Chapter 4: Set Operators

Exercise 4.1: Set Operators

Connect to the `HR` account.

1. Produce a short report showing the number of employees who earn commission and the number who do not.
   a. Your report should look like this:

```
Type                                    Count
----------------------------------- ----------
Employees who earn commission               35
Employees who do not earn commission        72
```

   b. Use a set operator to create this report.

Chapter 5: Aggregating Information

Exercise 5.1: Using the Aggregate Functions

Connect to the `SCOTT` account.

2. Write a query displaying how many rows there are in the emp table.

```
     Count
----------
        14
```

3. Write a query displaying the empno, name, salary and commission for all rows in the emp table, sequencing the list in salary (ascending) order.

```
     EMPNO ENAME              SAL       COMM
---------- ---------- ---------- ----------
      7369 SMITH             800
      7900 JAMES             950
      7876 ADAMS            1100
      7521 WARD             1250        500
      7654 MARTIN           1250       1400
      7934 MILLER           1300
      7844 TURNER           1500          0
      7499 ALLEN            1600        300
      7782 CLARK            2450
      7698 BLAKE            2850
      7566 JONES            2975
      7788 SCOTT            3000
      7902 FORD             3000
      7839 KING             5000
```

4. Write a query displaying how many non-null salary values exist and how many distinct non-null salary values exist in the emp table.

```
     Count         CDistinct
---------- -----------------
        14                12
```

5. Write a query displaying how many non-null commission values exists, the sum of the non-null commission values, the average of the non-null commission values for all rows in the emp table.

```
      Count        Sum    Average
----------- ---------- ----------
          4       2200        550
```

6. Modify the above query by adding the average of commission values, treating unknown values as zero. Round this value to three decimal places.

```
     Count        Sum    Average Average of all Records
---------- ---------- ---------- ----------------------
         4       2200        550                157.143
```

7. Write a query displaying the largest and smallest salaries in the emp table.

```
Maximum Salary Minimum Salary
-------------- --------------
          5000            800
```

8. Write a query displaying the latest and the earliest hire dates in the emp table.

```
Maximum Hire Date Minimum Hire Date
----------------- -----------------
12-JAN-1983       17-DEC-1980
```

Congratulations!
You have finished
this lab exercise!

Exercise 5.2: `GROUP BY` and `HAVING`

Connect to the `HR` account.

9. For each department in the employees table, show the total count of employees, the highest salary, the smallest salary, the sum of the salaries, and the average of salaries (round to the nearest whole currency unit).

DEPARTMENT_ID	COUNT(*)	MIN(SALARY)	MAX(SALARY)	Total Salary	Avg Salary
10	1	4400	4400	4400	4400
20	2	6000	13000	19000	9500
30	6	2500	11000	24900	4150
40	1	6500	6500	6500	6500
50	45	2100	8200	156400	3476
60	5	4200	9000	28800	5760
70	1	10000	10000	10000	10000
80	34	6100	14000	304500	8956
90	3	17000	24000	58000	19333
100	6	6900	12008	51608	8601
110	2	8300	12008	20308	10154
	1	7000	7000	7000	7000

Note: Your output may not be in the same sequence.

10. Modify the presentation sequence of the above query: the departments should be in ascending average salary order.

DEPARTMENT_ID	COUNT(*)	MIN(SALARY)	MAX(SALARY)	Total Salary	Avg Salary
50	45	2100	8200	156400	3476
30	6	2500	11000	24900	4150
10	1	4400	4400	4400	4400
60	5	4200	9000	28800	5760
40	1	6500	6500	6500	6500
	1	7000	7000	7000	7000
100	6	6900	12008	51608	8601
80	34	6100	14000	304500	8956
20	2	6000	13000	19000	9500
70	1	10000	10000	10000	10000
110	2	8300	12008	20308	10154
90	3	17000	24000	58000	19333

11. Modify the previous query by adding a new column: calculate how much each department's smallest salary is below the average salary. Sequence the list by this expression.

DEPARTMENT_ID	COUNT(*)	MIN(SALARY)	MAX(SALARY)	Total Salary	Avg Salary	Below Avg
20	2	6000	13000	19000	9500	3500
80	34	6100	14000	304500	8956	2856
90	3	17000	24000	58000	19333	2333
110	2	8300	12008	20308	10154	1854
100	6	6900	12008	51608	8601	1701
30	6	2500	11000	24900	4150	1650
60	5	4200	9000	28800	5760	1560
50	45	2100	8200	156400	3476	1376
40	1	6500	6500	6500	6500	0
70	1	10000	10000	10000	10000	0
10	1	4400	4400	4400	4400	0
	1	7000	7000	7000	7000	0

12. Modify the above query by changing the analysis: we now want to know all the above information by the manager each employee works for.

MANAGER_ID	COUNT(*)	MIN(SALARY)	MAX(SALARY)	Total Salary	Avg Salary	Below Avg
100	14	5800	17000	155400	11100	5300

101	5	4400	12008	44916	8983	4583
148	6	6100	11500	51900	8650	2550
149	6	6200	11000	50000	8333	2133
147	6	6200	10500	46600	7767	1567
146	6	7000	10000	51000	8500	1500
145	6	7000	10000	51000	8500	1500
121	8	2100	4200	25400	3175	1075
108	5	6900	9000	39600	7920	1020
103	4	4200	6000	19800	4950	750
122	8	2200	3800	23600	2950	750
123	8	2500	4000	25900	3238	738
120	8	2200	3200	22100	2763	563
124	8	2500	3500	23000	2875	375
114	5	2500	3100	13900	2780	280
102	1	9000	9000	9000	9000	0
	1	24000	24000	24000	24000	0
201	1	6000	6000	6000	6000	0
205	1	8300	8300	8300	8300	0

13. Another analysis request has been made: modify the previous query to “rate” managers within each department by how far their lowest employee salary is below average.

DEPTID	MGRID	COUNT(*)	MIN(SALARY)	MAX(SALARY)	Total Salary	Avg Salary	Below Avg
80	148	6	6100	11500	51900	8650	2550
80	149	5	6200	11000	43000	8600	2400
80	100	5	10500	14000	61000	12200	1700
80	147	6	6200	10500	46600	7767	1567
80	146	6	7000	10000	51000	8500	1500
80	145	6	7000	10000	51000	8500	1500
50	100	5	5800	8200	36400	7280	1480
50	121	8	2100	4200	25400	3175	1075
100	108	5	6900	9000	39600	7920	1020
60	103	4	4200	6000	19800	4950	750
50	122	8	2200	3800	23600	2950	750
50	123	8	2500	4000	25900	3238	738
50	120	8	2200	3200	22100	2763	563
50	124	8	2500	3500	23000	2875	375
30	114	5	2500	3100	13900	2780	280
10	101	1	4400	4400	4400	4400	0
90		1	24000	24000	24000	24000	0
30	100	1	11000	11000	11000	11000	0
110	205	1	8300	8300	8300	8300	0
60	102	1	9000	9000	9000	9000	0
100	101	1	12008	12008	12008	12008	0
90	100	2	17000	17000	34000	17000	0
20	100	1	13000	13000	13000	13000	0
20	201	1	6000	6000	6000	6000	0
110	101	1	12008	12008	12008	12008	0
70	101	1	10000	10000	10000	10000	0
40	101	1	6500	6500	6500	6500	0
	149	1	7000	7000	7000	7000	0

14. Modify the above query to show only those managers within a department that have more than 5 employees reporting to them.

DEPTID	MGRID	COUNT(*)	MIN(SALARY)	MAX(SALARY)	Total Salary	Avg Salary	Below Avg
80	148	6	6100	11500	51900	8650	2550
80	147	6	6200	10500	46600	7767	1567
80	146	6	7000	10000	51000	8500	1500
80	145	6	7000	10000	51000	8500	1500
50	121	8	2100	4200	25400	3175	1075
50	122	8	2200	3800	23600	2950	750
50	123	8	2500	4000	25900	3238	738
50	120	8	2200	3200	22100	2763	563
50	124	8	2500	3500	23000	2875	375

15. Display the sum of salary, the average of salary, and the number of employees in departments, consolidating departments 0-99 together, 100-199 together, etc.

Depts by 100s	SUM(SALARY)	AVG(SALARY)	COUNT(*)
0	612500	6250	98
100	71916	8989.5	8
	7000	7000	1

16. Display the average of all departments' average salaries. Round the result to whole currency units.

Avg of Dept Avgs
8153

17. Compare the result from the step above to the average of employee salaries. Is it the same? Why or why not?

Exercise 5.3: Using Subqueries

Connect to the `HR` account.

Using subqueries, write queries to display the following information:

18. Display the department id and department name for all departments that have one or more employees. Order the result by `department_id`.

```
DEPARTMENT_ID DEPARTMENT_NAME
------------- ------------------------------
           10 Administration
           20 Marketing
           30 Purchasing
           40 Human Resources
           50 Shipping
           60 IT
           70 Public Relations
           80 Sales
           90 Executive
          100 Finance
          110 Accounting
```

19. Display the employee id, first name, last name, and salary for all employees that have a salary greater than the average salary for all employees. Order the result by salary in descending sequence.

```
EMPLOYEE_ID FIRST_NAME      LAST_NAME            SALARY
----------- --------------- --------------- ----------
        100 Steven          King                 24000
        101 Neena           Kochhar              17000
        102 Lex             De Haan              17000
        145 John            Russell              14000
        146 Karen           Partners             13500
        201 Michael         Hartstein            13000
        205 Shelley         Higgins              12008
        108 Nancy           Greenberg            12008
        147 Alberto         Errazuriz            12000
        168 Lisa            Ozer                 11500
        148 Gerald          Cambrault            11000
        174 Ellen           Abel                 11000
        114 Den             Raphaely             11000
        162 Clara           Vishney              10500
        149 Eleni           Zlotkey              10500
        150 Peter           Tucker               10000
        156 Janette         King                 10000
        204 Hermann         Baer                 10000
        169 Harrison        Bloom                10000
        170 Tayler          Fox                   9600
        163 Danielle        Greene                9500
        157 Patrick         Sully                 9500
        151 David           Bernstein             9500
```

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```
       158 Allan           McEwen                9000
       109 Daniel          Faviet                9000
       103 Alexander       Hunold                9000
       152 Peter           Hall                  9000
       175 Alyssa          Hutton                8800
       176 Jonathon        Taylor                8600
       177 Jack            Livingston            8400
       206 William         Gietz                 8300
       110 John            Chen                  8200
       121 Adam            Fripp                 8200
       153 Christopher     Olsen                 8000
       120 Matthew         Weiss                 8000
       159 Lindsey         Smith                 8000
       122 Payam           Kaufling              7900
       112 Jose Manuel     Urman                 7800
       111 Ismael          Sciarra               7700
       154 Nanette         Cambrault             7500
       160 Louise          Doran                 7500
       171 William         Smith                 7400
       172 Elizabeth       Bates                 7300
       164 Mattea          Marvins               7200
       161 Sarath          Sewall                7000
       155 Oliver          Tuvault               7000
       178 Kimberely       Grant                 7000
       113 Luis            Popp                  6900
       165 David           Lee                   6800
       203 Susan           Mavris                6500
       123 Shanta          Vollman               6500

51 rows selected.
```

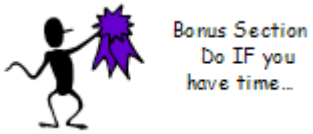
20. Display the employee id, first name, last name, and salary for the employee that has the highest salary.

```
EMPLOYEE_ID FIRST_NAME      LAST_NAME            SALARY
----------- --------------- ---------------- ----------
        100 Steven          King                  24000
```

21. Display the employee id, first name, last name, salary, and commission_pct for all employees that have a salary greater than the average salary for all employees and a commission_pct greater than the average commission_pct for all employees. Order the result by last_name.

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	SALARY	COMMISSION_PCT
174	Ellen	Abel	11000	.3
151	David	Bernstein	9500	.25
148	Gerald	Cambrault	11000	.3
160	Louise	Doran	7500	.3
147	Alberto	Errazuriz	12000	.3
152	Peter	Hall	9000	.25
175	Alyssa	Hutton	8800	.25
156	Janette	King	10000	.35
158	Allan	McEwen	9000	.35
168	Lisa	Ozer	11500	.25
146	Karen	Partners	13500	.3
145	John	Russell	14000	.4
161	Sarath	Sewall	7000	.25
159	Lindsey	Smith	8000	.3
157	Patrick	Sully	9500	.35
150	Peter	Tucker	10000	.3
162	Clara	Vishney	10500	.25

17 rows selected.



22. Display the employee id, first name, and last name for the employee(s) that work in London. You will need to use two levels of subquery.

EMPLOYEE_ID	FIRST_NAME	LAST_NAME
203	Susan	Mavris