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# Rudy Meza
# Machine Learning in R
# Michael Chang
# Spring
                                    # '***Lab_and_Quiz***'
# '*******************************Machine Learning*********************************'
# '*******************************Lab 2.3**********************************'
# '***************************2.3.1_Basic_Commands*********'
x <- c(1,3,2,5)
x

x = c(1,6,2)

x

y = c(1,4,3)

length(x)

length(y)

x+y

ls()

rm(x,y)

ls()

rm(list=ls())

x=matrix (data=c(1,2,3,4) , nrow=2, ncol =2)

x

matrix (c(1,2,3,4) ,2,2,byrow =TRUE)

sqrt(x)

x^2

x=rnorm(50)

x

y=x+rnorm (50, mean=50, sd=.1)
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```
cor(x,y)

set.seed (1303)

rnorm(50)

set.seed (3)

y=rnorm (100)

mean(y)

var(y)


sqrt(var(y))

sd(y)
# '****************2.3.2 Graphics********************************'
x=rnorm (100)
y=rnorm (100)
plot(x,y)
plot(x,y,xlab=" this is the x-axis",ylab=" this is the y-axis",
    main=" Plot of X vs Y")

pdf (" Figure .pdf ")
plot(x,y,col =" green ")
dev.off ()
x=seq (1 ,10)
x
x=1:10
x

x=seq(-pi ,pi ,length =50)

y=x
f=outer(x,y,function (x,y)cos(y)/(1+x^2))
contour (x,y,f)
contour (x,y,f,nlevels =45, add=T)
fa=(f-t(f))/2
contour (x,y,fa,nlevels =15)

image(x,y,fa)
persp(x,y,fa)
persp(x,y,fa ,theta =30)
persp(x,y,fa ,theta =30, phi =20)
persp(x,y,fa ,theta =30, phi =70)
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persp(x,y,fa ,theta =30, phi =40)

# '***************************2.3.3 Indexing Data********************'

A=matrix (1:16 ,4 ,4)
A
A[2,3]

A[c(1,3) ,c(2,4) ]

A[1:3 ,2:4]

A[1:2 ,]

A[ ,1:2]


A[1,]

A[-c(1,3) ,]

# '******dim function outputs number of rows followed by number of columns*************'
dim(A)

# '**********2.3.4 Reading Data********************************'

setwd("C:/Time-Series/Data Science/Machine Learning in R/Module 1")

Auto=read.table ("Auto.data ")
fix(Auto)

Auto=read.table ("Auto.data", header =T,na.strings ="?")
fix(Auto)

Auto.data <- read.csv("C:/Time-Series/Data Science/Machine Learning in R/Module 1/Auto.data.csv",
stringsAsFactors=FALSE, header=TRUE, na.strings="?")
fix(Auto)
dim(Auto)

Auto=na.omit(Auto)
dim(Auto)

names(Auto)

# '****2.3.5 Additional Graphical and Numerical Summaries*******'

plot(Auto$cylinders , Auto$mpg )
attach (Auto)
```

```r
plot(cylinders , mpg)

cylinders =as.factor (cylinders )

plot(cylinders , mpg)
plot(cylinders , mpg , col ="red ")
plot(cylinders , mpg , col ="red", varwidth =T)
plot(cylinders , mpg , col ="red", varwidth =T,horizontal =T)
plot(cylinders , mpg , col ="red", varwidth =T, xlab=" cylinders ",
    ylab ="MPG ")

hist(mpg)
hist(mpg ,col =2)
hist(mpg ,col =2, breaks =15)

pairs(Auto)
pairs(~ mpg + displacement + horsepower + weight +
      acceleration , Auto)

plot(horsepower ,mpg)
identify (horsepower ,mpg ,name)

summary(Auto)

# '**************Quiz***************************'

# 'Question (1)'

set.seed (3)

y=rnorm (1000)

summary(y)

# 'Question (2)'

?matrix

# 'Question (3)'

x=matrix (c(1:25) ,5,5,byrow =TRUE)
x
x[3,]

# 'Question (4)'

setwd("C:/Time-Series/Data Science/Machine Learning in R/Module 1")
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```r
Auto <- read.csv("C:/Time-Series/Data Science/Machine Learning in R/Module 1/Auto.data.csv",
stringsAsFactors=FALSE, header=TRUE, na.strings="?")
fix(Auto)
dim(Auto)
Auto=na.omit(Auto)
dim(Auto)

# 'Question (5)'

attach(Auto)

cylinders =as.factor (cylinders )

plot(cylinders , mpg)

# 'Question (6)'
hist(mpg)
hist(mpg ,col =2)
hist(mpg ,col =2, breaks =15)


# 'Question (7)'

pairs(~ mpg + displacement + horsepower + weight +
      acceleration , Auto)
```