EPPS 6323: Lab01 R programming basics I

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R Programming Basic Commands

Create object using the assignment operator (<-, =)

```
x <- c(1,3,2,5)
x
```

```
[1] 1 3 2 5
```

```
x = c(1,6,2)
x
```

```
[1] 1 6 2
```

```
y = c(1,4,3)
```

Using function

```
length(x)  # What does length() do?
```

```
[1] 3
```

```
length(y)
```

```
[1] 3
```

Using +, -, *, /,^ operators

```r
x+y
```

```
[1]  2 10  5
```

```r
ls() # List objects in the environment
```

```
[1] "has_annotations" "x"               "y"
```

```r
rm(x,y) # Remove objects
ls()
```

```
[1] "has_annotations"
```

```r
rm(list=ls()) # Danger! What does this do?  Not recommended!
```

Matrix operations

```r
?matrix
```

```
starting httpd help server ... done
```

```r
x=matrix(data=c(1,2,3,4), nrow=2, ncol=2) # Create a 2x2 matrix object
x
```

```
     [,1] [,2]
[1,]    1    3
[2,]    2    4
```

```r
x=matrix(c(1,2,3,4),2,2)
matrix(c(1,2,3,4),2,2,byrow=T) # What about byrow=F?
```

```
     [,1] [,2]
[1,]    1    2
[2,]    3    4
```

```
sqrt(x) # What does x look like?
```

```
         [,1]     [,2]
[1,] 1.000000 1.732051
[2,] 1.414214 2.000000
```

```
x
```

```
     [,1] [,2]
[1,]    1    3
[2,]    2    4
```

```
x^2
```

```
     [,1] [,2]
[1,]    1    9
[2,]    4   16
```

```
x=rnorm(50) # Generate a vector of 50 numbers using the rnorm() function

y=x+rnorm(50,mean=50,sd=.1) # What does rnorm(50,mean=50,sd=.1) generate?

cor(x,y) # Correlation of x and y
```

```
[1] 0.9973041
```

```
set.seed(1303) # Set the seed for Random Number Generator (RNG) to generate values that ar
rnorm(50)
```

```
 [1] -1.1439763145  1.3421293656  2.1853904757  0.5363925179  0.0631929665
 [6]  0.5022344825 -0.0004167247  0.5658198405 -0.5725226890 -1.1102250073
[11] -0.0486871234 -0.6956562176  0.8289174803  0.2066528551 -0.2356745091
[16] -0.5563104914 -0.3647543571  0.8623550343 -0.6307715354  0.3136021252
[21] -0.9314953177  0.8238676185  0.5233707021  0.7069214120  0.4202043256
[26] -0.2690521547 -1.5103172999 -0.6902124766 -0.1434719524 -1.0135274099
[31]  1.5732737361  0.0127465055  0.8726470499  0.4220661905 -0.0188157917
[36]  2.6157489689 -0.6931401748 -0.2663217810 -0.7206364412  1.3677342065
[41]  0.2640073322  0.6321868074 -1.3306509858  0.0268888182  1.0406363208
[46]  1.3120237985 -0.0300020767 -0.2500257125  0.0234144857  1.6598706557
```

```
set.seed(3) # Try different seeds?
y=rnorm(100)
```

Simple descriptive statistics (base)

```
mean(y)
```

```
[1] 0.01103557
```

```
var(y)
```

```
[1] 0.7328675
```

```
sqrt(var(y))
```

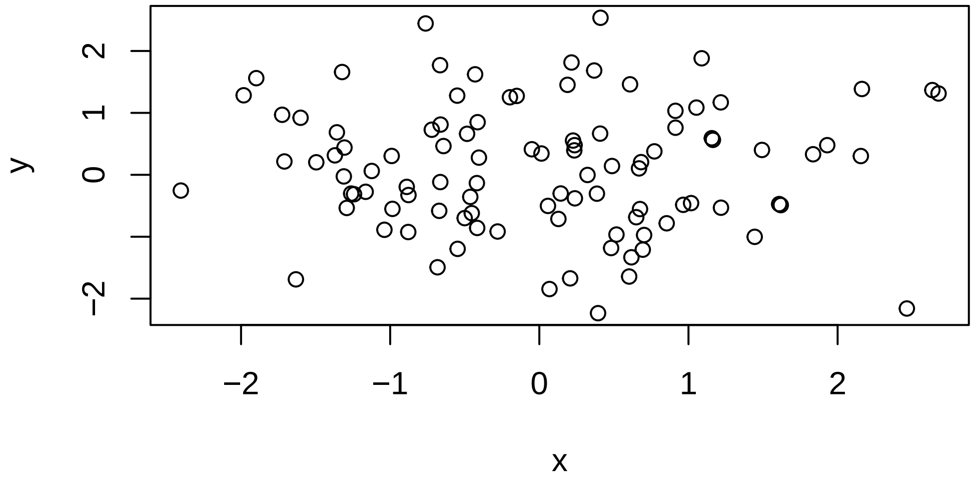
```
[1] 0.8560768
```

```
sd(y)
```

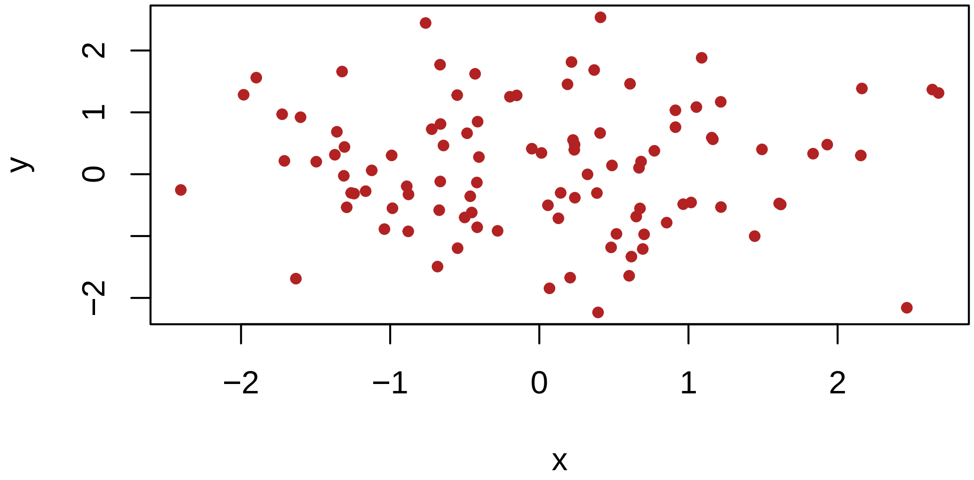
```
[1] 0.8560768
```

Visualization using R Graphics (without packages)

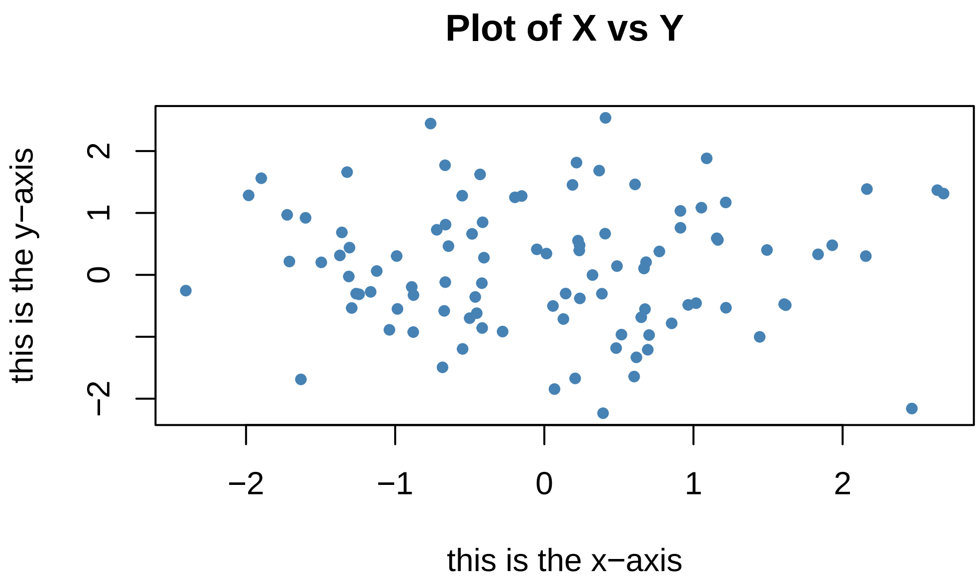
```
x=rnorm(100)
y=rnorm(100)
plot(x,y)
```



```
plot(x,y, pch=20, col = "firebrick") # Scatterplot for two numeric variables by default
```



```
plot(x,y, pch=20, col = "steelblue",xlab="this is the x-axis",ylab="this is the y-axis",ma
```



```
pdf("Figure01.pdf") # Save as pdf, add a path or it will be stored on the project director
plot(x,y,pch=20, col="forestgreen") # Try different colors?
dev.off() # Close the file using the dev.off function
```

```
pdf
  2
```

```
x=seq(1,10) # Same as x=c(1:10)
x
```

```
 [1]  1  2  3  4  5  6  7  8  9 10
```

```
x=1:10
x
```

```
 [1]  1  2  3  4  5  6  7  8  9 10
```

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