OPIM 5272 — Business Process Modeling and Data Management

Fall 2018, University of Connecticut

Homework 2 - v1

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 two columns: 1) the total number of employees hired in the 1980s (a date with year from 1980 to 1989) with column heading as '80s' 2) the total number of employees hired in 1990s (a date with year from 1990 to 1999) with column heading as '90s'.

Problem 2

Write a query that calculates the maximum and minimum salary of all employees with a `job_id` that has `AD` in it.

Problem 3

Write a query to calculate the number of full years an employee has served in the organization in the position that is listed in `job_history` table. For every unique "number of years in the organization", display the total number of employees who stayed for the same period in the organization. For any employee who has stayed for less than a year, the "number of years in the organization" should be 0. Order the results in ascending order of "Number of years in the organization" and use appropriate column headings.

Problem 4

Write a query to display 4 columns: Department ID, count of managers (with unique managerID), average salary and median salary of all employees in each department. Exclude rows with department ID or manager ID with NULL values. The output should include only those departments for which the average salary is equal to the median salary and has at least 2 unique manager IDs associated to it. Use appropriate column headings.

Problem 5

Create a query that categorized employees into two groups—EVEN and ODD, based on the employee id being even or odd. The output should contain two columns. The first is the employees last name, and the second is an indicator of whether or not the employees ID is even or odd.

Problem 6

Write a query to display the total number of employees with an `IT` in their job IDs. Also display four columns that display the number of "IT" employees hired in Q1, Q2, Q3 and Q4.

Problem 7

Write a query that calculates the end date of the probation period for each employee based on their `job_ids`:

- For employees with a job ID containing `IT`, the probation term is 9 month.
- For sales and marketing employees, the probation is 12 months.
- For other employees, the probation is 6 months.

Problem 8

Create a query that displays a column with distinct trailing characters after the _ in the job id of those employees in the employees table. The second column should display the number of employees with corresponding trailing characters in their job name. The output should return only those job IDs for which the minimum salary of all employees with that job ID is greater than 5000.

Problem 9

The company wants to create an organization hierarchy based on the employee's salaries. Employees with salary less than 5000 will be 'TIER 3', employees with salary between 5000 and 10000 (inclusive) will be 'TIER 2' and employees with salary greater than 10000 will be 'TIER 1'. Write a query that displays the organization hierarchy and the total number of employees working in each tier. Display the output in ascending order of organization hierarchy.

Problem 10

Create a query to calculate the total number of days that each manager (specified by a manager id) has managed his employees until the current date. Order the results by the number of days in descending order. Assume that every employee has been hired by their current manager and report total full days.

Problem 11

Create a query to display, for each employee, the first non-null value among commission pct, manager id, department id, in that order. If all values are NULL, report "All Null values."

Problem 12

12. HR wants to make querying the data from their database easier to use instead of writing SQL queries. They seek a single query that allows users to enter values for most fields. The query should display, for each department, the number of employees in that department, the number of employees in the department who have a salary greater than or equal to a value specified by the user, and the average salary in that department. Additionally, they want to add an exclusion criterion for filtering instances. Namely, the user should be prompted to enter a string and an employee with that corresponding job id should be filtered before any calculations. Please create this query.

Problem 13

Create a query that will display the total number of employees and, of that total, the number of employees hired in 1991, 1993, 1995, and 1997, each reported in a separate column. Create appropriate column headings.

Problem 14

Write a query, based on the data in the employees table, that reports the minimum hire date and number of employees for all job id's where the median salary with that job id has a salary greater than 6000.

Problem 15

Create a query to display the average salary for each job id for which the median salary is greater than the average salary of the employees with that respective job id.

Problem 16

A company wants to track the remuneration pattern across years for its departments. Write a query to display for each department the years in which hires were made and the corresponding minimum, maximum, average and median salaries in those years of the employees in that department. Order the output first by descending order of department id and then by year.

Problem 17

Create a query that reports the number of employees that were hired in each month, irrespective of year of hire. Display the months in `MON` format and order the results by month in numeric format. Only include an output row if there is at least one employee hired in that month.

Problem 18

Write a query that displays, for each year of hiring, the number of distinct dates for which an employee was hired, together with the average salary offered in that year, only for those years in which the average salary is strictly less than 13,000. Consider only instances with salary greater than or equal to 5,000 in the calculation of the average, and order the output in chronological order of years.

Problem 19

Create a query to display each manager id appearing in the employees table, the number of employees with that manager id, the sum of all salaries of those employees, and the sum of new salaries, calculated as follows. If the `commission_pct` is NULL, increase the salary by 20% and otherwise increase the salary by the associated commission percentage times 100,000. Include in the calculation only those employees with salary less than 11,000, and provide an output only for those cases where the sum of the new salaries is less than 9000. Exclude employees who don't have a manager id listed.

Problem 20

Create a query to display the average and variance of the maximum salaries in each department, excluding those employees with a null department ID from the calculation.