Joins → combining information stored in 2 different tables

customers

customer_id, name, city, phone #

purchases

purch_id, customer_id, sales_id, item_id, quantity, date

sales

sales_id, name, region, commission

items

item_id, name, category

→ Say I want to know total commission paid on sales to customers in Dallas during the month of Jan 2021

Suppose I want to know the total sales by city

JOIN customers with purchases
on customer_id

customers INNER JOIN purchases.
ON customers.id

customer_id, name, city, phone, purch_id, sales_id,
item_id, quantity, date

customers LEFT JOIN purchases

customer_id, city
1, NY
2, Boston
3, Atlanta

Customers

Purchases

purch_id, customer_id, qt
1, 1, 1
2, 1, 1
3, 2, 7
4, 4, 3

customers INNER JOIN purchases
on customer_id

customer_id, city, purch_id, qt
1, NY, 1, 1
2, Boston, 3, 7

customers LEFT JOIN purchases
ON customer

customer_id, city, purch_id, qt
1, NY, 1, 1
NY, 2, 1

2	Boston	3	7
3	Boston	NA	NA

purchases LEFT JOIN customers
ON customer_id

customer_id	city	purch_id	gt
1	NY	1	1
1	NY	2	1
2	Boston	3	7
4	NA	4	3

purchases OUTER JOIN customers

customer_id, city, purch_id, gt

1	NY	1	1
1	NY	2	1
2	Boston	3	7
3	Boston	NA	NA
4	NA	4	3

wide data

↳ every observation can be expressed across a variety of columns
every row consists of an observation

playerID	yearID	H	HR
bbonds1	2001	180	50
aaod7	2003	190	35
bigmac1	1998	185	70
twill7	1946	170	40

playerID	yearID	type	value
bbonds1	2001	H	180
bbonds1	2001	HR	50
bbonds1	2001	RBI	