UNIVERSIDAD AUTÓNOMA DEL ESTADO DE MÉXICO
FACULTAD DE CIENCIAS
LICENCIATURA EN BIOTECNOLOGÍA
BIOINFORMÁTICA AVANZADA
PROFESOR: ARMANDO SUNNY GARCÍA AGUILAR
ALUMNO: SCARLETT SOFÍA SÁNCHEZ CALLEROS
ACTIVIDAD EN RSTUDIO CON BASE DE DATOS DE MTCARS

```
#Abrir "mtcars"
str(mtcars)
data<-as.matrix(mtcars)
View(data)
```

RStudio Source Editor

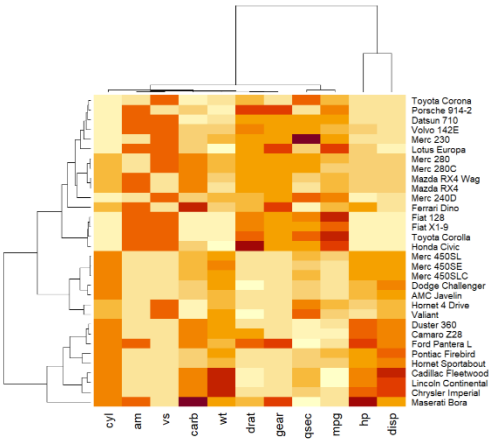
data

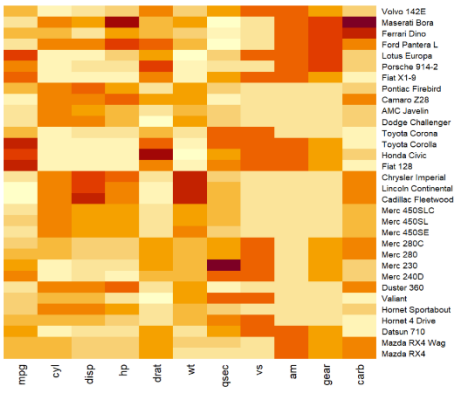
Filter

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2
Valiant	18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1
Duster 360	14.3	8	360.0	245	3.21	3.570	15.84	0	0	3	4
Merc 240D	24.4	4	146.7	62	3.69	3.190	20.00	1	0	4	2
Merc 230	22.8	4	140.8	95	3.92	3.150	22.90	1	0	4	2
Merc 280	19.2	6	167.6	123	3.92	3.440	18.30	1	0	4	4
Merc 280C	17.8	6	167.6	123	3.92	3.440	18.90	1	0	4	4
Merc 450SE	16.4	8	275.8	180	3.07	4.070	17.40	0	0	3	3
Merc 450SL	17.3	8	275.8	180	3.07	3.730	17.60	0	0	3	3
Merc 450SLC	15.2	8	275.8	180	3.07	3.780	18.00	0	0	3	3
Cadillac Fleetwood	10.4	8	472.0	205	2.93	5.250	17.98	0	0	3	4
Lincoln Continental	10.4	8	460.0	215	3.00	5.424	17.82	0	0	3	4
Chrysler Imperial	14.7	8	440.0	230	3.23	5.345	17.42	0	0	3	4
Fiat 128	32.4	4	78.7	66	4.08	2.200	19.47	1	1	4	1
Honda Civic	30.4	4	75.7	52	4.93	1.615	18.52	1	1	4	2
Toyota Corolla	33.9	4	71.1	65	4.22	1.835	19.90	1	1	4	1
Toyota Corona	21.5	4	120.1	97	3.70	2.465	20.01	1	0	3	1

Showing 1 to 21 of 32 entries, 11 total columns

```
#Heatmap
heatmap(data, scale="column")
heatmap(data, Colv = NA, Rowv = NA, scale="column")
```






```
#CORRELACIONES PARA ANOVA
my_group <- as.numeric(as.factor(substr(rownames(data), 1 , 1)))
mtcars$cyl <- as.factor(mtcars$cyl)
mtcars$am <- as.factor(mtcars$am)
mtcars$vs <- as.factor(mtcars$vs)
mtcars$gear <- as.factor(mtcars$gear)
class(mtcars$cyl)
class(mtcars$am)
class(mtcars$vs)
class(mtcars$gear)
AnovaOneWay <- aov(wt~cyl, data = mtcars)
summary(AnovaOneWay)
```

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```
> summary(AnovaOneWay)
            Df Sum Sq Mean Sq F value   Pr(>F)
cyl          2  18.18   9.088   22.91 1.07e-06 ***
Residuals   29  11.50   0.397
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

```
#PROMEDIO EN LOOPS
df<-mtcars
df
View(df)
output<-vector("double",ncol(df))for(i in seq_along(df)){output[[i
output
```

Console Terminal Background Jobs

R 4.3.2 · ~/

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Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1	4
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Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4
Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0	3
Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0	3
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Merc 280	19.2	6	167.6	123	3.92	3.440	18.30	1	0	4
Merc 280C	17.8	6	167.6	123	3.92	3.440	18.90	1	0	4
Merc 450SE	16.4	8	275.8	180	3.07	4.070	17.40	0	0	3
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Fiat 128	32.4	4	78.7	66	4.08	2.200	19.47	1	1	4
Honda Civic	30.4	4	75.7	52	4.93	1.615	18.52	1	1	4
Toyota Corolla	33.9	4	71.1	65	4.22	1.835	19.90	1	1	4
Toyota Corona	21.5	4	120.1	97	3.70	2.465	20.01	1	0	3
Dodge Challenger	15.5	8	318.0	150	2.76	3.520	16.87	0	0	3
AMC Javelin	15.2	8	304.0	150	3.15	3.435	17.30	0	0	3
Camaro Z28	13.3	8	350.0	245	3.73	3.840	15.41	0	0	3
Pontiac Firebird	19.2	8	400.0	175	3.08	3.845	17.05	0	0	3
Fiat X1-9	27.3	4	79.0	66	4.08	1.935	18.90	1	1	4
Porsche 914-2	26.0	4	120.3	91	4.43	2.140	16.70	0	1	5

```
> output
 [1]  20.090625         NA 230.721875 146.687500   3.596563
 [6]   3.217250  17.848750         NA         NA         NA
[11]   2.812500
```

```
#PCA#
summary(mtcars)
pcaCars <- princomp(mtcars, cor = TRUE)
names(pcaCars)
summary(pcaCars)
plot(pcaCars)
plot(pcaCars, type = "l")
carsHC <- hclust(dist(pcaCars$scores), method = "ward.D2")
plot(carsHC)
carsClusters <- cutree(carsHC, k = 3)
plot(carsHC)
rect.hclust(carsHC, k=3, border="pink2")
carsDf <- data.frame(pcaCars$scores, "cluster" = factor(carsClusters))
str(carsDf)
install.packages("ggplot2")
install.packages("ggrepel")
library(ggplot2)
library(ggrepel)
ggplot(carsDf,aes(x=Comp.1, y=Comp.2)) +
  +     geom_text_repel(aes(label = rownames(carsDf))) +
  +     theme_classic() +
  +     geom_hline(yintercept = 0, color = "lightblue2") +
  +     geom_vline(xintercept = 0, color = "purple1") +
  +     geom_point(aes(color = cluster), alpha = 0.55, size = 3) +
  +     xlab("PC1") +
  +     ylab("PC2") +
  +     xlim(-5, 6) +
  +     ggtitle("PCA PLOT OF CARS")
```

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```
> summary(mtcars)
      mpg             cyl             disp             hp             drat             wt             qsec             vs              am              gear            carb      
 Min.   :10.40   Min.   :4.000   Min.   : 71.1   Min.   : 52.0   Min.   :2.760   Min.   :1.513   Min.   :14.50   Min.   :0.0000   Min.   :0.0000   Min.   :3.000   Min.   :1.000  
 1st Qu.:15.43   1st Qu.:4.000   1st Qu.:120.8   1st Qu.: 96.5   1st Qu.:3.080   1st Qu.:2.581   1st Qu.:16.89   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:3.000   1st Qu.:2.000  
 Median :19.20   Median :6.000   Median :196.3   Median :123.0   Median :3.695   Median :3.325   Median :17.71   Median :0.0000   Median :0.0000   Median :4.000   Median :2.000  
 Mean   :20.09   Mean   :6.188   Mean   :230.7   Mean   :146.7   Mean   :3.597   Mean   :3.217   Mean   :17.85   Mean   :0.4375   Mean   :0.4062   Mean   :3.688   Mean   :2.812  
 3rd Qu.:22.80   3rd Qu.:8.000   3rd Qu.:326.0   3rd Qu.:180.0   3rd Qu.:3.920   3rd Qu.:3.610   3rd Qu.:18.90   3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:4.000   3rd Qu.:4.000  
 Max.   :33.90   Max.   :8.000   Max.   :472.0   Max.   :335.0   Max.   :4.930   Max.   :5.424   Max.   :22.90   Max.   :1.0000   Max.   :1.0000   Max.   :5.000   Max.   :8.000  
```