1 Using R and Latex together

Save this text file as text.Rnw and we'll use the knitr package in R to preprocess this, before compiling it in Latex and producing a pdf.

To do this, I used the command line in linux after installing R and all the TexLive packages.

Once you've installed R, start it up and run the following commands; *install.packages("knitr") install.packages("ggplot2") install.packages("kable")*

You'll be prompted to set a mirror for each, which is a location you can download from, use the one closest to you. After this, quit out of R.

Let's test using R and Latex using the mtcars dataset.

I followed the instructions here http://edrub.in/ARE212/latexKnitr.html and here https://sachsmc.github.io/knit-git-markr-guide/knitr/knit.html

Remember indexing starts at 1 not 0

I ran this outside Rstudio, although I think you could get it to work from inside that.

The sapply function just runs the functions mean and sd on each column in the mtcars dataframe.

2+2 is a demonstration

```
n <- 100
x <- rnorm(n)
y <- 2*x + rnorm(n)
out <- lm(y ~ x)
library(knitr)
kable(summary(out)$coef, digits=2)
```

	Estimate	Std. Error	t value	Pr(¿—t—)
(Intercept)	0.18	0.11	1.69	0.09
x	2.12	0.10	20.35	0.00

```
data(mtcars)
mean<-sapply(mtcars,mean)
sd<-sapply(mtcars,sd)
2+2

## [1] 4

print("dataframe without nice formatting")

## [1] "dataframe without nice formatting"

mtcars

##                    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
## Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
## Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
## Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
## Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
## Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
## Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
## Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
## Fiat 128            32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1
## Honda Civic         30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2
## Toyota Corolla      33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
## Toyota Corona       21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
## Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
## AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
## Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
## Pontiac Firebird    19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
## Fiat X1-9           27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
## Porsche 914-2       26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
## Lotus Europa        30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2
## Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
## Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
## Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
## Volvo 142E          21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
```

```
print("dataframe with nice formatting")
```

```
## [1] "dataframe with nice formatting"
```

```
kable(head(mtcars), digits=2)
```

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160	110	3.90	2.62	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160	110	3.90	2.88	17.02	0	1	4	4
Datsun 710	22.8	4	108	93	3.85	2.32	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258	110	3.08	3.21	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360	175	3.15	3.44	17.02	0	0	3	2
Valiant	18.1	6	225	105	2.76	3.46	20.22	1	0	3	1

```
print("Means of each column in mtcars")
```

```
## [1] "Means of each column in mtcars"
```

```
mean
```

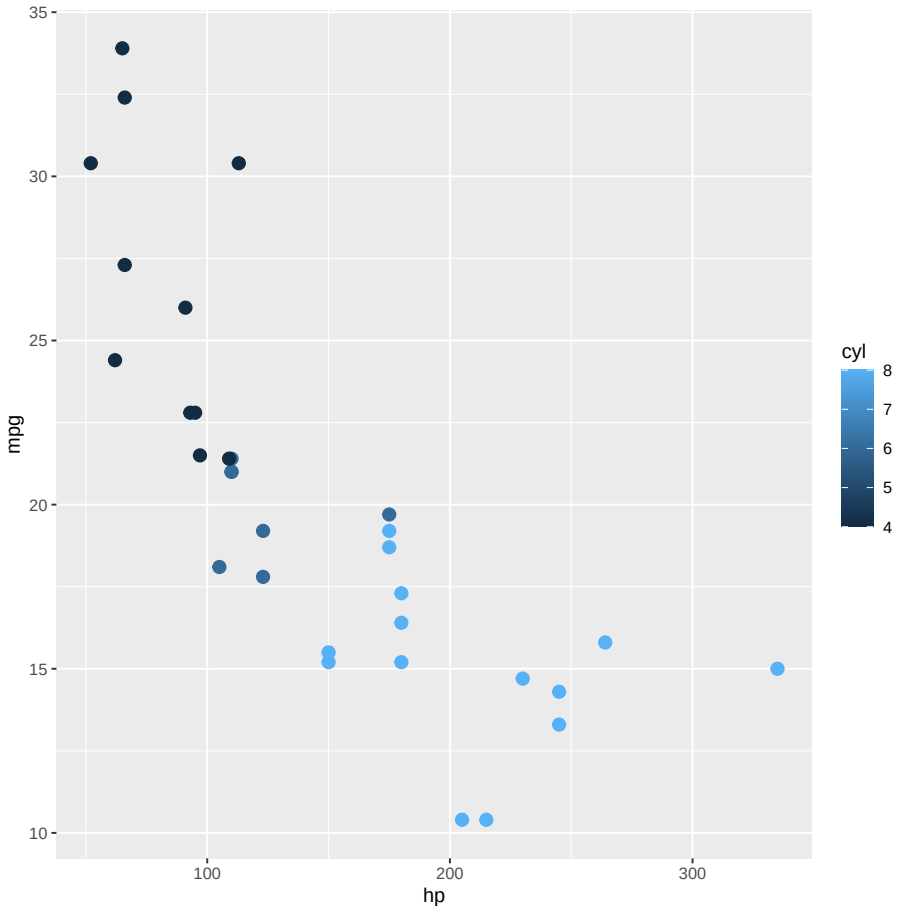
```
##        mpg        cyl       disp         hp       drat         wt       qsec
##  20.090625   6.187500 230.721875 146.687500   3.596563   3.217250  17.848750
##         vs         am       gear       carb
##   0.437500   0.406250   3.687500   2.812500
```

Now we've done tables, let's try using ggplot2.

```
library('ggplot2')
sd
```

```
##         mpg         cyl        disp          hp        drat          wt
##   6.0269481   1.7859216 123.9386938  68.5628685   0.5346787   0.9784574
##        qsec          vs          am        gear        carb
##   1.7869432   0.5040161   0.4989909   0.7378041   1.6152000
```

```
ggplot(mtcars, aes(x=hp, y=mpg, color=cyl)) +
    geom_point(size=3)
```



2 Building the document

All of these commands should be run from the commandline in the directory containing text.Rnw, by the user who ran install.packages.

2.1 Create the tex file

Rscript -e "library(knitr); knit('text.Rnw')"
This will take this document(text.Rnw) and produces a text.tex file.
pdflatex text.tex
This takes your text.tex file and produces a file called text.pdf