

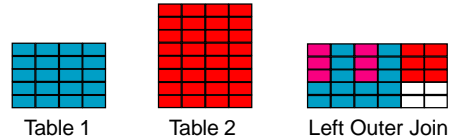
Outer Join Operations

The natural join (see [preceding page](#)) is the basis for all join operations—if you look at record numbers, you will see that California, Oregon, and Washington are records 1, 2, and 3, respectively, in all of the join operations. The left outer join also includes records from Table 1 with key field attribute values not found in Table 2.

State	Capital	Pop_1990	Pct_USA	UrbanPop	RuralPop
Alaska	Juneau	550043	0.22	0	0
California	Sacramento	29760021	12.00	27571878	2188143
Hawaii	Honolulu	1108229	0.45	0	0
Oregon	Salen	2842321	1.15	2002999	839322
Washington	Olympia	4866692	1.96	3717124	1149568
5					

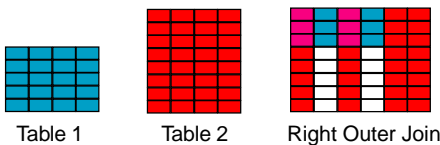
Left Outer Join

Records from Table 1 with key field attribute values not also found in Table 2 lack values for the unique fields from Table 2. The number of records in the output table is equal to the number of records in Table 1.



Right Outer Join

The right outer join operation adds the records in Table 2 not found in Table 1 to the natural join results. (Records for Alaska and Hawaii are not in this table.) Note in the Count row that the total number of records matches that for Table 2, but the number of records with capital cities and percent total population entered matches the number of records in the Natural Join result. Records from Table 2 with key field attribute values not also found in Table 1 lack values for the unique fields from Table 1.



Only the states that were also in Table 1 have values for these fields.

State	Capital	Pop_1990	Pct_USA	UrbanPop	RuralPop
Tennessee		4877185	0.00	2968743	1908442
Texas		16986510	0.00	13637248	3349262
Utah		1722850	0.00	1499375	223475
Vermont		562758	0.00	180904	381854
Virginia		6187358	0.00	4293607	1893751
Washington	Olympia	4866692	1.96	3717124	1149568
West Virginia		1793477	0.00	647853	1145624
Wisconsin		4891769	0.00	3212077	1679692
Wyoming		453588	0.00	294465	159123
48	3				

Outer Join

The outer join combines left and right outer joins so that all key field attribute values from Tables 1 and 2 are in the resulting table. Records not part of the natural join will lack values for the unique fields from the other table. In this example, Alaska and Hawaii lack urban and rural population data, and all states that do not border on the Pacific Ocean lack mention of a capital city and their percentage of the total population. The total number of records in the outer join result is the sum of the number of records in Tables 1 and 2 minus the number of records in the natural join result.

State	Capital	Pop_1990	Pct_USA	UrbanPop	RuralPop
Tennessee		4877185	0.00	2968743	1908442
Texas		16986510	0.00	13637248	3349262
Utah		1722850	0.00	1499375	223475
Vermont		562758	0.00	180904	381854
Virginia		6187358	0.00	4293607	1893751
Washington	Olympia	4866692	1.96	3717124	1149568
West Virginia		1793477	0.00	647853	1145624
Wisconsin		4891769	0.00	3212077	1679692
Wyoming		453588	0.00	294465	159123
50	5				

