Describe conceptually how a SQL retrieval query will be executed by specifying the conceptual order of executing each of the six clauses.

SELECT, FROM, WHERE, GROUP BY, HAVING, ORDER BY

The six clauses of a SQL retrieval query are SELECT, FROM, WHERE, GROUP BY, HAVING, and ORDER BY. A SQL retrieval query conceptually begins with the FROM clause. The FROM clause identifies all tables used in the query or it materializes the final table to be used after one or more joins. Next, the query will execute the WHERE clause to select and join the tuples that match the conditions listed in the WHERE clause. The GROUP BY clause then groups tuples by unique values for one or more attributes. A AHVING clause specifies conditions by which to filter the groups specified in the GROUP BY. Once this is completed, we return to the beginning of the query with the SELECT clause. At this time, only the attributes specified in the SELECT clause are returned in the query result. Finally, the tuples in the query result are ordered, ascending or descending, by the values of the attributes specified in the ORDER BY clause.

See the example query below, which finds all department names that have more than two employees who make more than $25,000:

SELECT Dname, COUNT(\*)

FROM company.employee

JOIN company.department ON employee.Dno=department.Dnumber

WHERE employee.Salary>25000

GROUP BY department.Dname

HAVING COUNT(\*)>2,

ORDER BY Dname;

We can think about the conceptual order by starting with the FROM clause. In the FROM clause, the EMPLOYEE table is joined with the DEPARTMENT table on the columns that store department number values. The rest of the query operates on this joined table. Next, the WHERE filters out employees across all departments who make less $25,000. The GROUP BY clause then groups all employee records by department name. The HAVING clause filters to include only the groups that have more than two employee records. The ORDER BY clause orders the groups by department name. Finally, we return to the SELECT clause, where only the department name and the number of records for each group is returned.