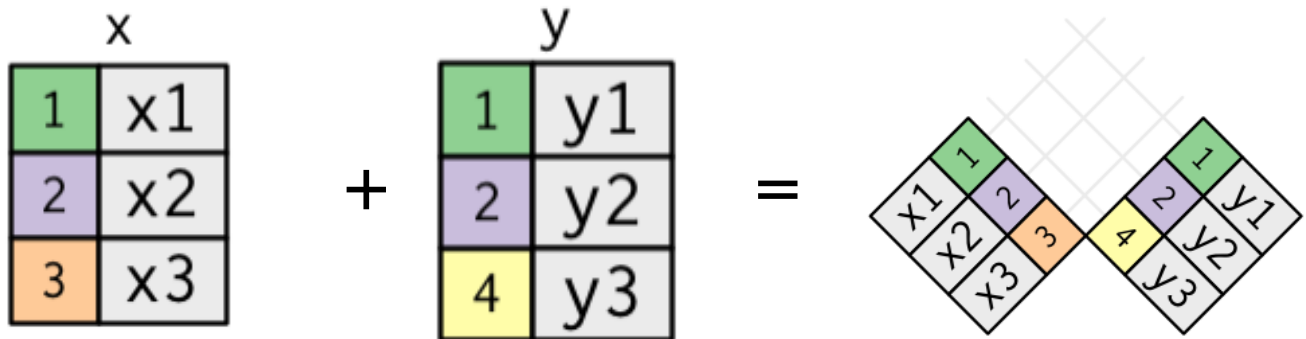


Original data sets:



Mutating Joins

| <code>inner_join(x,y, by="key")</code> | Join data. Retain only rows in both sets. | <table border="1"> <thead> <tr> <th>key</th><th>val_x</th><th>val_y</th></tr> </thead> <tbody> <tr><td>1</td><td>x1</td><td>y1</td></tr> <tr><td>2</td><td>x2</td><td>y2</td></tr> </tbody> </table> | key | val_x | val_y | 1 | x1 | y1 | 2 | x2 | y2 | | | | | | |
|--|---|--|-----|-------|-------|---|----|----|---|----|----|---|----|----|---|----|----|
| key | val_x | val_y | | | | | | | | | | | | | | | |
| 1 | x1 | y1 | | | | | | | | | | | | | | | |
| 2 | x2 | y2 | | | | | | | | | | | | | | | |
| <code>left_join(x,y, by="key")</code> | Join matching rows from y to x. A left join keeps all observations in x | Left <table border="1"> <thead> <tr> <th>key</th><th>val_x</th><th>val_y</th></tr> </thead> <tbody> <tr><td>1</td><td>x1</td><td>y1</td></tr> <tr><td>2</td><td>x2</td><td>y2</td></tr> <tr><td>3</td><td>x3</td><td>NA</td></tr> </tbody> </table> | key | val_x | val_y | 1 | x1 | y1 | 2 | x2 | y2 | 3 | x3 | NA | | | |
| key | val_x | val_y | | | | | | | | | | | | | | | |
| 1 | x1 | y1 | | | | | | | | | | | | | | | |
| 2 | x2 | y2 | | | | | | | | | | | | | | | |
| 3 | x3 | NA | | | | | | | | | | | | | | | |
| <code>right_join(x,y, by="key")</code> | Join matching rows from x to y. A right join keeps all observations in y. | Right <table border="1"> <thead> <tr> <th>key</th><th>val_x</th><th>val_y</th></tr> </thead> <tbody> <tr><td>1</td><td>x1</td><td>y1</td></tr> <tr><td>2</td><td>x2</td><td>y2</td></tr> <tr><td>4</td><td>NA</td><td>y3</td></tr> </tbody> </table> | key | val_x | val_y | 1 | x1 | y1 | 2 | x2 | y2 | 4 | NA | y3 | | | |
| key | val_x | val_y | | | | | | | | | | | | | | | |
| 1 | x1 | y1 | | | | | | | | | | | | | | | |
| 2 | x2 | y2 | | | | | | | | | | | | | | | |
| 4 | NA | y3 | | | | | | | | | | | | | | | |
| <code>full_join(x,y, by="key")</code> | Join data. Retain all values, all rows. A full join keeps all observations in x and y. | Full <table border="1"> <thead> <tr> <th>key</th><th>val_x</th><th>val_y</th></tr> </thead> <tbody> <tr><td>1</td><td>x1</td><td>y1</td></tr> <tr><td>2</td><td>x2</td><td>y2</td></tr> <tr><td>3</td><td>x3</td><td>NA</td></tr> <tr><td>4</td><td>NA</td><td>y3</td></tr> </tbody> </table> | key | val_x | val_y | 1 | x1 | y1 | 2 | x2 | y2 | 3 | x3 | NA | 4 | NA | y3 |
| key | val_x | val_y | | | | | | | | | | | | | | | |
| 1 | x1 | y1 | | | | | | | | | | | | | | | |
| 2 | x2 | y2 | | | | | | | | | | | | | | | |
| 3 | x3 | NA | | | | | | | | | | | | | | | |
| 4 | NA | y3 | | | | | | | | | | | | | | | |

Adapted from Wickham, Hadley, and Garrett Grolemond. 2016. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data. O'Reilly Media, Inc.

