Example PDF Document

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R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

```
# str(babynames)
str(mpg)
```

```
## tibble [234 x 11] (S3: tbl_df/tbl/data.frame)
##  $ manufacturer: chr [1:234] "audi" "audi" "audi" "audi" ...
##  $ model       : chr [1:234] "a4" "a4" "a4" "a4" ...
##  $ displ       : num [1:234] 1.8 1.8 2 2 2.8 2.8 3.1 1.8 1.8 2 ...
##  $ year        : int [1:234] 1999 1999 2008 2008 1999 1999 2008 1999 1999 2008 ...
##  $ cyl         : int [1:234] 4 4 4 4 6 6 6 4 4 4 ...
##  $ trans       : chr [1:234] "auto(l5)" "manual(m5)" "manual(m6)" "auto(av)" ...
##  $ drv         : chr [1:234] "f" "f" "f" "f" ...
##  $ cty         : int [1:234] 18 21 20 21 16 18 18 18 16 20 ...
##  $ hwy         : int [1:234] 29 29 31 30 26 26 27 26 25 28 ...
##  $ fl          : chr [1:234] "p" "p" "p" "p" ...
##  $ class       : chr [1:234] "compact" "compact" "compact" "compact" ...
```

Here, we try executing `python` code:

```
[2*i+3 for i in range(10)]
```

```
## [3, 5, 7, 9, 11, 13, 15, 17, 19, 21]
```

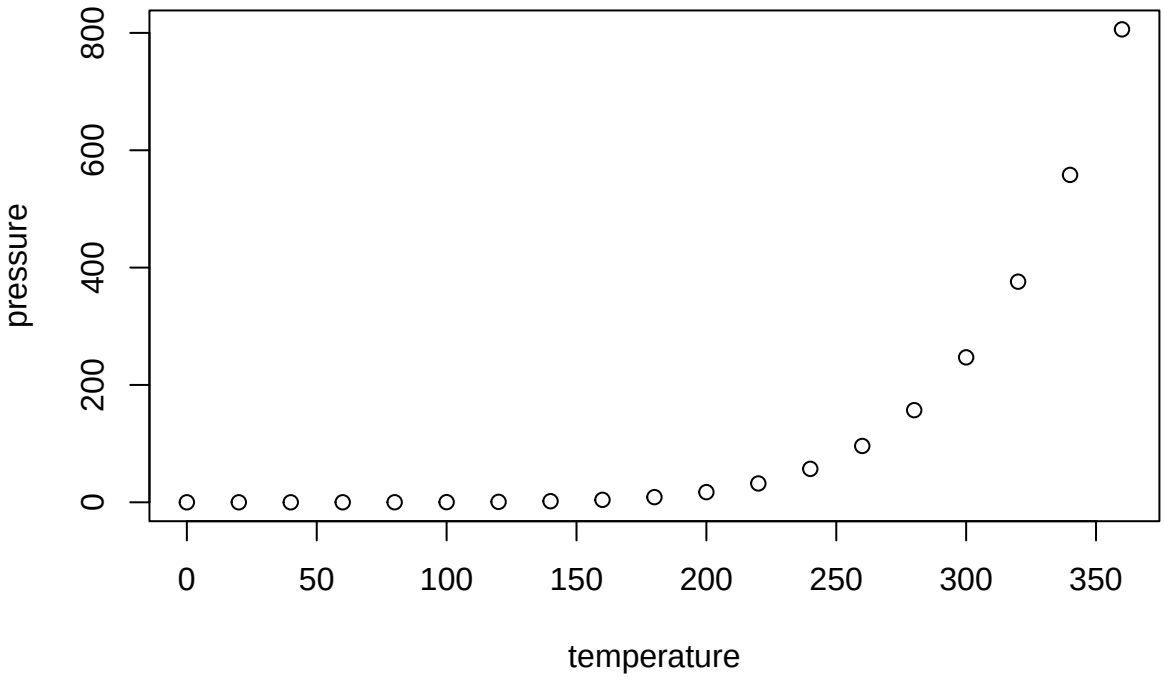
`Python` working well, so we get the simplicity of `Markdown` combined with `r` and `python` just by using `RMarkdown`.

What about `Mermaid` diagrams? Looks like the `DiagrammeR` library loaded properly, but I can't get the diagram codes to work.

```
# DiagrammeR::grViz("
#   digraph graph2 {

#   graph [layout = dot, rankdir = LR]

#   # node definitions with substituted label text
#   node [shape = oval]
#   a [label = '@@1']
#   b [label = '@@2']
#   c [label = '@@3']
#   d [label = '@@4']

#   a -> b -> c -> d
#   }

#   [1]: names(iris)[1]
#   [2]: names(iris)[2]
#   [3]: names(iris)[3]
#   [4]: names(iris)[4]
#   ",
#   height = 100)
```

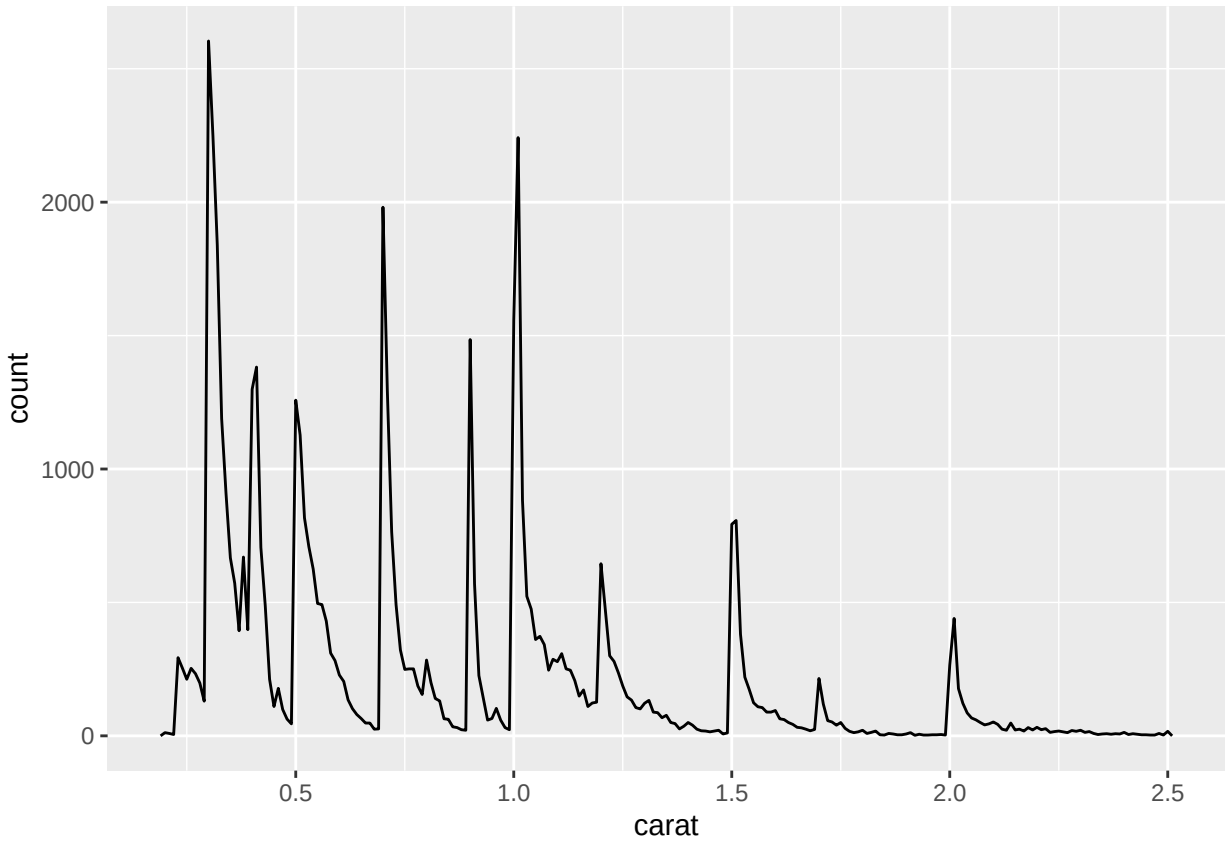
Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

We have data about 53940 diamonds. Only 126 are larger than 2.5 carats. The distribution of the remainder is shown below:



If you prefer that data be displayed with additional formatting you can use the knitr::kable function. The code below generates Table 27.1.

Table 1: A knitr kable.

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2
Valiant	18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1
Duster 360	14.3	8	360.0	245	3.21	3.570	15.84	0	0	3	4
Merc 240D	24.4	4	146.7	62	3.69	3.190	20.00	1	0	4	2
Merc 230	22.8	4	140.8	95	3.92	3.150	22.90	1	0	4	2
Merc 280	19.2	6	167.6	123	3.92	3.440	18.30	1	0	4	4

RMarkdown combines the simplicity of `Markdown` with the flexibility of `Latex` allowing you to input mathematical equations within pdf documents.

1. Text with `in line` β `code` or ...
2. `Check` with `in line` β `code`.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

A B
A B

$$
\begin{aligned}
v^2 &= u^2 + 2as && (1)\\
&= \exp(mt) \star \left\{ \frac{l}{2\sqrt{\pi t^3}} \exp(-l^2/4t) \right\} && (2)\\
&= F_1 * F_2 && (3)
\end{aligned}
$$

Another way to include `Latex` content is as follows: $\beta = 20.090625$

For inline formulas, enclose the formula in `$...$`. For displayed formulas, use `$$...$$`. These render differently. For example, type $\sum_{i=0}^{n} i^2 = \frac{(n^2+n)(2n+1)}{6}$ to show (which is inline mode) or type

$$\sum_{i=0}^{n} i^2 = \frac{(n^2+n)(2n+1)}{6}$$

to show as formula.

```
sequenceDiagram
Alice ->> Bob: Hello Bob, how are you?
Bob-->>John: How about you John?
Bob--x Alice: I am good thanks!
Bob-x John: I am good thanks!
Note right of John: Bob thinks a long<br/>
long time, so long<br/>
that the text does<br/>
not fit on a row.

Bob-->Alice: Checking with John...
Alice->John: Yes... John, how are you?
```

$$
\begin{aligned}
v^2 &= u^2 + 2as\\
10^2 &= u^2 + 2(10)(3.2)\\
u^2 &= 100 - 64\\
&= 36\\
u &= \sqrt{36}\\
&= 6ms^{-1}
\end{aligned}
$$