

OPIM 5272 — Business Process Modeling and Data Management

Fall 2019, University of Connecticut

Homework 1

Each problem requires you to compose a query which will produce a given output. The queries that you design should not work only for the data that exists in the table—the design of the query should be independent of the data that is in the table, but work according to how the database is set up. As an example, suppose I ask you to write a query that displays the first name of every employee in the Oracle HR Schema whose manager is not specified in the database. A example of a correct answer would be:

```
SELECT first_name
FROM employees
WHERE manager_id IS NULL;
```

An example of a query that would receive no credit is:

```
SELECT first_name
FROM employees
WHERE first_name = 'Steven';
```

Although the output is correct, it depends on the data in the table, and would not work if a different employee was added who also had a NULL `manager_id`. This should also work if any of the data in the tables is ever changed. If you have any questions regarding this please let me know, but it should be clear that a query can be unacceptable, even if the output that that calculates is correct.

There are 20 problems in the homework, and each is worth five points. Unless otherwise noted, you should assume that the queries are based off of the Oracle HR Schema.

Problem 1

Write a query to display the last name, job ID and hire date of all employees who were hired on the first Monday of the month they were hired in.

Problem 2

Write a query to extract last name, hire date and job ID of all employees who were hired on 1st month of a quarter of a year.

Example: An employee with the hire date of Jan 15th 2005 should be present in the query results and an employee with a hire date of Feb 10th 2005 should not be present.

Problem 3

Create a query that reports the average of the maximum salary of all employees in each department.

Problem 4

Create a query that displays three columns from the employees table. The first column should be the full name of the employee (first and last name concatenated together with a space in between). The second column should be the employees email ID with @GMAIL.COM appended to it. The third column should be the employees phone number displayed in the format +<countryCode> (<areaCode>) <exchange>-<number> Apply the query only for domestic phone numbers (10 digits). Label the three columns as Full Name, Email ID, and Phone Number.

Example: 123.456.7890 needs to be displayed as +1(123)456-7890

Problem 5

Generate a list of experienced employees in the company with last name and hire date, defined as those employees who have worked for more than 10 years in the organization as of 01-Jan-2001. Label the columns as **Experienced Employee** and **Hire Date**.

Problem 6

Display the first name of those employees who have manager ID 100 and do not have two consecutive vowels in their last names. Order the results in ascending order of last name.

Problem 7

Create a query that displays the last name, commission percentage and new commission percentage columns for each of the employee in the employees table. To calculate the new commission percentage column with alias `new_commission_pct` perform the following: For those employees with null commission pct, calculate commission pct as 1.5% of the monthly salary of employee. For those employees who have non-null values for commission pct, use the existing value.

Problem 8

Create a query that displays 5 columns from the JOB HISTORY table. The first two columns should be the employees start and end date in the role listed. For the next three columns, the query should calculate the number of years, months and days between the start and end dates and display them in three different columns using a single SELECT statement for each row. The query should work for all the months irrespective of whether it has 30 days or 31 days and the resulting columns with years, months and days should be in whole numbers. In the resulting columns, the number of months should not exceed 12 and number of days does should not exceed the number of days in the months it corresponds to, so that the results are displayed in highest time units possible.

Example: The query should return 11 years and 1 month instead of 10 years and 13 months or 10 years and 396 days.

Problem 9

Create a query that displays the total number of employees who has a anywhere in their first name irrespective of upper or lower case.

Problem 10

Create a query that displays the last name of the employees and their respective phone numbers if their phone number starts with a 1 and contains a 5 or 6 anywhere in anywhere in the phone number.

Problem 11

For each employee, display the last name (with the first letter uppercase and all other letters lowercase), and calculate the number of months between today and the date on which the employee was hired. Label the columns appropriately. Display the result for only those employees whose last name start with letters B, K or M. Order the results by the number of months employed. Round the number of months up to the closest whole number.

Problem 12

Write a query to retrieve the last word of the street address for each location.

Problem 13

Create a query that displays the first and last name of the employees in the employees table for which the employee's last name does not contain the letter that a user enters using a substitution variable, and for which that same letter exists somewhere in the first name at least twice at any position in either upper or lower case.

Problem 14

The HR department wants to calculate the size of the bonus that will be offered to each employee. The bonus is calculated as follows. Take the number of months the employee has worked and round it to the nearest whole number. Multiply that number by 100, and then add 10% of the employee salary. The bonus should calculate to 0 for any employee whose manager ID is NULL. For each employee, display their last name and the calculated bonus. Add appropriate column aliases. Order your results by the bonus.

Problem 15

Write a query to display the employees with their first name, last name and hire date who were hired either on seventh day of any month or seventh month in any year.

Problem 16

The probation period for all employees with a salary less than 8000 is 9 months from their hire date. Write a query to display the last name of all such employees and the end date of their probation period.

Problem 17

Suppose that you are a salesperson at a cash register, and you have one purchase to serve before you close. A buyer has to pay X dollars and N cents with bills only (no coins). You have lots of bills of various nomination and a limited number of coins: 3 quarters, 9 dimes, 19 nickels, and 4 pennies left in the register. You are required to give exact change (between 1 and 99 cents) using the smallest number of (available) coins. You must use a single SELECT statement, and

the result should return 1 row and 4 columns indicating how many coins of each type to use. The value should be specified by a substitution variable. For example, suppose change due is \$3.67. The result should be 2 quarters, 1 dime, 1 nickel, and pennies. The column headings should be Quarters, Dimes, Nickels, and Pennies.

Problem 18

Display all the last names of the employees whose email has the letter **n** in the fourth position and order the results by the second letter in the employee's email.

Problem 19

Write a query to display the first word from those job titles which contain more than one word.

Problem 20

Create a query to replace **S** or **s** to **K**, **K** or **k** to **A**, **A** or **a** to **E**, and **E** or **e** to **S** for each last name in the employees table. Display the last name and the new last name, sorted by new last name in descending order. As an example, if **SKQAE** is the last name, the new last name should be **KAQES**.