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Assignment 10

Query Optimization

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1 First exercise

The initial permutation is $\{R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8\}$. The first `for` loop of the algorithm assigns the following numbers to the array ϕ: $[0, 1, 2, 3, 4, 5, 6, 7]$ with 0 corresponding to R_1, 1 to R_2 and so on.

Then the algorithm enters the second for loop, changes at each iteration are displayed below:

1. Iteration 1
   Swapping elements 7 and 0
   The new rank is 8
2. Iteration 2
   Swapping elements 6 and 1
   The new rank is 1
3. Iteration 3
   Swapping elements 5 and 6
   The new rank is 0
4. Iteration 4
   Swapping elements 4 and 7
   The new rank is 0
5. Iteration 5
   Swapping elements 3 and 4
   The new rank is 0
6. Iteration 6
   Swapping elements 2 and 3
   The new rank is 0

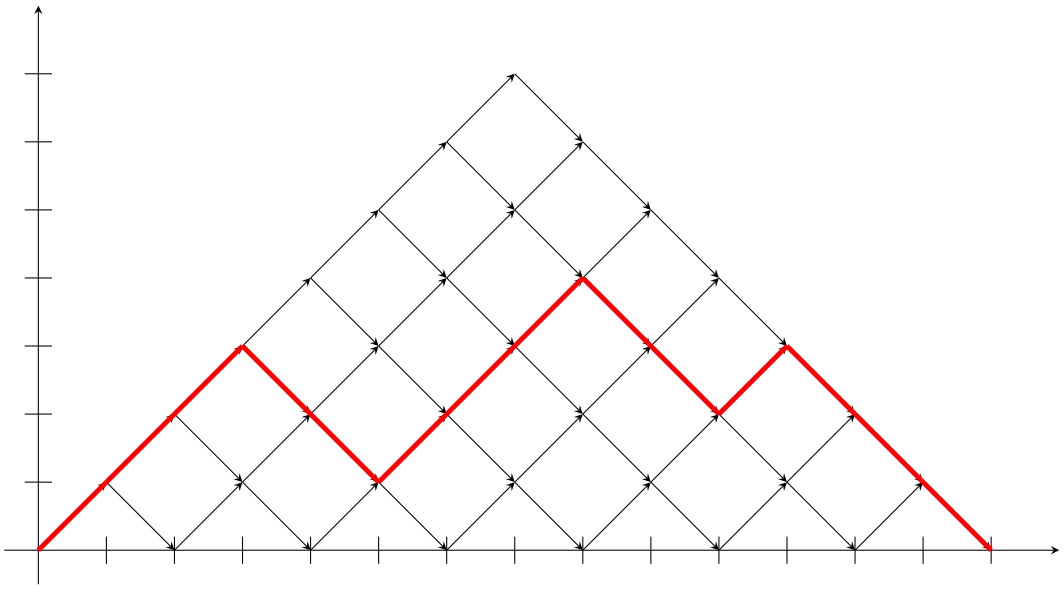
7. Iteration 7
   Swapping elements 5 and 2
   The new rank is 0

8. Iteration 8
   Swapping elements 5 and 5
   The new rank is 0

The obtained permutation after exiting the loop is $[5, 2, 3, 4, 7, 6, 1, 0]$, corresponding to $\{R_6, R_3, R_4, R_5, R_8, R_7, R_2, R_1\}$.

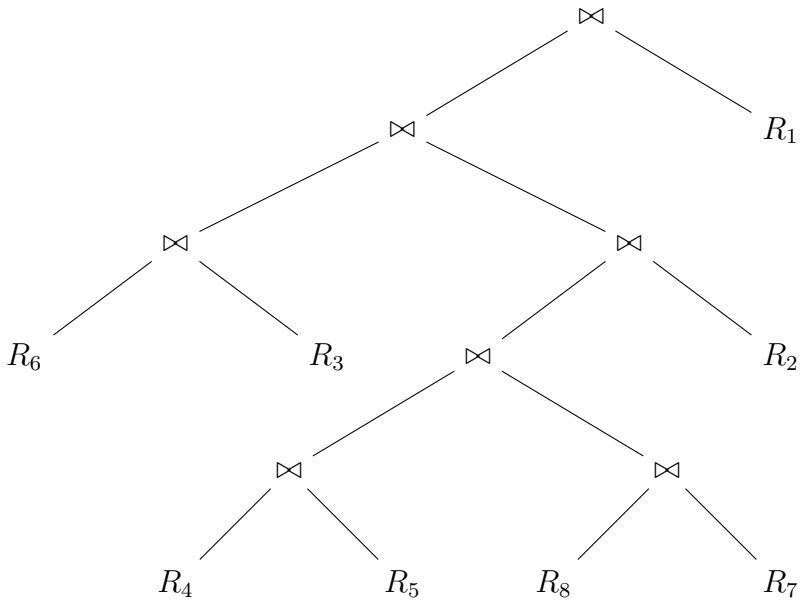
2 Second exercise

The path on the grid is highlighted in red, using the same number of combinations as the example in Session 10:



The order of parentheses is therefore, adding the last right bracket for completeness: `(((())(((())())))`

From this order we obtain the join tree, with relations from previous permutation added in pre-order:


⋈
⋈
R_1
⋈
⋈
R_6
R_3
⋈
R_2
⋈
⋈
R_4
R_5
R_8
R_7