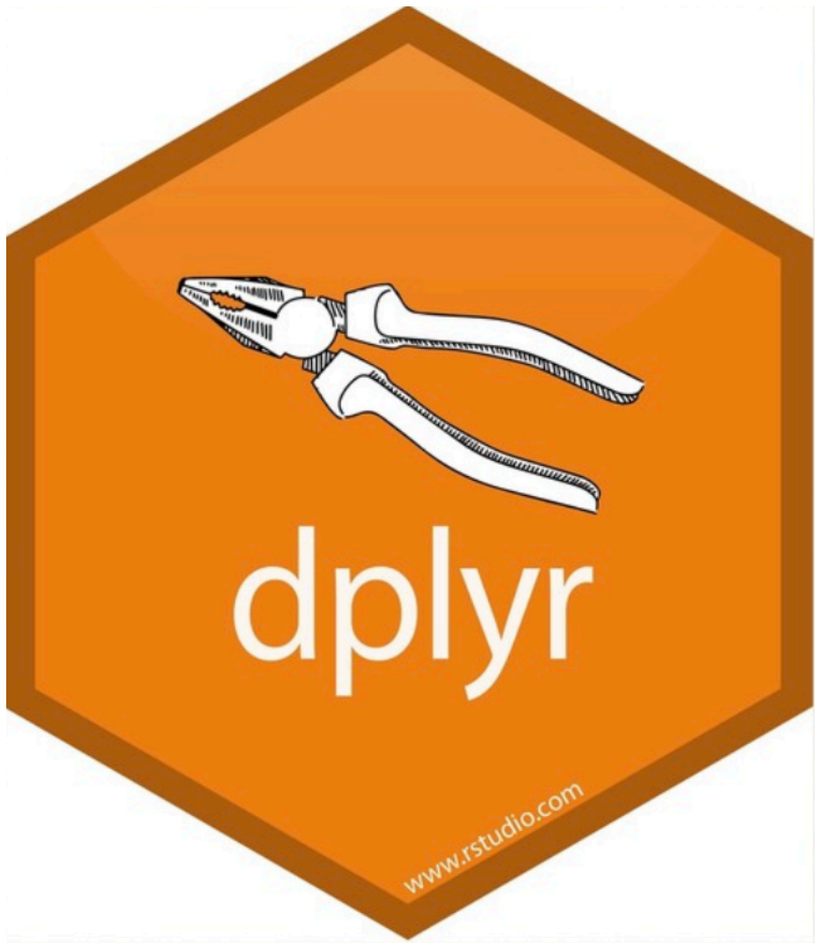
Relational Data with dplyr



Outline

Intro to relational data

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Mutating Joins

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Filtering Joins

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Set operations - treats observations like set elements

nycflights13

The *nycflights13* R package contains similar info as the Houston flights data but also contains data frames about the airlines, weather, and airports.

Credit: R4DS

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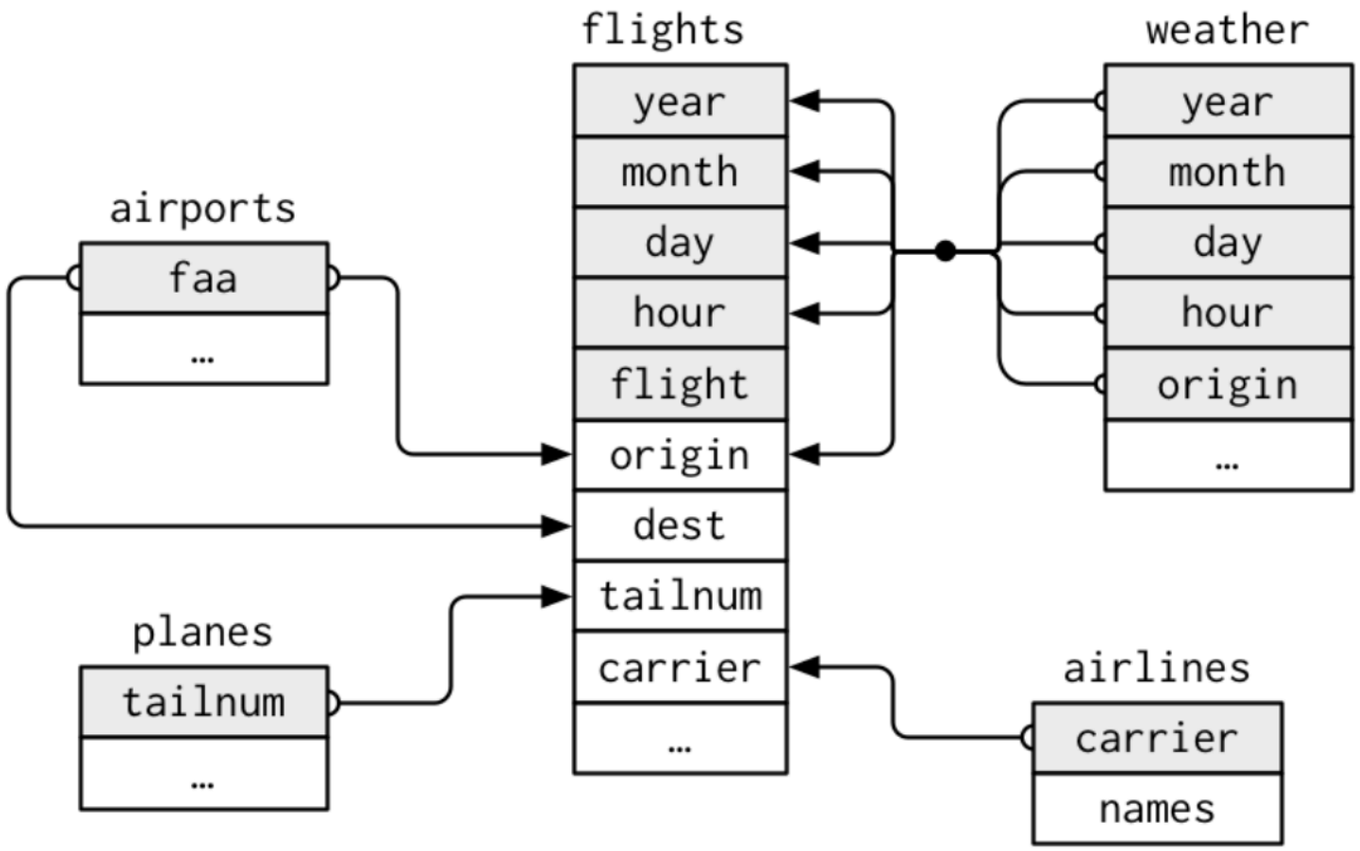

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A primary key and the corresponding foreign key in another table for the *relation.*

Mutating Joins

Setup:

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```
x <- tribble(
    ~key, ~val_x,
    1, "x1",
    2, "x2",
    3, "x3"
)
```

```
y <- tribble(
    ~key, ~val_y,
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    2, "y2",
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)
```

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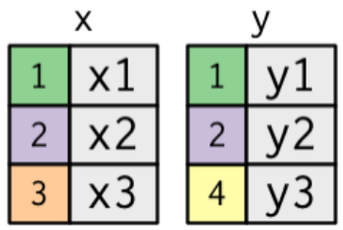

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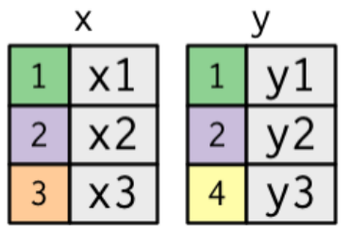

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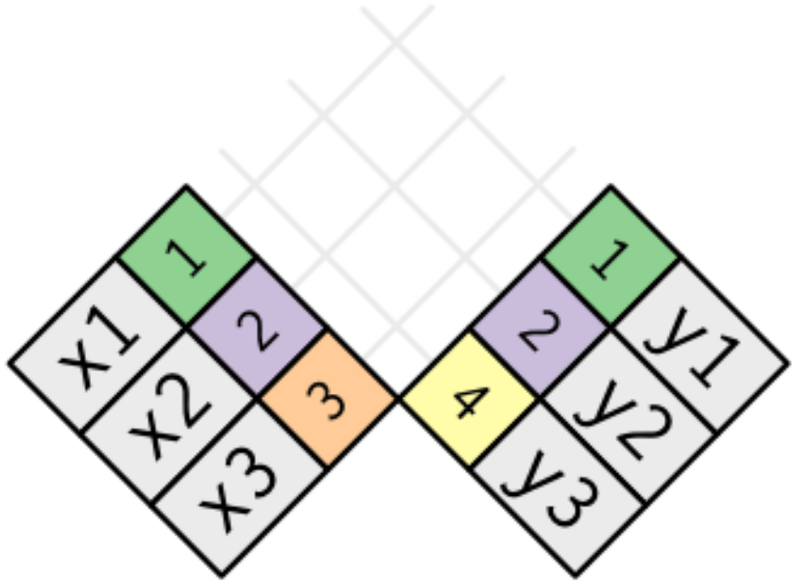
```

A join is a way of connecting the rows in x to 0,1, or more rows in y



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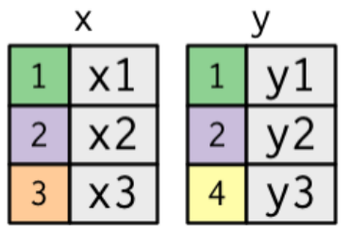

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1	x1
2	x2
3	x3

y	
1	y1
2	y2
4	y3

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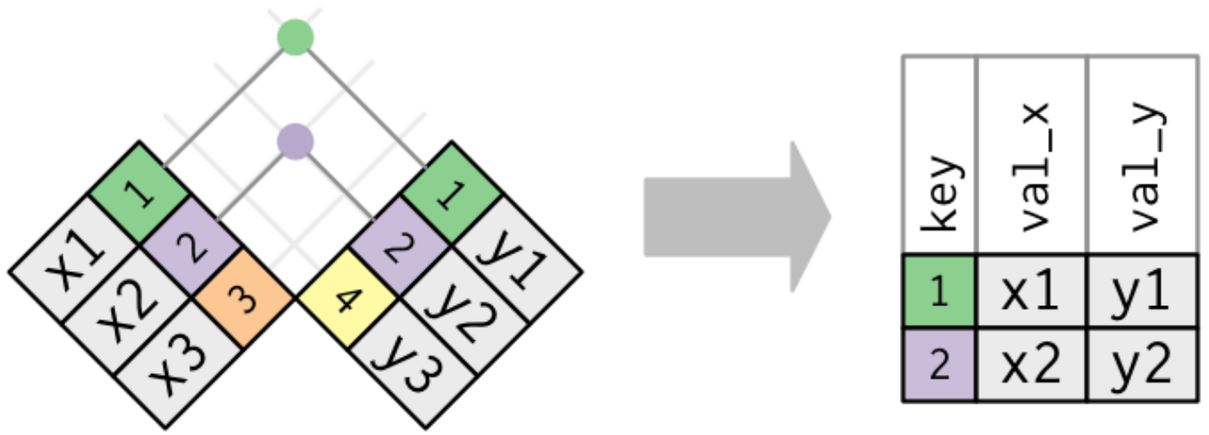

key	val_x	val_y
1	x1	y1
2	x2	y2

Mutating Joins

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3	x3

y

1	y1
2	y2
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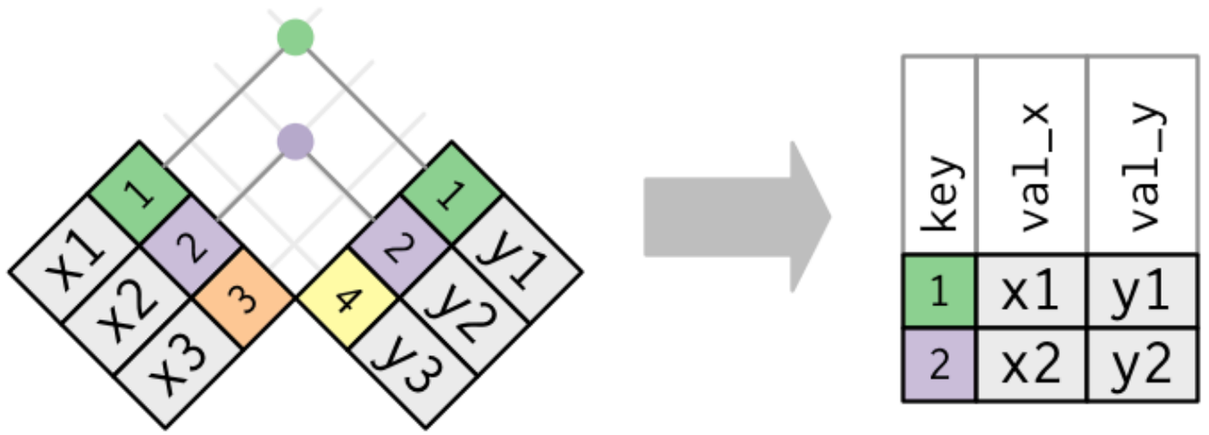

key	val_x	val_y
1	x1	y1
2	x2	y2

```
inner_join(x, y, by = "key")
```

```
x %>%
 inner_join(y, by = "key")
```

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left_join() - keeps all observations in x (left dataset)

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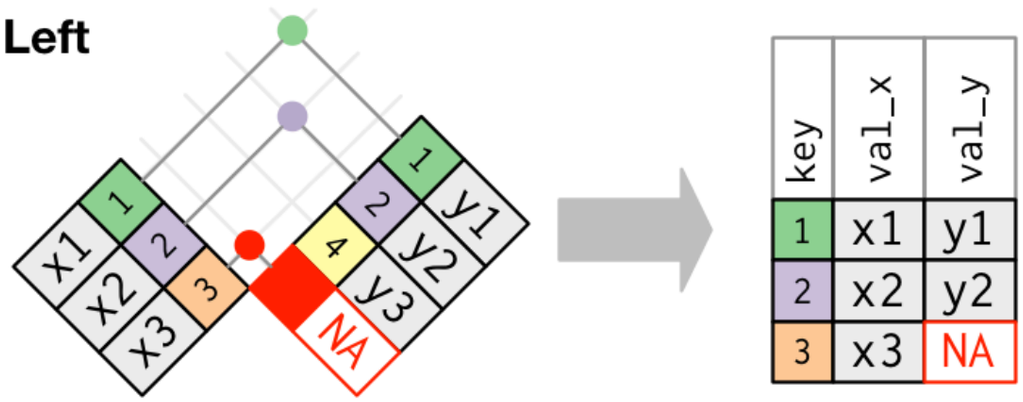
full_join() - keeps all observations in both datasets

Mutating Joins

x	
1	x1
2	x2
3	x3

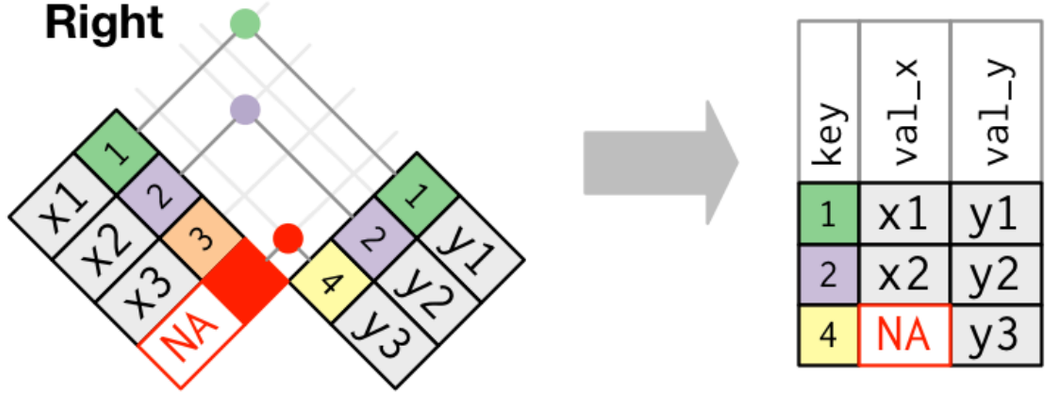
y	
1	y1
2	y2
4	y3

Left



key	val_x	val_y
1	x1	y1
2	x2	y2
3	x3	NA

Right



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1	x1	y1
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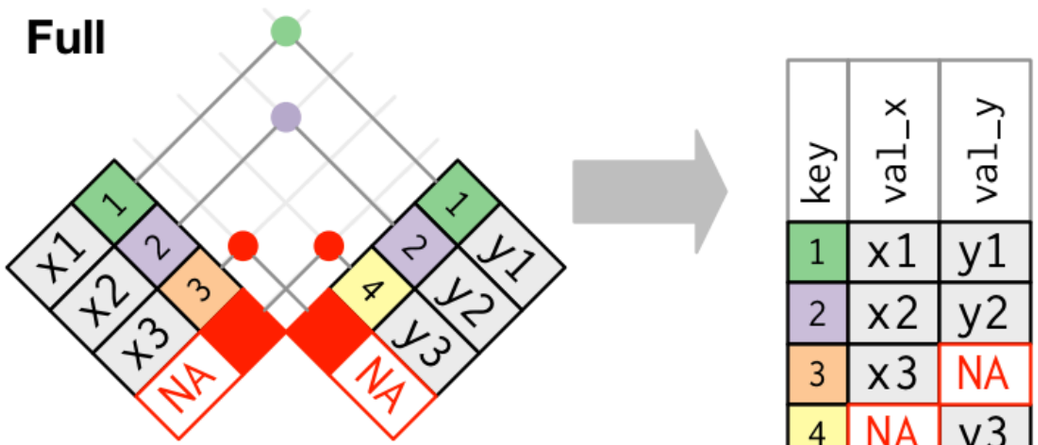
4	NA	y3

Full



key	val_x	val_y
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2	x2	y2
3	x3	NA
4	NA	y3

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Duplicate keys - When the keys are not unique.

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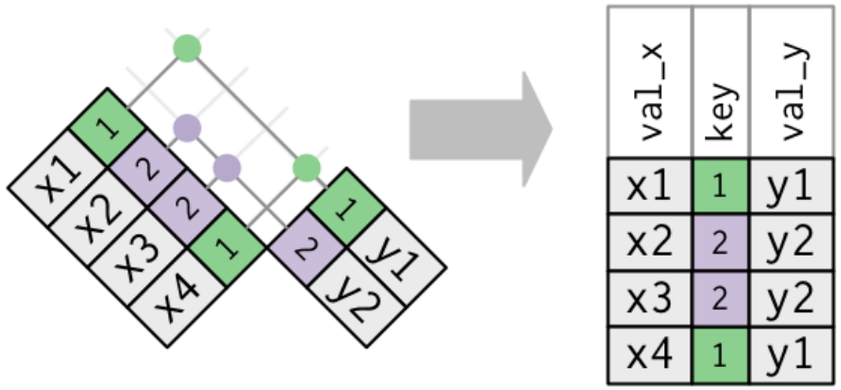

val_x	key	val_y
x1	1	y1
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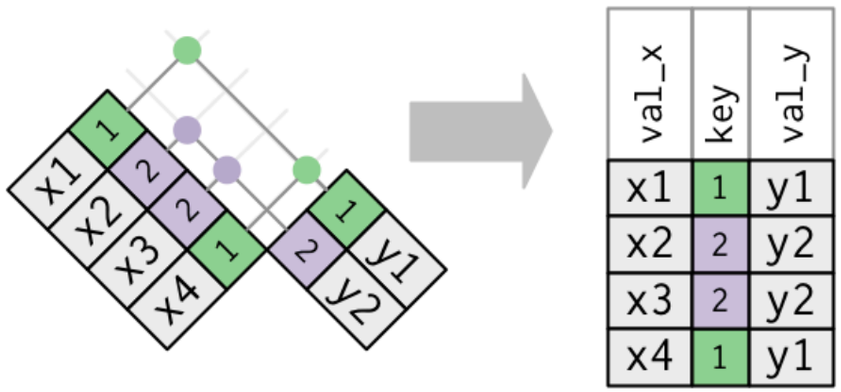

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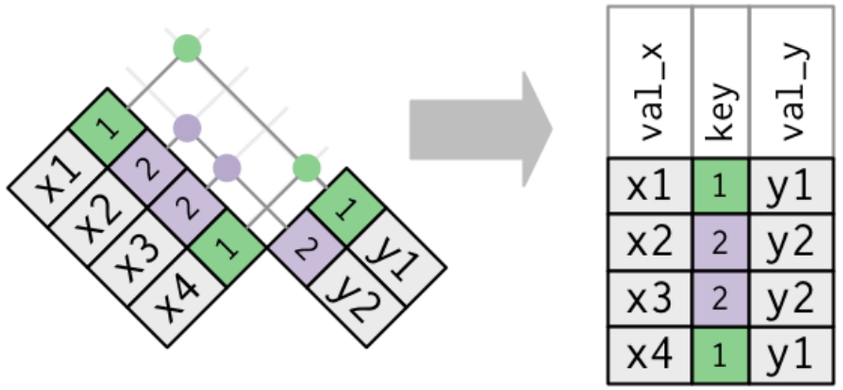

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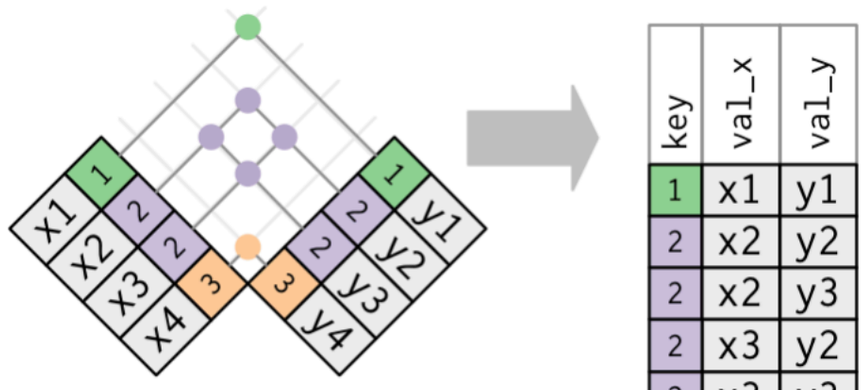

key	val_x	val_y
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`by = c("a" = "b")` - named character vector. Will match variable *a* in table *x* to variable *b* in table *y*

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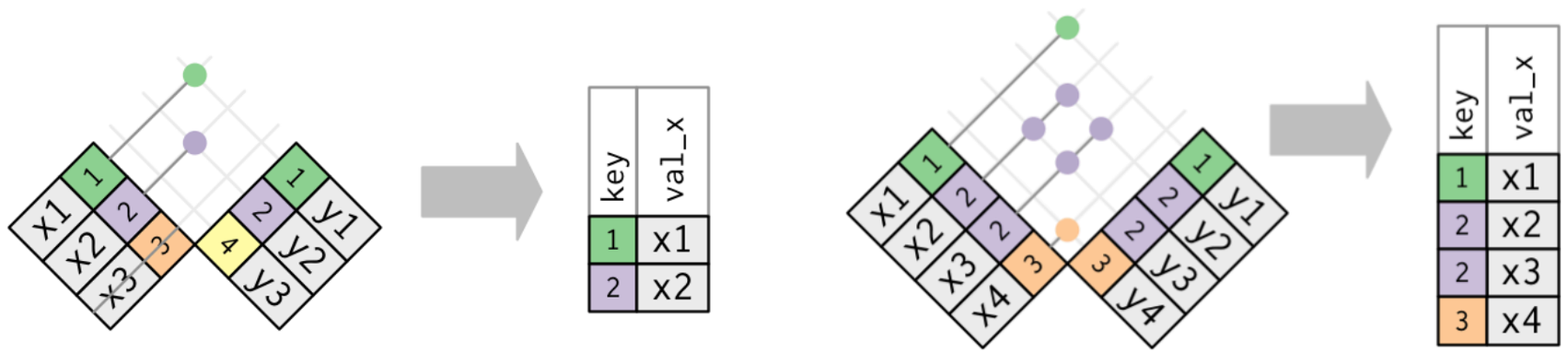

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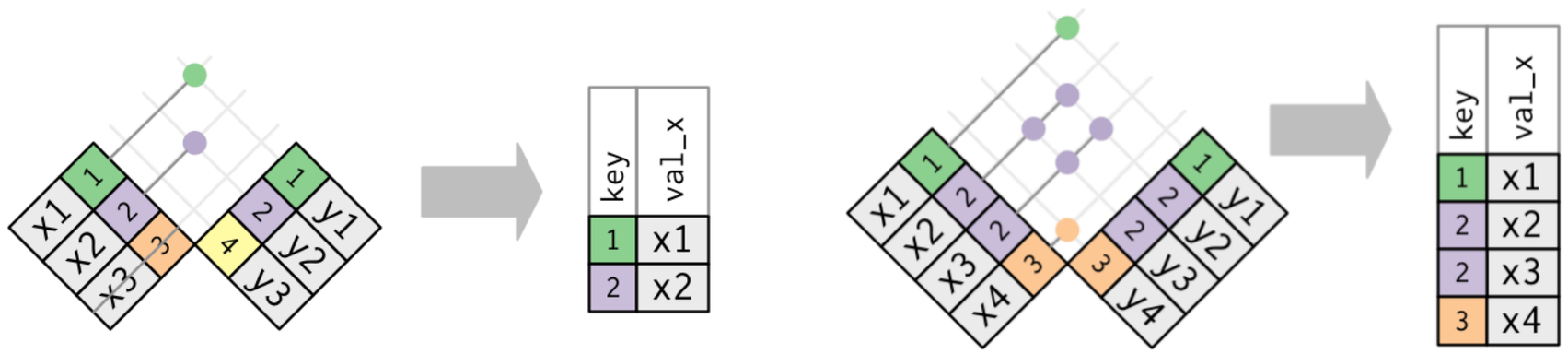

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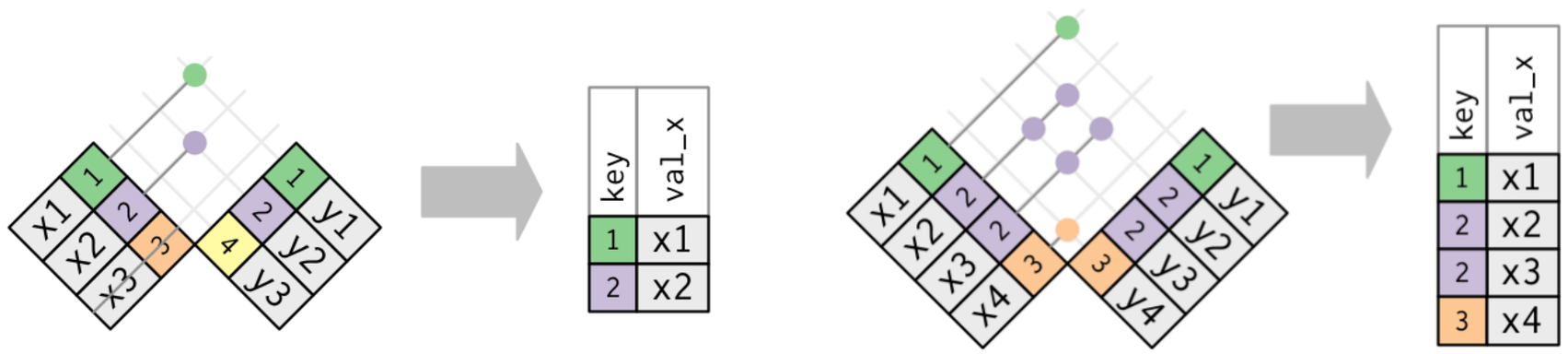

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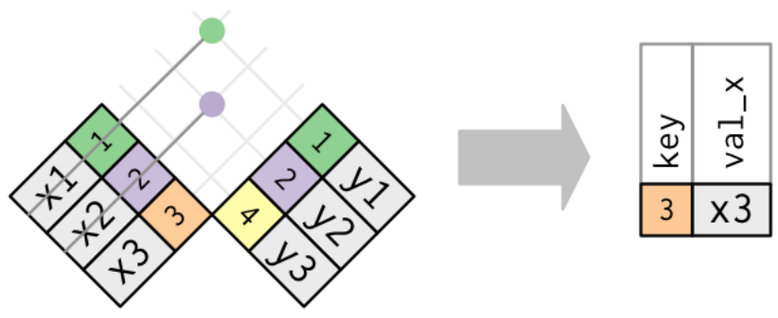

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union(x, y) - returns unique observations in x and y

setdiff(x, y) - returns observations in x, but not y