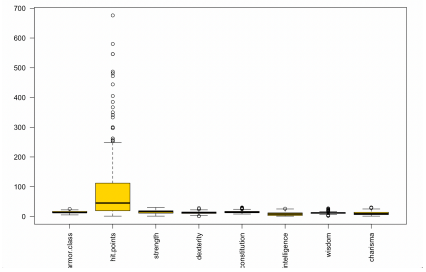
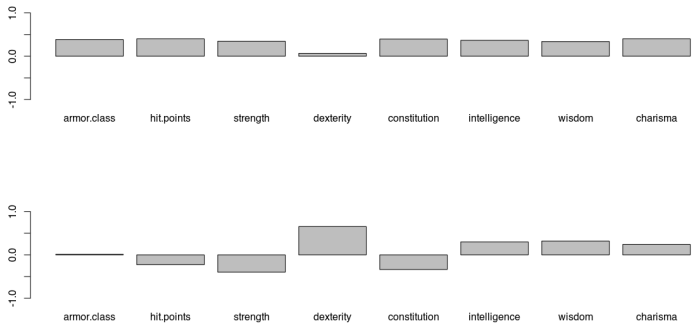
Problem 1

We perform a Principal Component Analysis to explain the variability of the dataset. We will find the directions around with the maximum variability is spread.

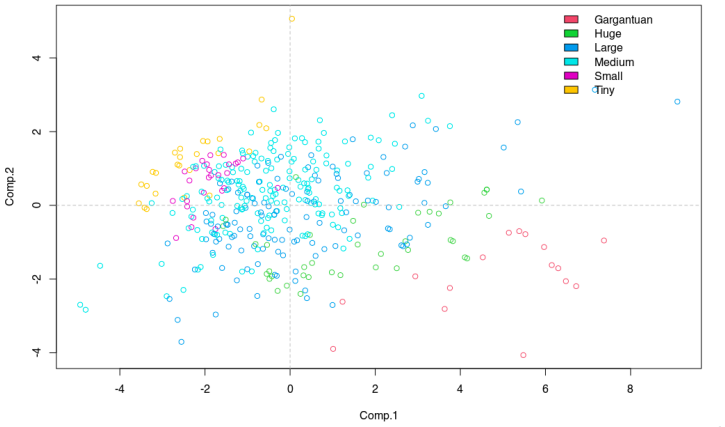


As we can see from the box plot of the data their scale is too different to be compared so we rescale them before studying.

The first 2 principal components explain respectively 0.5857602 0.1979671 of the variances and their loadings are the following:

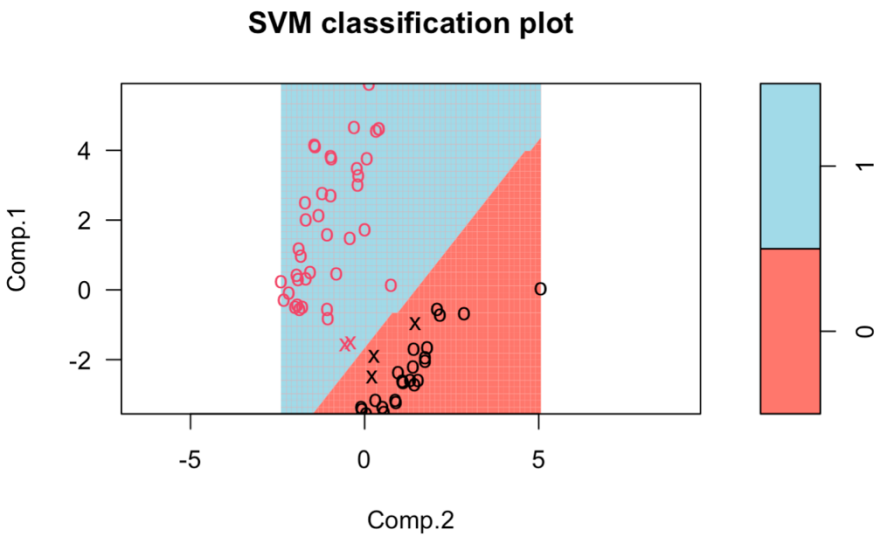


As we can see the first PCS is an average mean of all the features except the dexterity while the second consider the contrast of physical variable against dexterity and the other features regarding the mind of the character.



From the plot of the score along the first two PCS we can see that character are divided in groups and the fist two pcs show whether they are more physical or intellectual.

Considering now only Tiny and Huge monsters we create a svm classifier. It has 3 supported vectors and the plot is the following



A monter with armor.class=14, hit.points=50, strength=19, dexterity=10, constitution=16, intelligence=8, wisdom=12 and charisma=13 is classified as Huge