old_salary = OLD.salary;
    ->     SET salary_diff = new_salary - old_salary;
    ->
    ->     INSERT INTO change_log (emp_no, old_salary, new_salary, salary_diff)
    ->     VALUES (NEW.emp_no, OLD.salary, NEW.salary, salary_diff);
    -> END //
Query OK, 0 rows affected (0.139 sec)
```

14.

```
MariaDB [company]> DELIMITER //
MariaDB [company]> CREATE TRIGGER prevent_salary_increase_trigger
    -> BEFORE UPDATE ON salaries
    -> FOR EACH ROW
    -> BEGIN
    -> DECLARE current_salary DECIMAL(10,2);
    -> DECLARE new_salary DECIMAL(10,2);
    ->
    -> -- Get the current and new salary values
    -> SET current_salary = OLD.salary;
    -> SET new_salary = NEW. salary;
    ->
    -> -- Check if the new salary increase is more than 10%
    -> IF (new_salary > current_salary * 1.10) THEN
    -> SIGNAL SQLSTATE '45000'
    -> SET MESSAGE_TEXT = 'Salary increase of more than 10% is not allowed. ';
    -> END IF;
    -> END//
Query OK, 0 rows affected (0.082 sec)

MariaDB [company]>
```