14 – Query Planning & Optimization 1

1. Query Plan
    A. Logical vs. Physical
        i. Logical plan : make optimal relational algebra
        ii. Physical plan : make optimal operator selection
        (join algorithm, compression, index, etc)
2. Query Optimization (NP-Hard)
    A. Heuristics & Rules – remove things that cause inefficiency
    B. Cost-Based Search – estimate cost, find minimum
3. Relational Algebra Equivalences
    A. Relational algebra expression A, B are equivalent if A, B's result are same
    B. Query rewriting is for lower cost, same result
    C. Technique
        i. Predicate pushdown : reduce operands
        ii. Ignoring useless predicate & projection : get rid of useless operation
        iii. Merging predicate : reduce operation
4. Plan Cost Estimation
    A. CPU, Disk, Memory, Network are all matter of plan cost estimation
    B. Use statistics to see what tables look like