

# Normalization

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## Libraries and Data

```
library("readr")
library("tibble")
library("tidyr")
```

```
co2 <- read_csv("co2.csv")
head(co2)
```

```
## # A tibble: 6 x 13
##   Year  Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  2018  408.  408.  409.  410.  411.  411.  409.  407.    0    0    0
## 2  2017  406.  406.  407.  409.  410.  409.  407.  405.  403.  404.  405.
## 3  2016  403.  404.  405.  407.  408.  407.  404.  402.  401.  402.  404.
## 4  2015  400.  400.  402.  403.  404.  403.  401.  399.  398.  398.  400.
## 5  2014  398.  398.  400.  401.  402.  401.  399.  397.  395.  396.  397.
## 6  2013  396.  397.  397.  398.  400.  399.  397.  395.  393.  394.  395.
## # ... with 1 more variable: Dec <dbl>
```

Above is the data preview.

## Covert to tibble

```
as_tibble(co2)
```

```
## # A tibble: 61 x 13
##   Year  Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  2018  408.  408.  409.  410.  411.  411.  409.  407.    0    0    0
## 2  2017  406.  406.  407.  409.  410.  409.  407.  405.  403.  404.  405.
## 3  2016  403.  404.  405.  407.  408.  407.  404.  402.  401.  402.  404.
## 4  2015  400.  400.  402.  403.  404.  403.  401.  399.  398.  398.  400.
## 5  2014  398.  398.  400.  401.  402.  401.  399.  397.  395.  396.  397.
## 6  2013  396.  397.  397.  398.  400.  399.  397.  395.  393.  394.  395.
## 7  2012  393.  394.  394.  396.  397.  396.  394.  392.  391.  391.  393.
## 8  2011  391.  392.  393.  393.  394.  394.  393.  390.  389.  389.  390.
## 9  2010  389.  390.  391.  392.  393.  392.  390.  388.  387.  387.  389.
## 10 2009  387.  387.  389.  390.  390.  389.  388.  386.  385.  384.  386.
## # ... with 51 more rows, and 1 more variable: Dec <dbl>
```

## Changing Column Names

```
colnames(co2)<- c('year', 1:12)
head(co2)
```

```
## # A tibble: 6 x 13
```

```
##   year   `1`   `2`   `3`   `4`   `5`   `6`   `7`   `8`   `9`  `10`  `11`
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  2018  408.  408.  409.  410.  411.  411.  409.  407.    0     0     0
## 2  2017  406.  406.  407.  409.  410.  409.  407.  405.  403.  404.  405.
## 3  2016  403.  404.  405.  407.  408.  407.  404.  402.  401.  402.  404.
## 4  2015  400.  400.  402.  403.  404.  403.  401.  399.  398.  398.  400.
## 5  2014  398.  398.  400.  401.  402.  401.  399.  397.  395.  396.  397.
## 6  2013  396.  397.  397.  398.  400.  399.  397.  395.  393.  394.  395.
## # ... with 1 more variable: `12` <dbl>
```

We change the column names from the Month Name (Jan, Feb, Mar...) to Month Number.

### Using the 'Gather' function

```
g.co2<- gather(co2, 'month', 'value', 2:13)
head(g.co2)
```

```
## # A tibble: 6 x 3
##   year month value
##   <dbl> <chr> <dbl>
## 1  2018 1      408.
## 2  2017 1      406.
## 3  2016 1      403.
## 4  2015 1      400.
## 5  2014 1      398.
## 6  2013 1      396.
```

The goal of the gather function is for each instance to include Year, Month, and Value in each row.

### Writing to CSV

```
write.csv(g.co2, file="CO2_gathered.csv")
```