Hand on SQL – Classic Model database

Task 1

1. Name two aspects in which T-SQL deviates from the relational model?
2. Which of the following correctly represents the logical query processing order of the various query clauses?
    a. SELECT > FROM > WHERE > GROUP BY > HAVING > ORDER BY
    b. FROM > WHERE > GROUP BY > HAVING > SELECT > ORDER BY
    c. FROM > WHERE > GROUP BY > HAVING > ORDER BY > SELECT
    d. SELECT > ORDER BY > FROM > WHERE > GROUP BY > HAVING

Each phase operates on one or more tables as inputs and returns a virtual table as output. The output table of one phase is considered the input to the next phase.

Let's try a dry run

```
SELECT country, YEAR(hiredate) AS yearhired, COUNT(*) AS numemployees
FROM HR.Employees
WHERE hiredate >= '20030101'
GROUP BY country, YEAR(hiredate)
HAVING COUNT(*) > 1
ORDER BY country , yearhired DESC;
```

What is this query going to do?

- FROM - issued against the HR.Employees table.
- WHERE - It filters only employees that were hired in or after the year 2003.
- GROUP BY - It groups the remaining employees by country and the hire year.
- HAVING - It keeps only groups with more than one employee.
- ORDER BY - For each qualifying group, the query returns the hire year and count of employees, sorted by country and hire year, in descending order.

Important point: A typical mistake made is an attempting to refer in the WHERE clause to a column alias defined in the SELECT clause. This will give you an error – Remember the logical flow of the query – FROM is evaluated first.

```
SELECT country, YEAR(hiredate) AS yearhired
FROM HR.Employees WHERE yearhired >= 2003;
```

This will give an Error.

HAVING vs WHERE

Always remember WHERE clause is to filter at the tuple/row level whereas HAVING is evaluated after the data has been grouped. Hence, it is evaluated per group and filters groups as a whole

Task 1: Single entity

1. Prepare a list of offices sorted by country, state, city.

   Query Processing

   FROM – offices
   WHERE – NULL
   SELECT – *
   ORDER BY – country, state and City

   SELECT * FROM offices ORDER BY country, state, city;

2. How many employees are there in the company?

   FROM – employees
   WHERE – NULL
   SELECT – count(distinct employeeNumber)

   SELECT count(distinct employeeNumber) FROM employees;

3. Report total payments for October 28, 2004.
4. Report total payments for July 21, 2003.

   SELECT paymentDate, sum(amount) as total_payment FROM payments GROUP BY paymentDate having paymentDate = '2003-07-21';

5. List the products in each product line.
6. List all payments not greater than thrice the average payment.
   SELECT amount, checkNumber FROM Payments WHERE amount <= 3*(SELECT AVG(amount) FROM Payments); Let do the dry run
   a. FROM – Payments
   b. Where – we choose the filter criteria i.e, three times the average
      i. From Payment
      ii. Select 3 * AVG(amount)
   c. Select – amount, check number
7. Which orders have a value greater than $5,000?

Task 2

1. Report the account representative for each customer.
2. Report the total payments by date
3. How many orders have been placed by Herkku Gifts?
4. List the amount paid by each customer?
    1. Give the top 10 customers?
    2. Customer from row 11 to 20?
5. List names of products sold by order date?
    1. Can you give me the number of order by order date?
6. List the products ordered on a Monday.
7. List all the order dates in descending order for orders for the 1940 Ford Pickup Truck.
8. List those names of products sold at less than 80% of the MSRP

Task 3: Correlated subqueries

1. List products that appear on all orders. (Hint: use where Not Exits)
2. Who reports to Mary Patterson?
    1. Who reports to who?
3. Which payments in any month and year are more than twice the average for that month and year (ie compare all payments in Oct 2004 with the average payment for Oct 2004)? Order the results by the date of the payment. You will need to use the date functions.
4. Report for each product, the percentage value of its stock on hand as a percentage of the stock on hand for product line to which it belongs. Order the report by product line and percentage value within product line descending. Show percentages with two decimal places.
5. For orders containing more than two products, report those products that constitute more than 50% of the value of the order.
6. Compute the profit generated by each product line, sorted by profit descending
    1. Can you give me percentage contribution for each product line?
7. Compute the profit generated by each sales representative based on the orders from the customers they serve. Sort by profit generated descending.