STAT 571 HW1

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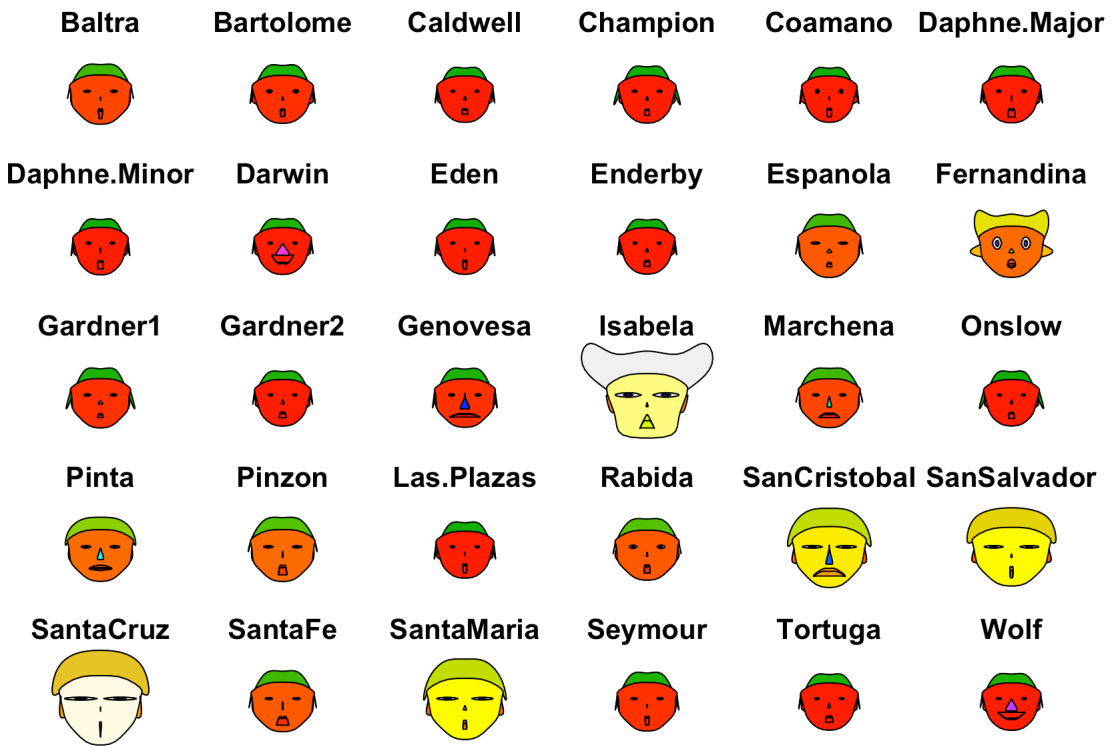
Problem1(a)

Here is the Chernoff's faces for data faraway:



Problem1(b)

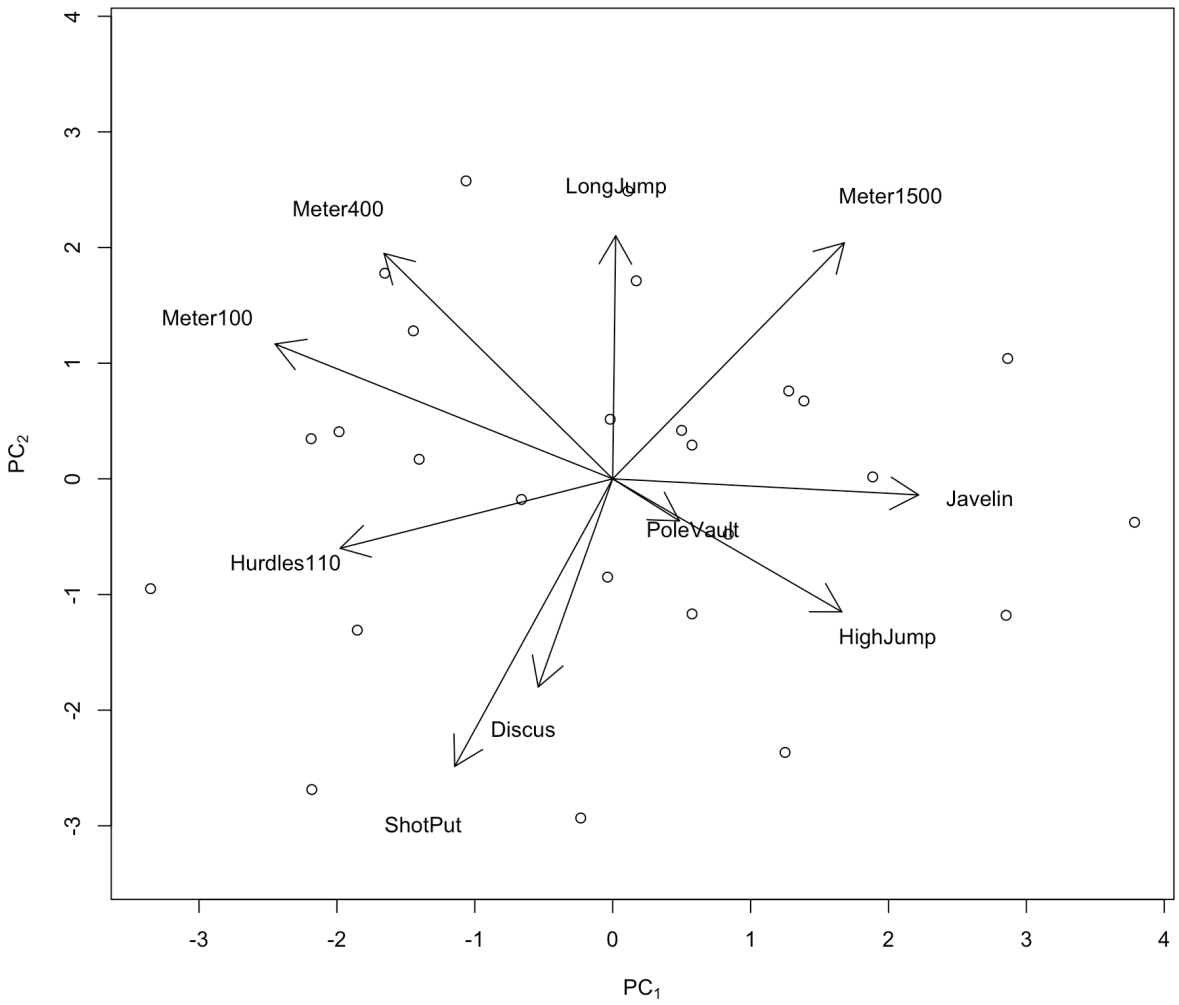
From the plot, Darwin appears most similar to Wolf.

Problem1(c)

From the plot, SantaFe appears most different from San Salvador.

Problem7(a)

Here is the biplot:



Problem7(b)

According to the biplot, Shot Put seems most similar to the Discus.

Problem7(c)

According to the biplot, Long Jump is in the direction of PC2. Hence, second principal component is primarily affected by a higher score on the Long Jump.

R-code:

```
#(1)
#install.packages("faraway")
library(faraway)
data(gala)

#(1a)
library(aplpack)
faces(gala)

#7
#install.packages("msos")
library(msos)
data(decathlon12)
y <- as.matrix(decathlon12[,1:10]) # select variables for matrix
y <- t(scale(t(y),scale=FALSE)) # center rows
y <- scale(y) # center columns and scale vars
eg <- eigen(var(y))
ev <- eg$vectors
w <- y%*%ev # The principal components
r <- range(w)
plot(w[,
1:2],xlim=r,ylim=r,xlab=expression('PC'[1]),ylab=expression('PC'
[2]))
arrows(0,0,5*ev[,1],5*ev[,2])
text(6*ev[,1:2],labels=colnames(y))
```