

### Util Functions

<code>getwd()</code>	gets working dir
<code>setwd("C:/file/path")</code>	set working dir
<code>help.start()</code>	open help
<code>install.packages("package")</code>	install package
<code>library("package")</code>	make content available
<code>detach("package")</code>	detach package
<code>x=read.csv(file.choose())</code>	import data
<code>ls()</code>	list the variables
<code>str(var)</code>	structure of variable
<code>rm(var)</code>	remove variable

### Arrays and Matrix

<code>1D = array(1:24)</code>	1-D array
<code>2D=array(1:24,dim=c(6,4))</code>	2-D array
<code>3D=array(1:24,dim=c(4,3,2))</code>	3-D array
<code>matrix(1:12,nrow=4,ncol=3)</code>	matrix
<code>rbind/cbind(mat1,mat2)</code>	row/col bind
<code>t(mat)</code>	transpose

### Descriptive Statistics

<code>rowMeans(data[])/ colMeans(data[])</code>	row/ column mean
<code>rowSums(data[])/ colSums(data[])</code>	row / column sum

### Graphical Plots

<code>qplot(data, line=TRUE,...)</code>	produces quantile-quantile plot
<code>ggplot(data = NULL, mapping = aes(), ...)</code>	initializes a ggplot object
<code>geom_bar()</code>	bar graph
<code>coord_flip()</code>	flip x and y coordinates
<code>facet_grid()</code>	lay out panels in a grid
<code>geom_density/hist/point</code>	density/histogram/scatter plot

### Strings

<code>toString(x)</code>	produces a single character string
<code>toupper()/tolower()</code>	converts to upper/lower case
<code>substring(chr,n,n)</code>	retrieves/replaces the substring
<code>paste(..., sep=" ", collapse=NULL)</code>	Convert to character + Concatenate

### Vector

<code>num = c(1,2,3,4,5,6)</code>	numeric vector
<code>chr = c("aaa","bbb")</code>	character vector
<code>log = c(TRUE,TRUE,FALSE)</code>	logical vector
<code>mean(vec)</code>	mean
<code>sd(vec)</code>	standard deviation
<code>var(vec)</code>	variance
<code>range(vec)</code>	range
<code>which.min(vec)/which.max(vec)</code>	position of the min/max value
<code>rep(1:5,times=3)</code>	Replicate elements of vector

### Probability Distributions

<code>rbinom(n, size, prob)</code>	Binomial
<code>rpois(n,size)</code>	Poisson
<code>runif(n, min = 0, max = 1)</code>	Uniform
<code>rnorm(n,mean,sd)</code>	Normal
<code>rexp(n)</code>	Exponential

### Data Frames

<code>df = data.frame(subjectID=1:5,gender=c("M","F","M","M","F"),score=c(8,3,6,5,5))</code>	Created data frames in R
<code>fw = read.csv(file.choose())</code>	Importing data by choosing a file
<code>grass = read.csv('C:/Users/Downloads/grass.csv')</code>	Importing data by specifying paths
<code>view(df)</code>	opens editor
<code>rbind(a_data_frame, another_data_frame)</code>	Bind rows/columns of frames
<code>merge(frame1, frame2, by="x")</code>	Merge 2 data frames
<code>summary(df)</code>	returns descriptive statistics of data

### Loops

<code>if (condition){ Do something }</code>	ifelse statement
<code>else { Do something different }</code>	
<code>while (condition){ Do something }</code>	while loop
<code>for (variable in sequence){ Do something }</code>	for loop



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### Hypothesis testing

<code>t.test(data)</code>	1 sample t test
<code>t.test(data1,data2)</code>	2 sample t test
<code>t.test(pre,post,paired=TRUE)</code>	paired sample t test
<code>wilcox.test(data)</code>	Wilcox test
<code>cor.test(data1,data2)</code>	correlation test
<code>chisq.test(data)</code>	Chi square test
<code>shapiro.test(data)</code>	Shapiro test
<code>aov()</code>	ANOVA
<code>summary(lm(y ~ x1 + x2 + x3, data=mydata))</code>	multiple regression
<code>summary(glm(y ~ x1 + x2 + x3, family="", data=mydata))</code>	classification
<code>cluster = kmeans(data)</code>	cluster analysis



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