Objectives:

1. To understand the need for natural join operation
2. To understand Division Operation

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NATURAL JOIN Operation: Because one of each pair of attributes with identical values is superfluous, a new operation called natural join—denoted by *—was created to get rid of the second (superfluous) attribute in an EQUIJOIN condition.
The standard definition of natural join requires that the two join attributes, or each pair of corresponding join attributes, have the **same name** in both relations. If this is not the case, a renaming operation is applied first.

The set of operations including **select σ, project π , union $\cup$, set difference - , and cartesian product X** is called a **complete set** because any other relational algebra expression can be expressed by a combination of these five operations.
For example: $\mathbf{R \cap S = (R \cup S) - ((R - S) \cup (S - R))}$

DIVISION Operation

The division operation is applied to two relations, R(Z) ÷ S(X), where X subset Z. Let Y = Z **-** X (and hence Z = X $\cup$ Y); that is, let Y be the set of attributes of R that are not attributes of S.

The result of DIVISION is a relation T(Y) that includes a tuple t if tuples t_R appear in R with t_R [Y] = t, and with
t_R [X] = t_s *for every tuple* t_s in S.

For a tuple t to appear in the result T of the DIVISION, the values in t must appear in R in combination with *every* tuple in S.

R	A	B
	p1	q1
	p2	q1
	p3	q1
	p4	q1
	p1	q2
	p3	q2
	p2	q2
	p3	q3
	p4	q3
	p1	q4
	p2	q4
	p3	q4

S	A
	p1
	p2
	p3

T	B
	q1
	q2