

COMP207
Database
Development
Tutorial 6 (Week 8)
Relational Algebra-3

Query Transformation

- EMPLOYEE (Ssn,Fname,Lname,_Bdate,Salary,Dno)
- PROJECT (Pnumber,Pname,_Plocation,Dnum)
- WORKS-ON (Essn,Pno,Hours)
- “Find the last names of employees born after 1957 who work on the project called ‘Aquarius’”
- Need one record from the PROJECT relation for the ‘Aquarius’ project and only those records from the EMPLOYEE relation who have a birth date after 31/12/1957

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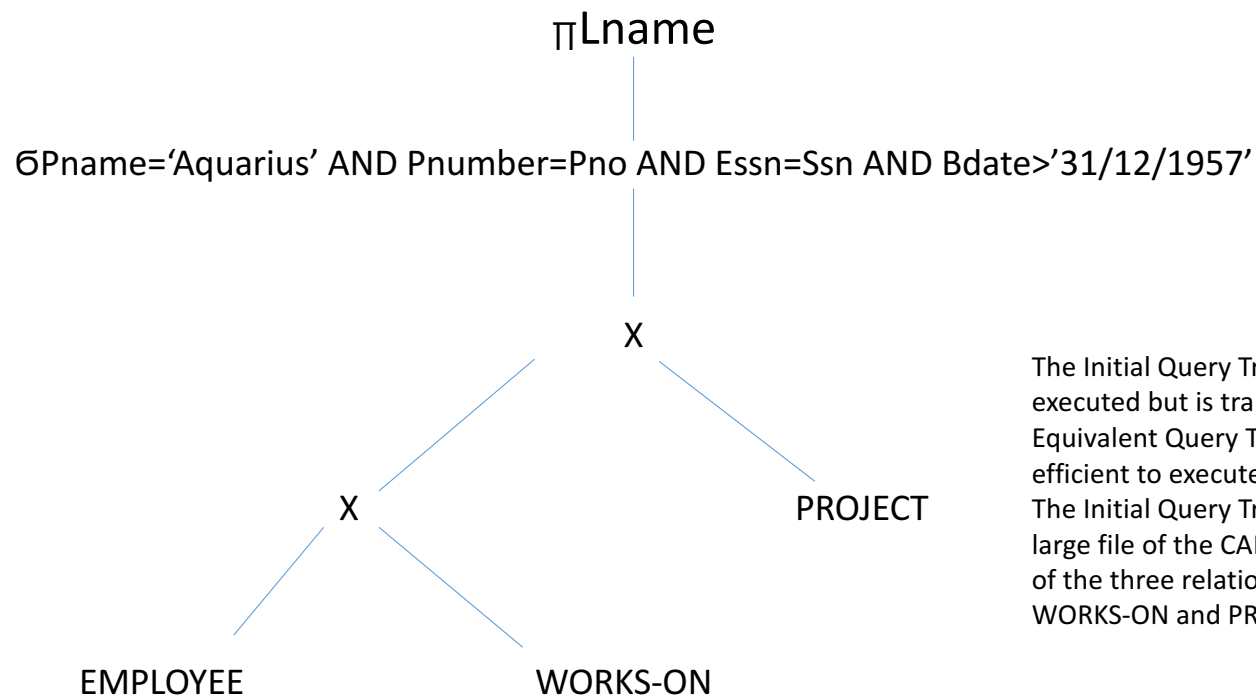
SELECT Lname

FROM EMPLOYEE, WORKS-ON, PROJECT

WHERE Pname = ‘Aquarius’ AND Pnumber = Pno AND Essn = ssn AND
Bdate > ‘31/12/1957’

Initial ('Canonical' Query Tree)

"Find the last names of employees born after 1957 who work on the project called 'Aquarius'"

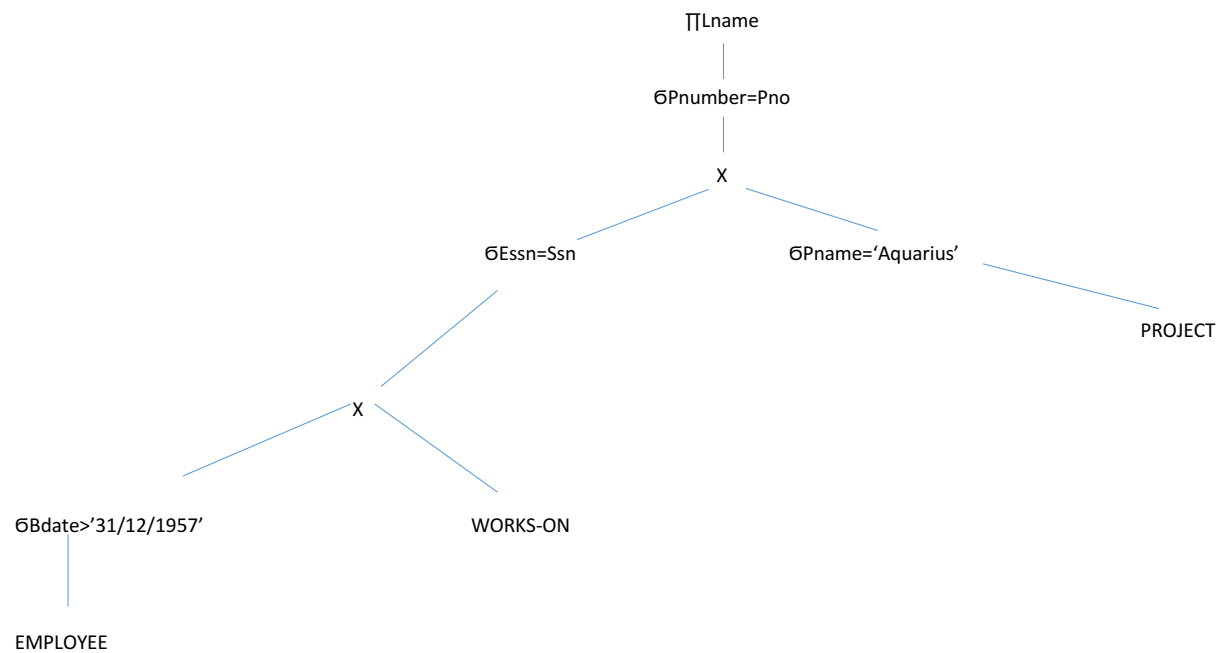


The Initial Query Tree is never executed but is transformed into an Equivalent Query Tree that is more efficient to execute
The Initial Query Tree creates a very large file of the CARTESIAN PRODUCT of the three relations EMPLOYEE, WORKS-ON and PROJECT

Improved Query Tree

“Find the last names of employees born after 1957 who work on the project called ‘Aquarius’”

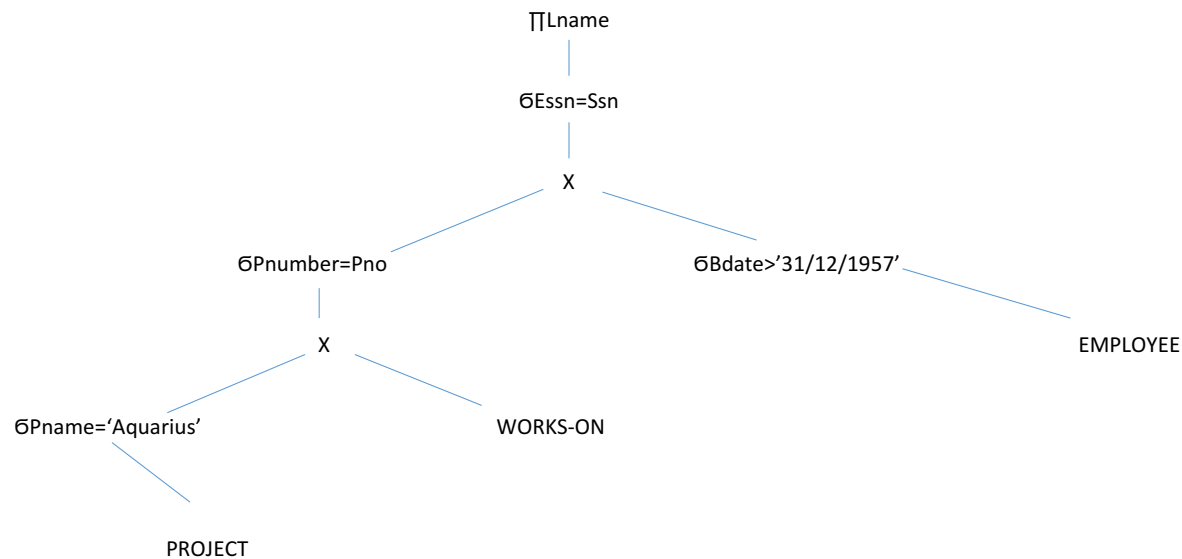
- Apply SELECT operations to reduce the number of tuples that occur in the CARTESIAN PRODUCT



Further Improvement

“Find the last names of employees born after 1957 who work on the project called ‘Aquarius’”

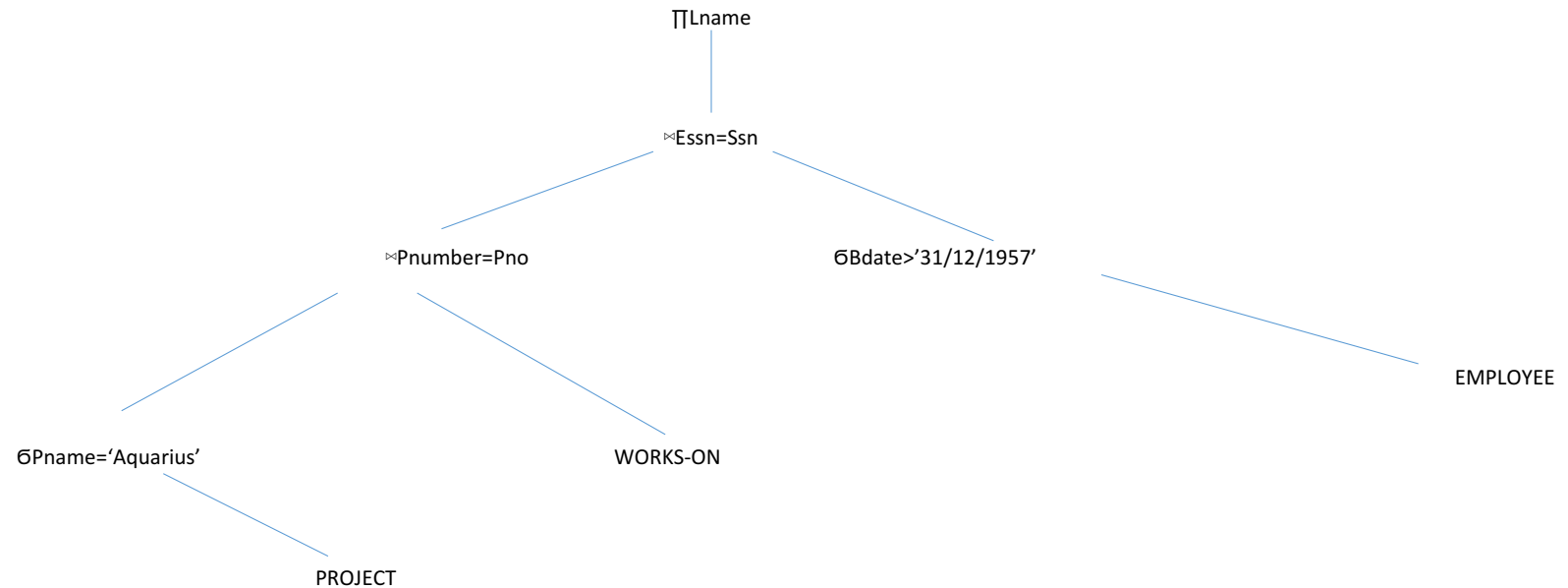
- Switch position of EMPLOYEE with PROJECT relation
- Because Pnumber is the key attribute in PROJECT so any SELECT operation on PROJECT relation will retrieve a single record only



Further Improvement Again

“Find the last names of employees born after 1957 who work on the project called ‘Aquarius’”

- Replace the CARTESIAN PRODUCT operation with a JOIN operation



Optimised (Final) Query Tree

“Find the last names of employees born after 1957 who work on the project called ‘Aquarius’”

Put PROJECT (Π) operations into the intermediate relations as early as possible in the tree, i.e. only keep those attributes that are needed by the operations in the parent node. Reduces the number of attributes (columns) in the intermediate operations

