Query Optimization illustration

List the last name of employees who work for 'AQUARIUS' project and born after '1982-12-31'.

```
SELECT Lname
FROM Employee, works_on Project
WHERE Pname = 'AQUARIUS'
    AND Pnumber = Pno
    AND ESSN = SSN
    AND Bdate > '1982-12-31'
```
Step 2: Swap the most restrictive selection & its associated join so that this join will be performed earlier than other joins.

Step 3: Replace cross product & selection pair with sort-merge join operation

Step 4: Apply projection on each incoming branch of join operation.
SELECT Lname
FROM (SELECT ESSN
      FROM (LL
            JOIN (LR
                  ON c2) as L
            JOIN (R)
            ON c3)
      FROM Employee
      WHERE Bdate > '1982-12-31') as R
      ON L.ESSN = R.SSN;

Complete SQL Query for the optimized tree:
Tuning Queries

- Partitioning a table and store them on multiple physical disks to exploit concurrent disk I/O operation.

- Creating relevant indexes for retrieval queries.

- Apply de-normalization and store derived results to speed up future queries on the same set of tables.