

Join Algorithms Comparison

Algorithms	I/O cost
Page-oriented Nested Loops join	$M + M * N$
Block Nested Loops Join	$M + \lceil M / (B-2) \rceil * N$
Index Nested Loops Join	$M + (M * p_R * (\text{cost of finding matching S tuples with index}))$
Sort-Merge Join	$3 * (M+N)$, if $B > \sqrt{M}$ M: size of the larger relation
Hash Join	$3 * (M+N)$, if $B > \sqrt{N}$ N: size of the smaller relation

Outer relation R: M pages, p_R tuples / page
 Inner relation S: N pages, p_S tuples / page