

Query Optimization

1. Conjunction of SELECT operations \rightarrow cascade of selects
$$\sigma_{c1}AND\sigma_{c2}AND\cdots$$
$$= \sigma_{c1}(\sigma_{c2}(\sigma_{c3}(\cdots)))$$
2. Commutativity of SELECT
$$\sigma_{c1}(\sigma_{c2}(R)) = \sigma_{c2}(\sigma_{c1}(R))$$
3. Cascade of Projections operations: only last projection step counts
$$\pi_x(\pi_y(\pi_z(\cdots))) = \pi_x(\cdots)$$
4. Commutativity of σ, π
5. \bowtie and X are commutative
6. Commutativity of σ with \bowtie and X when σ condition applies to a single table involved in the \bowtie or X
$$\sigma_{A[x]=\cdots} = (A \times B) = (\sigma_{A[x]=\cdots}(A) \times B)$$
7. Commutativity of π with \bowtie and X when join (or X) only involved attributes in projection
8. Associativity of \bowtie, X