WEEK 9

QUERY OPTIMIZATIONS – BUILDING A QUERY OPTIMIZATION TREE

STUDENT OBJECTIVES

- Upon completion of this video, you should be able to:
  - Use the 5 rules to take a query that is NOT optimized and put it into a query tree to optimize it

QUERY TREE

- The General Rules for building your query tree are:
  - Do SELECTION and PROJECTIONS as early as possible as they will NEVER increase the number of tuples or bytes and if anything, usually decrease the number of tuples or bytes
  - Do SELECTIONS and JOINS that are the MOST restrictive first (the ones that result in the fewest tuples)

EXAMPLE:

- Consider the following query:

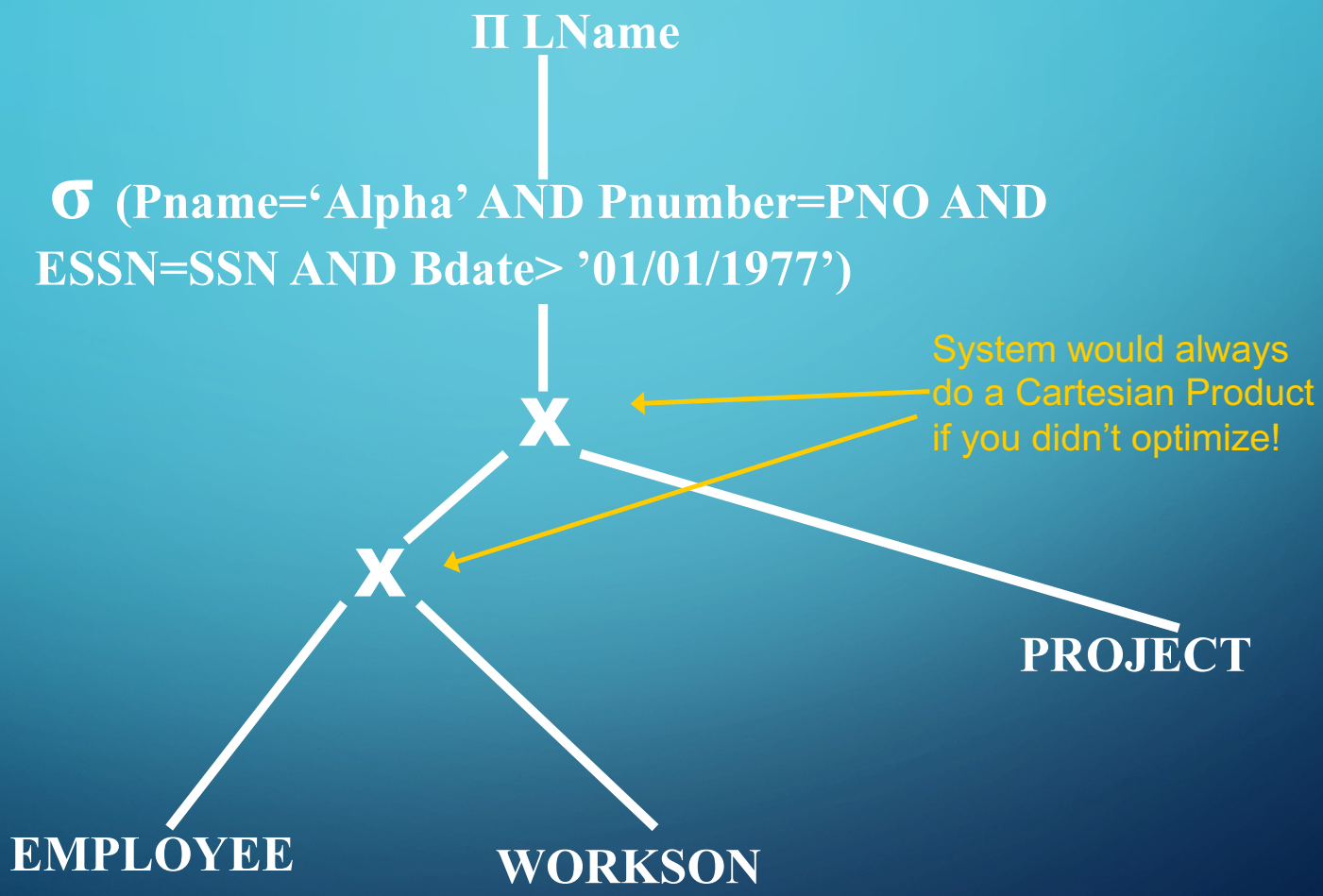
  Find the last name of employees born after 1976 who work on the 'Alpha' Project

  In SQL:

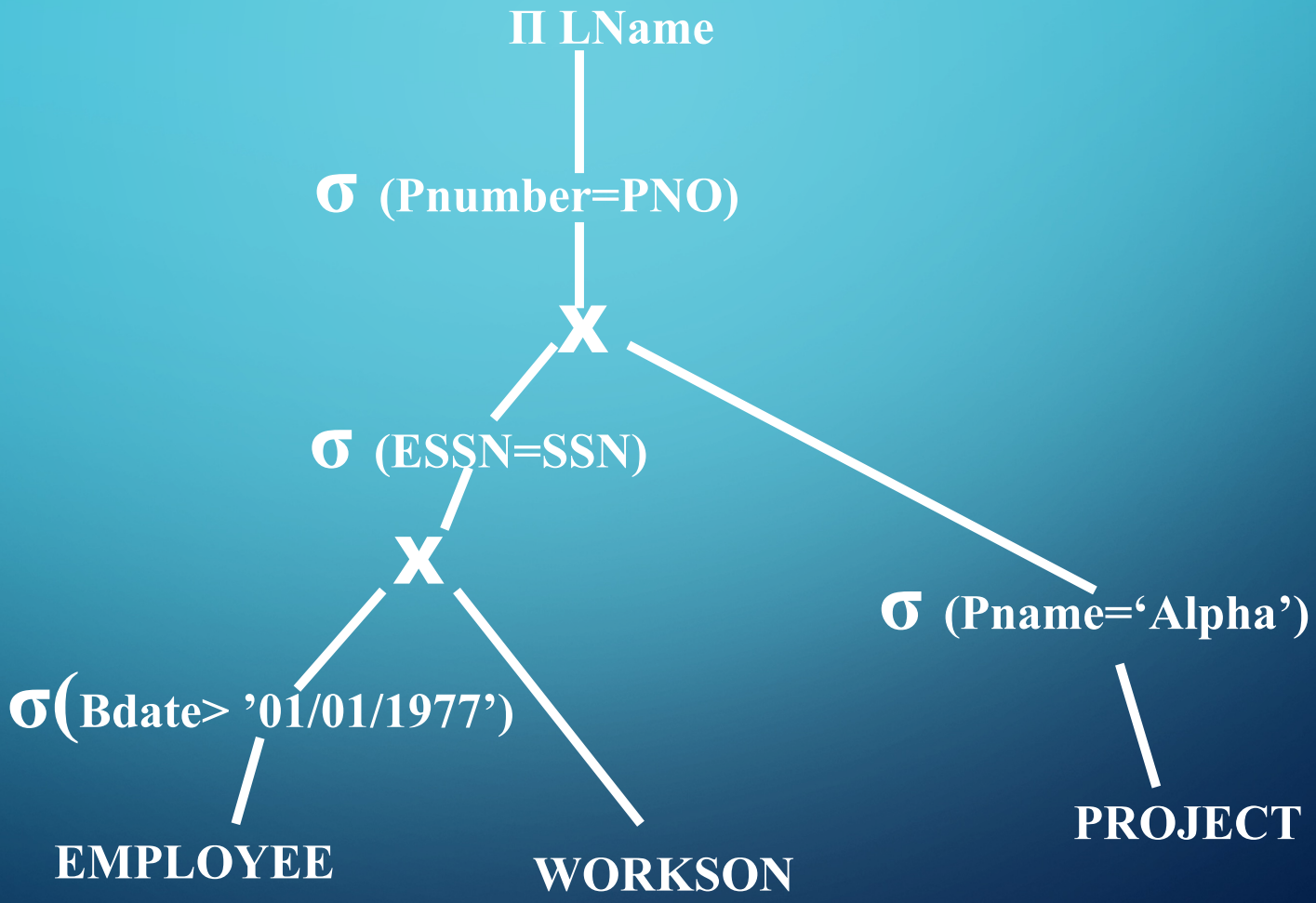
  SELECT lname FROM employee, workson, project WHERE pname='Alpha' AND pnumber = pno AND essn=ssn AND bdate > '01/01/77'

RULES:

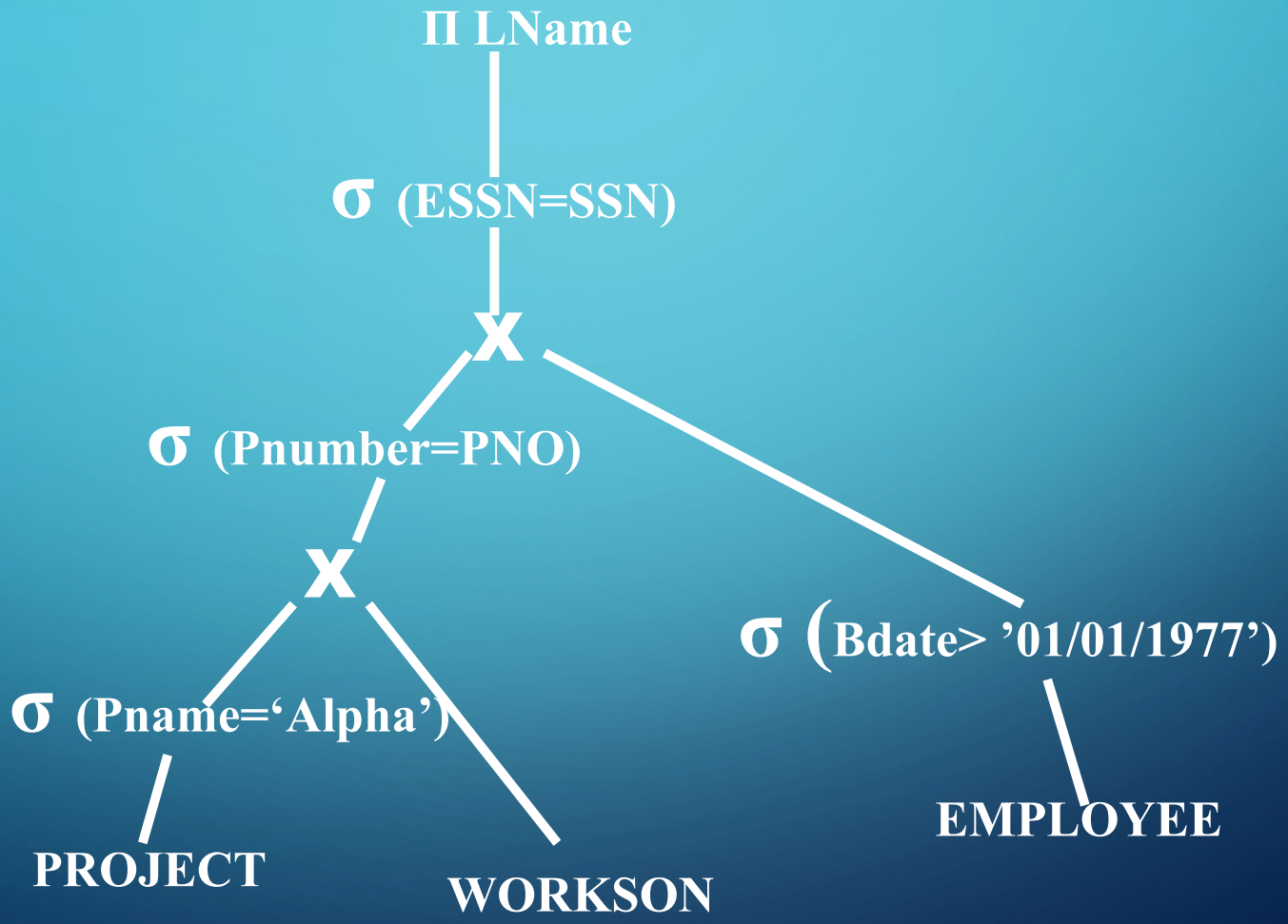
- Rule 1. Draw Initial Tree:



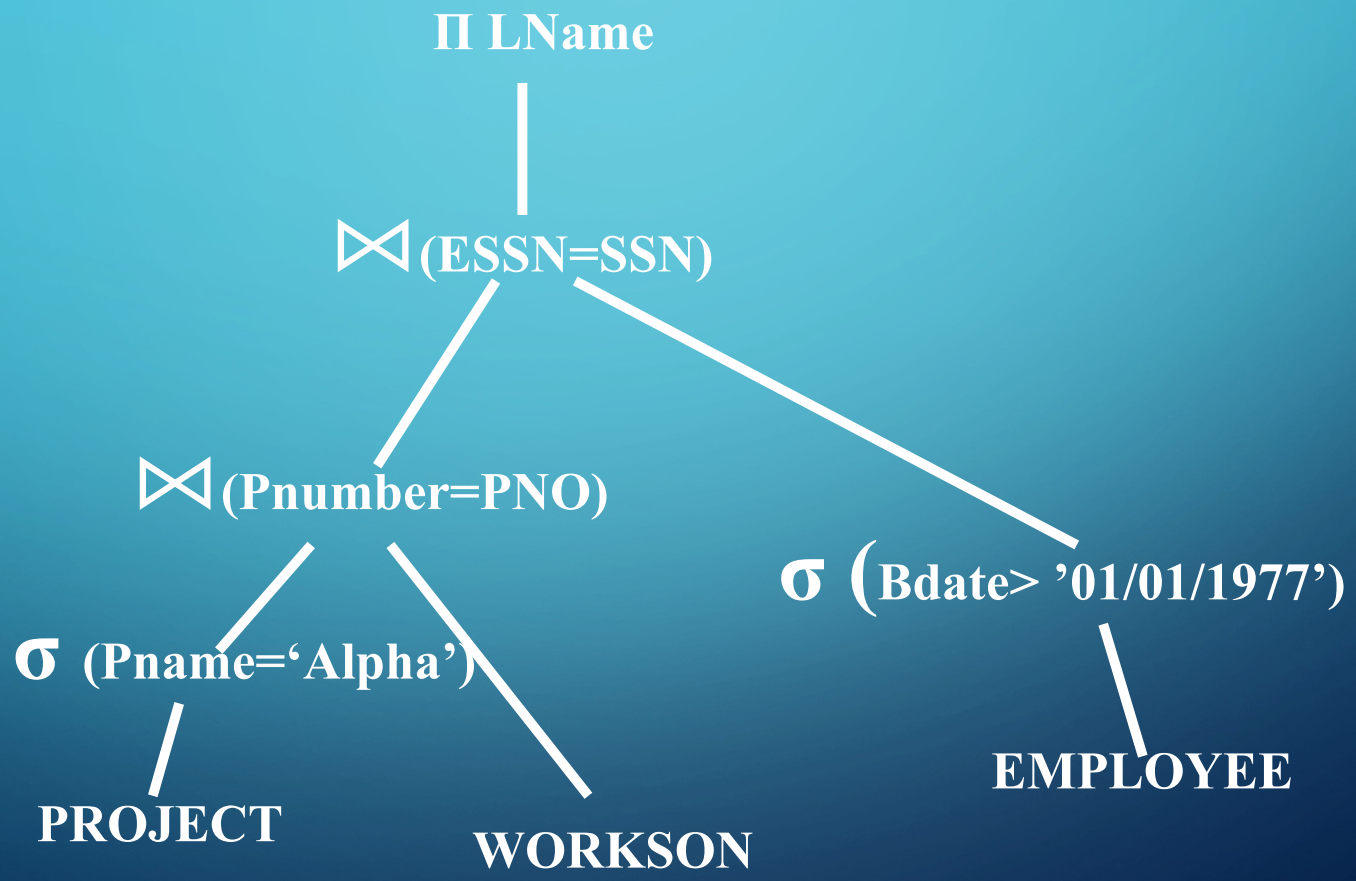
- Rule 2. Move SELECT operations down the query tree as low as you can.



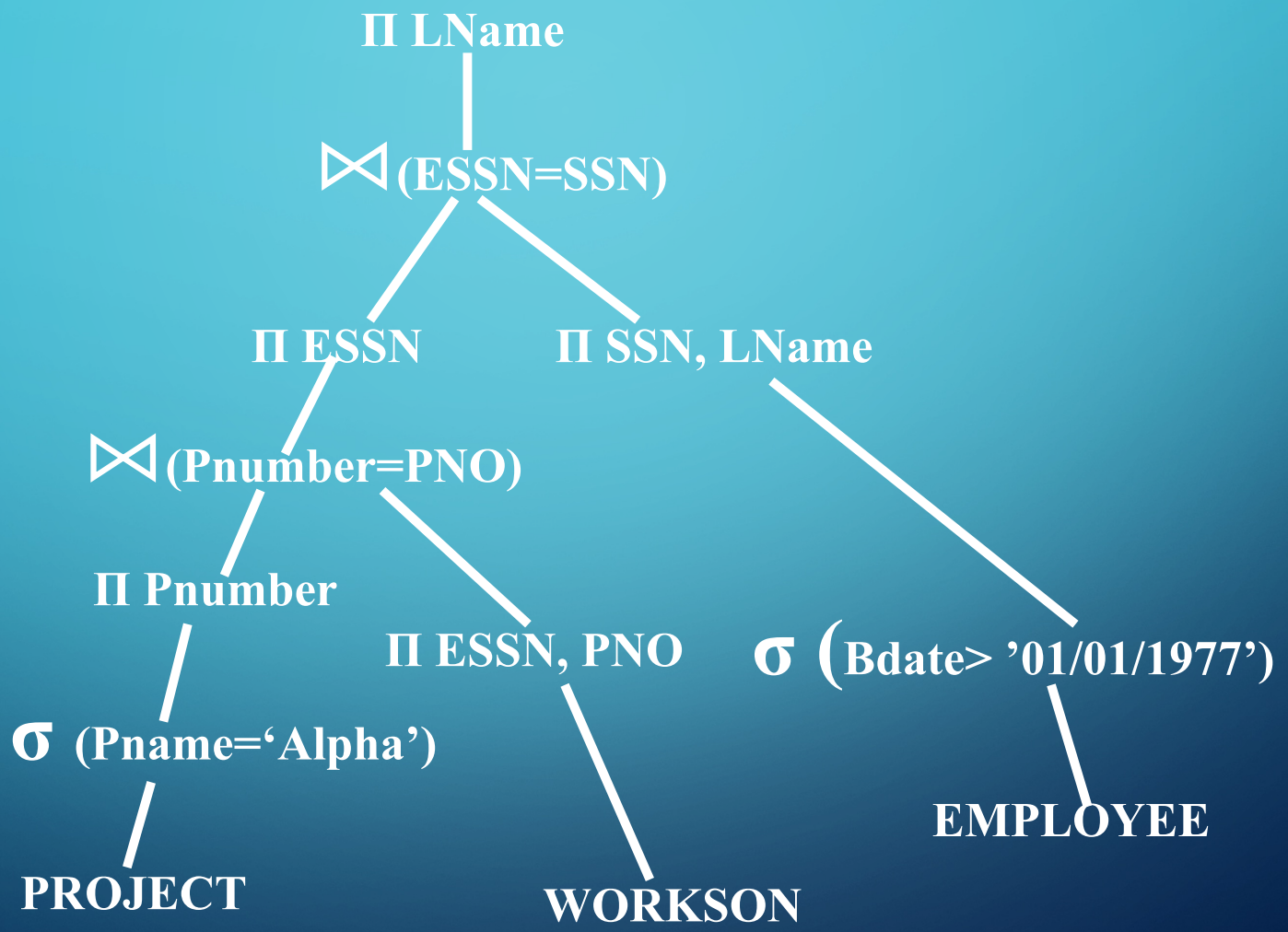
- Rule 3. Apply the more restrictive SELECT operation first



- Rule 4. Replace CARTESIAN PRODUCTS and SELECTS with JOINS



- Rule 5. Move PROJECT down the query tree



MORAL OF THE STORY:

- The way you build your query can great affect the amount of time it takes to run the query and return the results!
- Always apply the operations that reduced the number of rows and attributes as early as possible!

SELECT lname FROM employee, workson, project WHERE pname='Alpha' AND pnumber = pno AND essn=ssn AND bdate > '01/01/77'

Versus:

SELECT lname FROM (SELECT lname, ssn FROM employee WHERE bdate > '01/01/77') WHERE ssn IN (SELECT essn FROM workson WHERE pno IN (SELECT pnumber FROM project WHERE pname='Alpha'))