# post2

## 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.

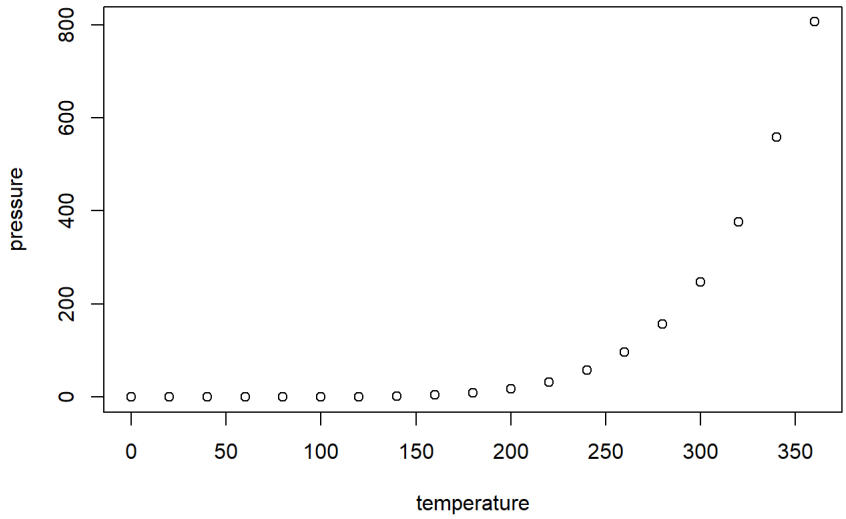
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
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
```

## 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

```
#while taking stat134, I learned about normal distribution, binomial distribution and poisson distribution
#this time I want to use R to see how random numbers generated by these three distributions are distributed and ho
w close are these numbers that are randomly generated
#in order to better visualize this, I will use the package 'rgl'
#RGL is a 3D real-time rendering system for R. Multiple windows are managed at a time.
library("rgl")
```

```
## Warning: package 'rgl' was built under R version 3.4.3
```

```r
#5000 numbers randomly generated by a normal distribution
#with mean=0 and standard deviation=1

graph1<- rnorm(5000,0,1)

#now I use seq() to divide the 5000 numbers generated by the normal distribution
#and then I aline these three groups to x-axis y-axis and z-axis so that it is easier to visualize

x <- graph1[seq(1, length(graph1), 3)]
y<- graph1[seq(2, length(graph1), 3)]
z<- graph1[seq(3, length(graph1), 3)]
#created a lim function to limit the maximum value and the min value of something based on the value of the input
lim <- function(x){c(-max(abs(x)), max(abs(x))) * 1.3}
#now importing the rgl package
rgl.open()

rgl.bg(color="white")# background color
#use spheres to represent each number generated
rgl.spheres(x, y, z, r = 0.5, color = "lightblue")

#now create x,y,z axises, with each axis limited by 1.3 times of its max and min values
#different colors each axis and with the line thickness of 2
rgl.lines(lim(x), c(0, 0), c(0, 0), lw=2, color = "black")
rgl.lines(c(0, 0), lim(y), c(0, 0), lw=2, color = "red")
rgl.lines(c(0, 0), c(0, 0), lim(z), lw=2, color = "blue")
grid3d(c("x", "y", "z"))
#does it show on markdown file?
#if not, would you please run it and a window will pop up

#as we can see, the numbers are pretty close to the origin with approximately a mean of 0
```

```r
graph2<- rbinom(5000,100,0.5)
#try again with random number generated by a binomial distribution
x <- graph2[seq(1, length(graph2), 3)]
y<- graph2[seq(2, length(graph2), 3)]
z<- graph2[seq(3, length(graph2), 3)]

lim <- function(x){c(-max(abs(x)), max(abs(x))) * 1.3}

rgl.open()
rgl.bg(color="white")
rgl.spheres(x, y, z, r = 0.5, color = "lightblue")
rgl.lines(lim(x), c(0, 0), c(0, 0), lw=2, color = "black")
rgl.lines(c(0, 0), lim(y), c(0, 0), lw=2, color = "red")
rgl.lines(c(0, 0), c(0, 0), lim(z),  lw=2, color = "blue")
grid3d(c("x", "y", "z"))
#as we can see, the numbers are pretty close to the mean, with is 100*0.5=50, the numbers are distributed along th
e mean, and there are a few exceptions where some numbers are pretty for from the mean.
```

```r
graph3<- rpois(5000,10)
#again with poison distribution
x <- graph3[seq(1, length(graph3), 3)]
y<- graph3[seq(2, length(graph3), 3)]
z<- graph3[seq(3, length(graph3), 3)]

lim <- function(x){c(-max(abs(x)), max(abs(x))) * 1.3}

rgl.open()
rgl.bg(color="white")
rgl.spheres(x, y, z, r = 0.5, color = "lightblue")
rgl.lines(lim(x), c(0, 0), c(0, 0), lw=2,color = "black")
rgl.lines(c(0, 0), lim(y), c(0, 0), lw=2, color = "red")
rgl.lines(c(0, 0), c(0, 0), lim(z), lw=2, color = "blue")
grid3d(c("x", "y", "z"))
#numbers generated by poisson distribution are also distributed along mean; however , there are few exceptions. An
d the exceptions are more likely to appear on one side of the graph.
```

```r
#overall, I think the numbers distributed by the normal distribution is probably better than the numbers by the ot
her two because the other two tend to have more exceptions from the norm.
```