Lab1 key

#1. Start R Studio and in the R pane, create a vector, x, with entries 1,1,2,3,4,5,3,4.

```r
x <- c(1, 1, 2, 3, 4, 5, 3, 4)
x
```

## [1] 1 1 2 3 4 5 3 4

#2. Create another vector, y, with entries 10,8,8,9,5,3,4,2.

```r
y <- c(10, 8, 8, 9, 5, 3, 4, 2)
y
```

## [1] 10 8 8 9 5 3 4 2

#3. Evaluate all of the following: 2*x, exp(x), x*y, x+y, the matrix product of the vector x and the transpose of the vector y, the matrix product of the transpose of vector x and the vector y.

```r
2*x
```

## [1]  2  2  4  6  8 10  6  8

```r
exp(x)
```


```r
x*y
```

## [1] 10 8 16 27 20 15 12 8

```r
x+y
```

## [1] 11 9 10 12 9 8 7 6

```r
x%*%t(y)
```

## [1,]   10    8    8    9    5    3    4    2
## [2,]   10    8    8    9    5    3    4    2
## [3,]   20   16   16   18   10    6    8    4
## [4,]   30   24   24   27   15    9   12    6
## [5,]   40   32   32   36   20   12   16    8
## [6,]   50   40   40   45   25   15   20   10
## [7,]   30   24   24   27   15    9   12    6
## [8,]   40   32   32   36   20   12   16    8

```r
t(x)%*%y
```

## [1]
## [1,] 116
#4. See what objects are in your workspace by typing `objects()`.
```r
objects()
```
```markdown
## [1] "x" "y"
```

#5. Make up two new objects, z that is x-y and w that is log(x)+y. Display both of these.
```r
z = x - y
z
```
```markdown
## [1] -9 -7 -6 -6 -1 2 -1 2
```
```r
w = log(x) + y
w
```
```markdown
## [8] 3.386294
```

#6. See what objects are now in your workspace.
```r
objects()
```
```markdown
## [1] "w" "x" "y" "z"
```

#7. Remove w from your workspace by typing `rm(w)`.
```r
rm(w)
```

#8. See what objects are now in your workspace.
```r
objects()
```
```markdown
## [1] "w" "x" "y" "z"
```

#9. Type `rm(list=ls())` and then check what objects are now in your workspace.
```r
rm(list=ls())
```

#10. Recreate the vectors x and y.
```r
x <- c(1, 1, 2, 3, 4, 5, 3, 4)
y <- c(10, 8, 8, 9, 5, 3, 4, 2)
```

```r
x[3]
```
```markdown
## [1] 2
```
```r
x[3:5]
```
```markdown
## [1] 2 3 4
```

#12. Type `x[2] <- 2` and then look again at x. What has happened?
```r
x[2] <- 2
x
```
```markdown
## [1] 1 2 2 3 4 5 3 4
```

#12. Evaluate both the sample mean and the sample standard deviation of the entries of the vector `x`.
```r
mean(x)
```
#13. Plot y versus x. Plot x versus y. Notice that you may save or copy these plots using
"Export" menu is R Studio (for later pasting into a document).

```r
plot(x,y)
```

```r
plot(y,x)
```
#14. Type the code below into a new R Script file in the upper left pane. Then highlight it and run it.

```r
z <- cbind(x[1:4], y[5:8])
w <- rbind(x[1:4], y[5:8])
z

## [,1] [,2]
## [1,] 1 5
## [2,] 2 3
## [3,] 2 4
## [4,] 3 2

w

## [1,] 1 2 2 3
## [2,] 5 3 4 2

z[2,1]

## [1] 2

w[2,1]

## [1] 5
```

# (cbind is binding together as columns and rbind is binding together as rows.)
#15. Load the datasets package by checking it in the lower right R Studio pane. Then
click on the link to get to the documentation for the package. Examine the
documentation of the
stackloss dataset. Type stackloss in the R pane. What appears?

```r
stackloss
```
```
##    Air.Flow Water.Temp Acid.Conc. stack.loss
## 1        80         27         89         42
## 2        80         27         88         37
## 3        75         25         90         37
## 4        62         24         87         28
## 5        62         22         87         18
## 6        62         23         87         18
## 7        62         24         93         19
## 8        62         24         93         20
## 9        58         23         87         15
## 10       58         18         80         14
## 11       58         18         89         14
## 12       58         17         88         13
## 13       58         18         82         11
## 14       58         19         93         12
## 15       50         18         89          8
## 16       50         18         86          7
## 17       50         19         72          8
## 18       50         19         79          8
## 19       50         20         80          9
## 20       56         20         82         15
## 21       70         20         91         15
```

#16. See what objects are now in your workspace.
(By the way, if you type Stackloss<-stackloss and now check to see what objects are in
your workspace, the new version of the dataset should appear in the list of objects. Apparently,
although the built-in version of the dataset is available to you, it is not formally loaded into #your workspace, but the assignment of it to a new name makes the newly named object a formal #part of the workspace.)

```r
objects()
```
```
## [1] "w" "x" "y" "z"
```

#17. Type summary(stackloss). What is produced? What happens if you type #stackloss[3,3]?

```r
summary(stackloss)
```
```
##    Air.Flow Water.Temp Acid.Conc. stack.loss
##  Min.   :50.00   Min.   :17.0   Min.   :72.00   Min.   : 7.00
```
## 1st Qu.:56.00 1st Qu.:18.0 1st Qu.:82.00 1st Qu.:11.00
## Median :58.00 Median :20.0 Median :87.00 Median :15.00
## Mean :60.43 Mean :21.1 Mean :86.29 Mean :17.52
## 3rd Qu.:62.00 3rd Qu.:24.0 3rd Qu.:89.00 3rd Qu.:19.00
## Max. :80.00 Max. :27.0 Max. :93.00 Max. :42.00

stackloss[3,3]

## [1] 90

#18. Type stackloss[,1]. What do you get?
stackloss[,1]

## [1] 80 80 75 62 62 62 62 62 58 58 58 58 58 58 58 50 50 50 50 50 50 50 50 50 56 70

#19. Make a histogram for stackloss[,1].
hist(stackloss[,1])

#20. Type pairs(stackloss). What is produced?
pairs(stackloss)