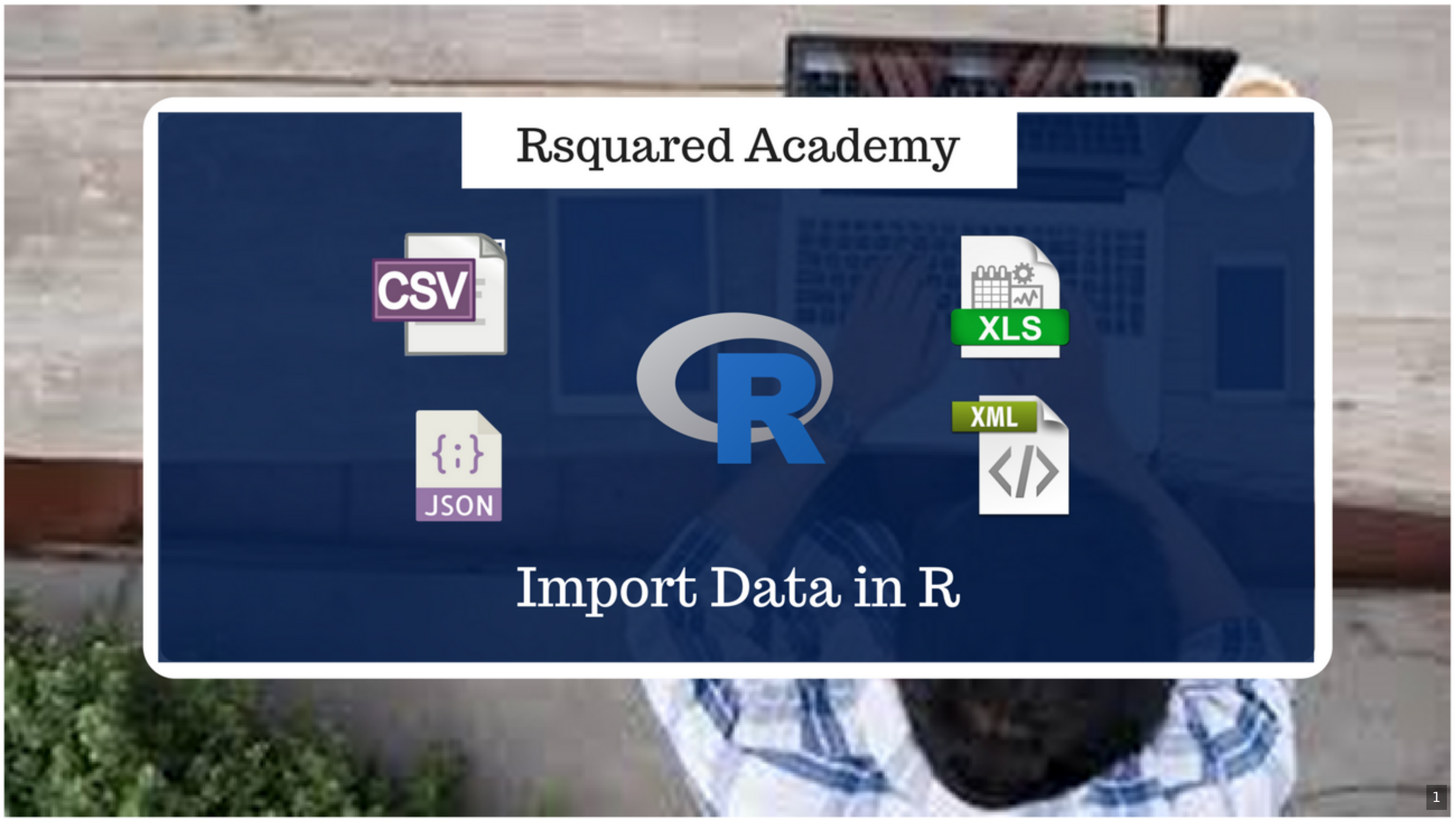

Rsquared Academy
CSV
XLS
JSON
XML
Import Data in R

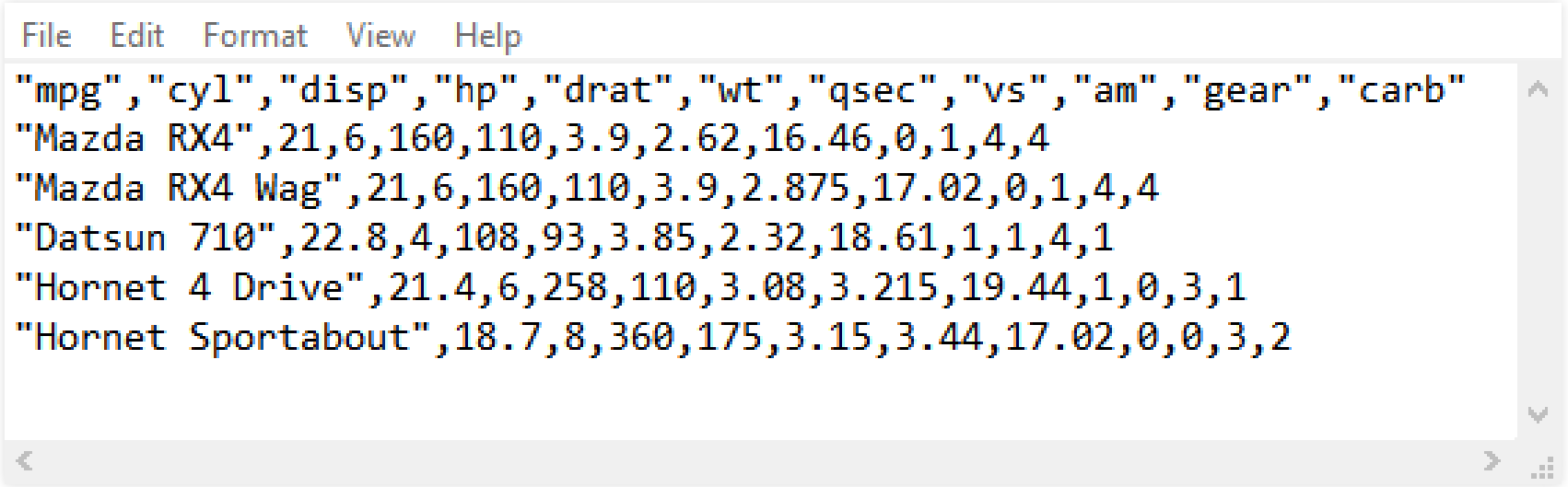
Agenda

- read data from flat or delimited files
- handle column names/header
- skip text/info
- specify column/variable types
- read specific columns/variables

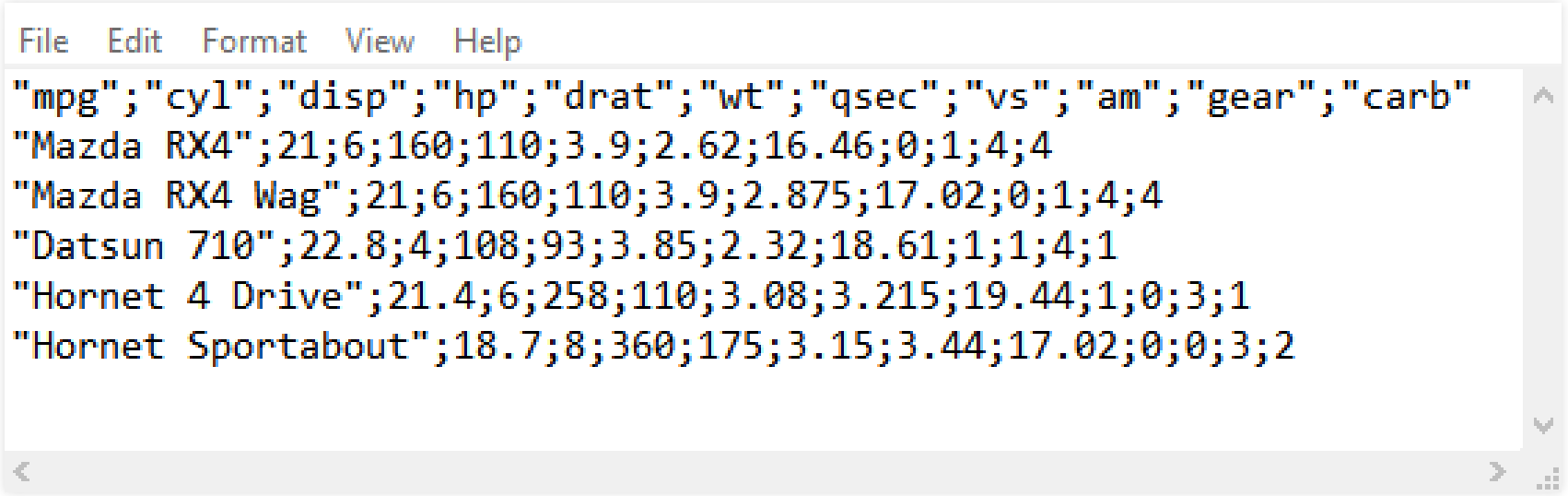
Libraries

```
library(readr)
```

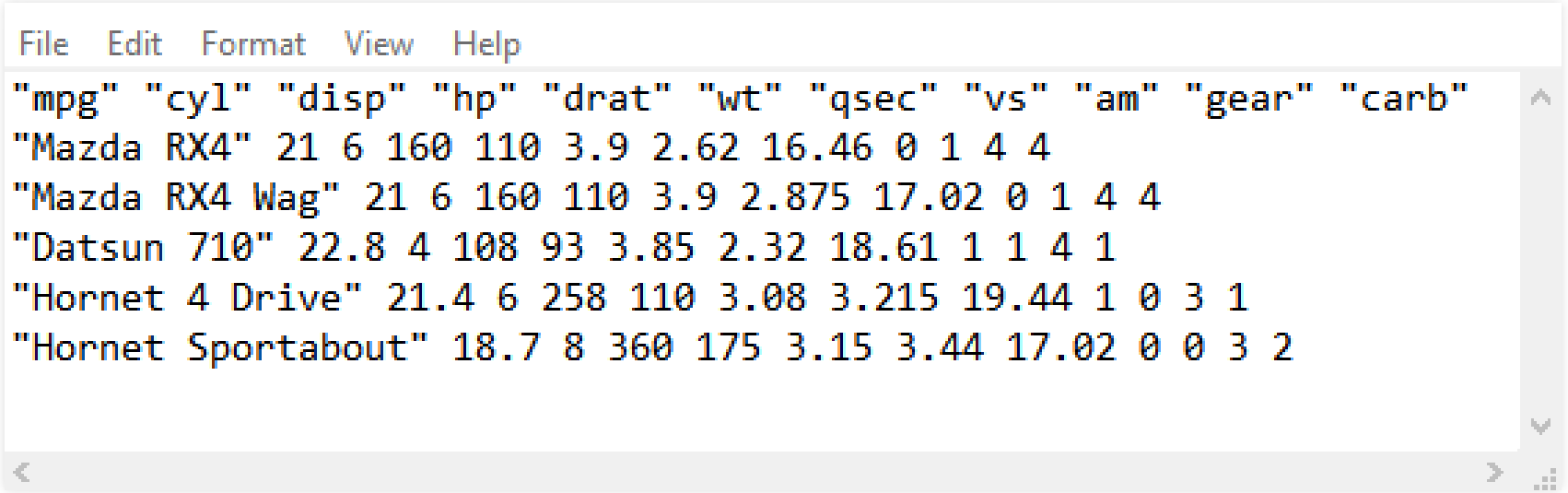
Comma Separated Values



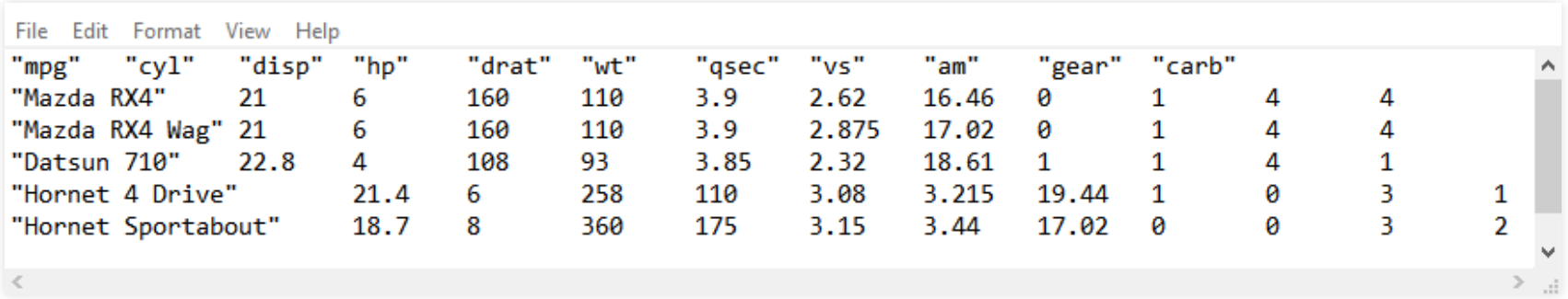
Semi Colon Separated Values



Space Separated Values



Tab Separated Values



Read CSV File

```
read_csv('mtcars.csv')
```

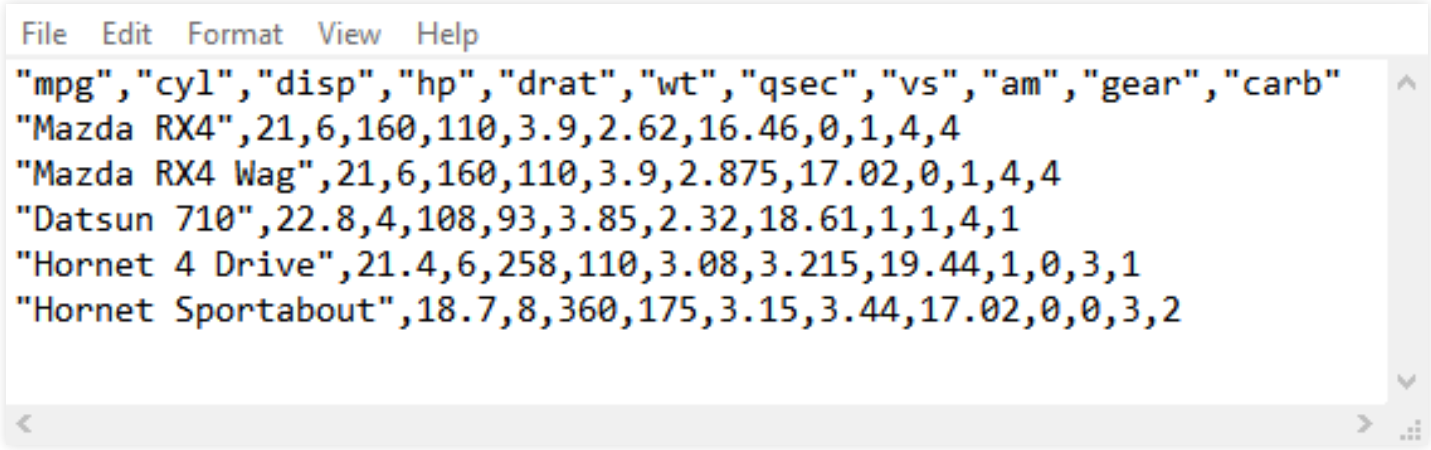
```
## # A tibble: 32 x 11
##      mpg   cyl  disp    hp  drat    wt  qsec    vs    am  gear  carb
##    <dbl> <int> <dbl> <int> <dbl> <dbl> <dbl> <int> <int> <int> <int>
##  1  21       6  160    110  3.9   2.62  16.5     0     1     4     4
##  2  21       6  160    110  3.9   2.88  17.0     0     1     4     4
##  3  22.8     4  108     93  3.85  2.32  18.6     1     1     4     1
##  4  21.4     6  258    110  3.08  3.22  19.4     1     0     3     1
##  5  18.7     8  360    175  3.15  3.44  17.0     0     0     3     2
##  6  18.1     6  225    105  2.76  3.46  20.2     1     0     3     1
##  7  14.3     8  360    245  3.21  3.57  15.8     0     0     3     4
##  8  24.4     4  147.    62  3.69  3.19  20       1     0     4     2
##  9  22.8     4  141.    95  3.92  3.15  22.9     1     0     4     2
## 10  19.2     6  168.   123  3.92  3.44  18.3     1     0     4     4
## # ... with 22 more rows
```

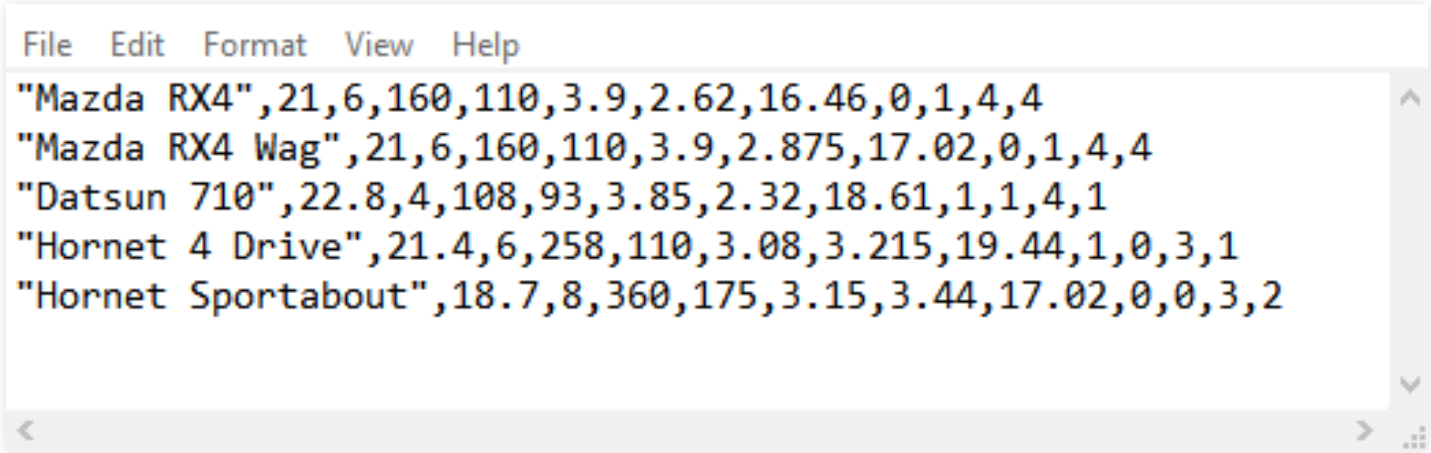
Read CSV File

```
read_delim('mtcars.csv', delim = ",")
```

```
## # A tibble: 32 x 11
##      mpg   cyl  disp    hp  drat    wt  qsec    vs    am  gear  carb
##    <dbl> <int> <dbl> <int> <dbl> <dbl> <dbl> <int> <int> <int> <int>
##  1  21       6  160    110  3.9   2.62  16.5     0     1     4     4
##  2  21       6  160    110  3.9   2.88  17.0     0     1     4     4
##  3  22.8     4  108     93  3.85  2.32  18.6     1     1     4     1
##  4  21.4     6  258    110  3.08  3.22  19.4     1     0     3     1
##  5  18.7     8  360    175  3.15  3.44  17.0     0     0     3     2
##  6  18.1     6  225    105  2.76  3.46  20.2     1     0     3     1
##  7  14.3     8  360    245  3.21  3.57  15.8     0     0     3     4
##  8  24.4     4  147.    62  3.69  3.19  20       1     0     4     2
##  9  22.8     4  141.    95  3.92  3.15  22.9     1     0     4     2
## 10  19.2     6  168.   123  3.92  3.44  18.3     1     0     4     4
## # ... with 22 more rows
```

Column Names





Column Names

```
read_csv('mtcars1.csv')
```

```
## Warning: Duplicated column names deduplicated: '4' => '4_1' [11]
```

```
## # A tibble: 31 x 11
##     `21`   `6` `160` `110` `3.9` `2.62` `16.46`   `0`   `1`   `4` `4_
##    <dbl> <int> <dbl> <int> <dbl>  <dbl>   <dbl> <int> <int> <int> <ir
##  1  21       6  160    110  3.9    2.88    17.0     0     1     4
##  2  22.8     4  108     93  3.85   2.32    18.6     1     1     4
##  3  21.4     6  258    110  3.08   3.22    19.4     1     0     3
##  4  18.7     8  360    175  3.15   3.44    17.0     0     0     3
##  5  18.1     6  225    105  2.76   3.46    20.2     1     0     3
##  6  14.3     8  360    245  3.21   3.57    15.8     0     0     3
##  7  24.4     4  147.    62  3.69   3.19    20       1     0     4
##  8  22.8     4  141.    95  3.92   3.15    22.9     1     0     4
##  9  19.2     6  168.   123  3.92   3.44    18.3     1     0     4
## 10  17.8     6  168.   123  3.92   3.44    18.9     1     0     4
## # ... with 21 more rows
```

Column Names

```
read_csv('mtcars1.csv', col_names = FALSE)
```

```
## # A tibble: 32 x 11
##       X1    X2    X3    X4    X5    X6    X7    X8    X9   X10   X11
##    <dbl> <int> <dbl> <int> <dbl> <dbl> <dbl> <int> <int> <int> <int>
##  1  21       6  160    110  3.9   2.62  16.5     0     1     4     4
##  2  21       6  160    110  3.9   2.88  17.0     0     1     4     4
##  3  22.8     4  108     93  3.85  2.32  18.6     1     1     4     1
##  4  21.4     6  258    110  3.08  3.22  19.4     1     0     3     1
##  5  18.7     8  360    175  3.15  3.44  17.0     0     0     3     2
##  6  18.1     6  225    105  2.76  3.46  20.2     1     0     3     1
##  7  14.3     8  360    245  3.21  3.57  15.8     0     0     3     4
##  8  24.4     4  147.    62  3.69  3.19  20       1     0     4     2
##  9  22.8     4  141.    95  3.92  3.15  22.9     1     0     4     2
## 10  19.2     6  168.   123  3.92  3.44  18.3     1     0     4     4
## # ... with 22 more rows
```

Skip Lines

File Edit Format View Help

```
"The data was extracted from the 1974 Motor Trend US magazine, and comprises fuel consumption and 10 aspects of automobile design
,,,,,,,,,,
A data frame with 32 observations on 11 variables.,,,,,,,,,,
,,,,,,,,,,
"[, 1]", mpg, Miles/(US) gallon,,,,,,,,
"[, 2]", cyl, Number of cylinders,,,,,,,,
"[, 3]", disp, Displacement (cu.in.),,,,,,,,
"[, 4]", hp, Gross horsepower,,,,,,,,
"[, 5]", drat, Rear axle ratio,,,,,,,,
"[, 6]", wt, Weight (1000 lbs),,,,,,,,
"[, 7]", qsec, 1/4 mile time,,,,,,,,
"[, 8]", vs, V/S,,,,,,,,
"[, 9]", am," Transmission (0 = automatic, 1 = manual)",,,,,,,,
"[,10]", gear, Number of forward gears,,,,,,,,
"[,11]", carb, Number of carburetors,,,,,,,,
,,,,,,,,,,
,,,,,,,,,,
"Henderson and Velleman (1981), Building multiple regression models interactively. Biometrics, 37, 391–411.",,,,,,,,,
,,,,,,,,,,
mpg,cyl,disp,hp,drat,wt,qsec,vs,am,gear,carb
21,6,160,110,3.9,2.62,16.46,0,1,4,4
21,6,160,110,3.9,2.875,17.02,0,1,4,4
22.8,4,108,93,3.85,2.32,18.61,1,1,4,1
```

Skip Lines

```
read_csv('mtcars2.csv')
```

```
## Warning: Missing column names filled in: 'X2' [2], 'X3' [3], 'X4' [4]
## 'X5' [5], 'X6' [6], 'X7' [7], 'X8' [8], 'X9' [9], 'X10' [10], 'X11' [
```

```
## # A tibble: 51 x 11
##    `The data was ex~ X2    X3    X4    X5    X6    X7    X8    X9
##    <chr>             <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr>
##  1 <NA>              <NA>  <NA>  <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
##  2 A data frame wit~ <NA>  <NA>  <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
##  3 <NA>              <NA>  <NA>  <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
##  4 [, 1]             mpg   Mile~ <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
##  5 [, 2]             cyl   Numb~ <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
##  6 [, 3]             disp  Disp~ <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
##  7 [, 4]             hp    Gros~ <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
##  8 [, 5]             drat  Rear~ <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
##  9 [, 6]             wt    Weig~ <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
## 10 [, 7]             qsec  1/4 ~ <NA>  <NA>  <NA>  <NA>  <NA>  <NA>
## # ... with 41 more rows, and 1 more variable: X11 <chr>
```

Skip Lines

```
read_csv('mtcars2.csv', skip = 19)
```

```
## # A tibble: 32 x 11
##      mpg   cyl  disp    hp  drat    wt  qsec    vs    am  gear  carb
##    <dbl> <int> <dbl> <int> <dbl> <dbl> <dbl> <int> <int> <int> <int>
##  1  21       6  160    110  3.9   2.62  16.5     0     1     4     4
##  2  21       6  160    110  3.9   2.88  17.0     0     1     4     4
##  3  22.8     4  108     93  3.85  2.32  18.6     1     1     4     1
##  4  21.4     6  258    110  3.08  3.22  19.4     1     0     3     1
##  5  18.7     8  360    175  3.15  3.44  17.0     0     0     3     2
##  6  18.1     6  225    105  2.76  3.46  20.2     1     0     3     1
##  7  14.3     8  360    245  3.21  3.57  15.8     0     0     3     4
##  8  24.4     4  147.    62  3.69  3.19  20       1     0     4     2
##  9  22.8     4  141.    95  3.92  3.15  22.9     1     0     4     2
## 10  19.2     6  168.   123  3.92  3.44  18.3     1     0     4     4
## # ... with 22 more rows
```

Maximum Lines

```
read_csv('mtcars.csv', n_max = 20)
```

```
## # A tibble: 20 x 11
##      mpg   cyl  disp    hp  drat    wt  qsec    vs    am  gear  carb
##    <dbl> <int> <dbl> <int> <dbl> <dbl> <dbl> <int> <int> <int> <int>
##  1  21       6 160     110  3.9   2.62  16.5     0     1     4     4
##  2  21       6 160     110  3.9   2.88  17.0     0     1     4     4
##  3  22.8     4 108      93  3.85  2.32  18.6     1     1     4     1
##  4  21.4     6 258     110  3.08  3.22  19.4     1     0     3     1
##  5  18.7     8 360     175  3.15  3.44  17.0     0     0     3     2
##  6  18.1     6 225     105  2.76  3.46  20.2     1     0     3     1
##  7  14.3     8 360     245  3.21  3.57  15.8     0     0     3     4
##  8  24.4     4 147.     62  3.69  3.19  20       1     0     4     2
##  9  22.8     4 141.     95  3.92  3.15  22.9     1     0     4     2
## 10  19.2     6 168.    123  3.92  3.44  18.3     1     0     4     4
## 11  17.8     6 168.    123  3.92  3.44  18.9     1     0     4     4
## 12  16.4     8 276.    180  3.07  4.07  17.4     0     0     3     3
## 13  17.3     8 276.    180  3.07  3.73  17.6     0     0     3     3
## 14  15.2     8 276.    180  3.07  3.78  18       0     0     3     3
```

Column Types

Data Type	Function
Integer	`col_integer()`
Double	col_double()
Logical	col_logical()
Categorical	col_factor()
Character	col_character()

Column Types

```
spec_csv('mtcars5.csv')
```

```
## cols(
##   mpg = col_double(),
##   cyl = col_integer(),
##   disp = col_double(),
##   hp = col_integer()
## )
```

Objective	Function
Specify column data types	`col_types()`
Skip column	col_skip()
Read spcecific columns	cols_only()

Column Types

```
read_csv('mtcars5.csv',
         col_types = list(col_double(), col_factor(levels = c(4, 6, 8)),
                          col_double(), col_integer()))
```

```
## # A tibble: 32 x 4
##      mpg cyl    disp    hp
##    <dbl> <fct> <dbl> <int>
##  1  21   6      160    110
##  2  21   6      160    110
##  3  22.8 4      108     93
##  4  21.4 6      258    110
##  5  18.7 8      360    175
##  6  18.1 6      225    105
##  7  14.3 8      360    245
##  8  24.4 4      147.    62
##  9  22.8 4      141.    95
## 10  19.2 6      168.   123
## # ... with 22 more rows
```

Skip Columns

```
read_csv('mtcars5.csv',
         col_types = list(col_double(), col_factor(levels = c(4, 6, 8)),
                          col_skip(), col_integer()))
```

```
## # A tibble: 32 x 3
##      mpg cyl      hp
##    <dbl> <fct> <int>
##  1  21   6       110
##  2  21   6       110
##  3  22.8 4        93
##  4  21.4 6       110
##  5  18.7 8       175
##  6  18.1 6       105
##  7  14.3 8       245
##  8  24.4 4        62
##  9  22.8 4        95
## 10  19.2 6       123
## # ... with 22 more rows
```

Read Specific Columns

```
read_csv('mtcars5.csv',
         col_types = cols_only(mpg = col_double(),
                               cyl = col_factor(levels = c(4, 6, 8))))
```

```
## # A tibble: 32 x 2
##      mpg cyl
##    <dbl> <fct>
##  1  21   6
##  2  21   6
##  3  22.8 4
##  4  21.4 6
##  5  18.7 8
##  6  18.1 6
##  7  14.3 8
##  8  24.4 4
##  9  22.8 4
## 10  19.2 6
## # ... with 22 more rows
```

Summary

Type	readr	Base R
comma	`read_csv()`	`read.csv()`
semicolon	read_csv2()	read.csv2()
tab	read_tsv()	read.delim() / read.table()
space	read_table()	read.table()
multiple spaces	read_table2()	read.table()
any delimiter	read_delim()	read.delim()

Thank You

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