Assignment\_10\_SinghalSarika\_Exercise\_2-2\_Clustering

Sarika Singhal

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## R Markdown

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setwd("~/Documents/repo/Week2/dsc520/data")  
#binary-classifier-data.csv  
  
##Clustering  
  
clusteringdata <- read.csv("clustering-data.csv")  
  
#here is the structure of the data  
  
summary(clusteringdata)

## x y   
## Min. : 0.0 Min. :134.0   
## 1st Qu.: 56.0 1st Qu.:141.0   
## Median : 82.0 Median :154.0   
## Mean :109.6 Mean :175.7   
## 3rd Qu.:180.0 3rd Qu.:218.0   
## Max. :249.0 Max. :236.0

#PLot clusteringdata  
p <- clusteringdata$x  
q <- clusteringdata$y  
  
  
plot(p, q, main="Scatterplot clusteringdata",xlab="X", ylab="Y", pch=19)  
  
##Fitting  
  
kmeans(clusteringdata, 2)

## K-means clustering with 2 clusters of sizes 1308, 2714  
##   
## Cluster means:  
## x y  
## 1 207.8005 203.2898  
## 2 62.2815 162.4090  
##   
## Clustering vector:  
## [1] 2 2 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1  
## [38] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [75] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [112] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [149] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [186] 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1  
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## [3701] 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2  
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## [3960] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [3997] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
##   
## Within cluster sum of squares by cluster:  
## [1] 3057964 5385717  
## (between\_SS / total\_SS = 70.5 %)  
##   
## Available components:  
##   
## [1] "cluster" "centers" "totss" "withinss" "tot.withinss"  
## [6] "betweenss" "size" "iter" "ifault"

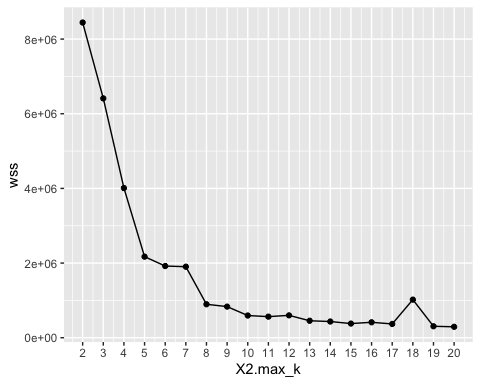
kmeans(clusteringdata, 12)

## K-means clustering with 12 clusters of sizes 153, 800, 566, 518, 193, 115, 172, 548, 148, 116, 467, 226  
##   
## Cluster means:  
## x y  
## 1 57.15033 231.0915  
## 2 71.78875 145.4550  
## 3 12.91166 143.2915  
## 4 179.55019 225.2664  
## 5 64.58031 189.7358  
## 6 171.17391 134.5739  
## 7 50.06977 218.9651  
## 8 103.68796 143.7500  
## 9 51.32432 183.3919  
## 10 64.58621 218.3793  
## 11 231.08994 224.3683  
## 12 237.85841 138.8628  
##   
## Clustering vector:  
## [1] 1 1 4 4 4 4 11 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [25] 1 1 1 1 1 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [49] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [73] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 11 11 11 11 11 11 11  
## [97] 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11  
## [121] 11 11 11 11 11 11 11 11 11 11 11 1 4 4 4 4 4 4 4 4 4 4 4 4  
## [145] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [169] 4 4 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11  
## [193] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 4  
## [217] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [241] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [265] 4 4 4 4 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11  
## [289] 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 1 1 1 1 1 1 1  
## [313] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 4 4 4 4 4 4 4 4  
## [337] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 11 11 11 11 11 11 11 11 11 11  
## [361] 11 11 11 11 11 11 11 11 11 11 11 11 1 1 1 1 1 1 1 1 1 1 1 1  
## [385] 1 1 1 1 1 1 1 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  
## [409] 4 4 4 4 4 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11  
## [433] 11 11 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
## [457] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 11 11 11 11  
## [481] 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 7 1 1 1 1 1 1 1 1  
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## [529] 11 11 11 11 11 11 11 11 11 11 7 7 7 1 1 1 1 1 1 1 1 10 10 4  
## [553] 4 4 4 4 4 4 4 4 4 4 4 11 11 11 11 11 11 11 11 11 11 11 7 7  
## [577] 7 7 7 7 1 1 1 1 1 1 1 10 10 10 10 4 4 4 4 4 4 4 4 4  
## [601] 4 4 4 4 4 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 7 7 7 7  
## [625] 7 7 7 1 1 1 1 10 10 10 10 10 4 4 4 4 4 4 4 4 4 4 4 4  
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## [673] 1 10 10 10 10 10 4 4 4 4 4 4 4 4 4 4 4 4 4 4 11 11 11 11  
## [697] 11 11 11 11 11 11 11 11 11 11 7 7 7 7 7 7 7 7 1 1 1 10 10 10  
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## [745] 11 11 11 11 11 11 11 11 7 7 7 7 7 7 7 7 7 7 7 10 10 10 10 10  
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## [985] 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 7 7 7 7 7  
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## [1105] 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 7 7 7 7 7 7  
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## [1201] 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 11 11 11 11 11  
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## [1417] 11 11 11 11 11 11 11 11 11 7 5 5 5 5 5 5 5 5 9 5 5 5 5 5  
## [1441] 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 9 5 5 5 5 5 5  
## [1465] 5 5 5 9 9 5 5 5 5 9 9 5 5 5 5 5 5 9 9 9 9 5 5 5  
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## [1561] 9 9 9 9 9 5 5 5 5 5 5 5 5 5 5 5 5 5 9 9 9 9 9 9  
## [1585] 5 5 5 5 5 5 5 5 5 5 5 5 9 9 9 9 9 5 5 5 5 5 5 5  
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## [1681] 9 9 9 9 9 9 5 5 5 5 9 9 9 9 9 9 9 9 9 5 5 5 5 5  
## [1705] 9 9 9 9 9 9 9 9 5 5 5 5 5 9 9 9 5 5 5 9 9 9 9 9  
## [1729] 5 5 5 9 9 9 9 9 5 5 5 9 9 9 9 9 9 5 5 9 9 9 9 9  
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## [3985] 6 6 6 6 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12  
## [4009] 12 12 12 12 12 12 12 12 12 12 12 12 12 12  
##   
## Within cluster sum of squares by cluster:  
## [1] 8044.261 132473.679 72634.482 112959.431 10198.528 44348.643  
## [7] 6014.953 103186.391 7485.703 3241.448 65846.874 32762.217  
## (between\_SS / total\_SS = 97.9 %)  
##   
## Available components:  
##   
## [1] "cluster" "centers" "totss" "withinss" "tot.withinss"  
## [6] "betweenss" "size" "iter" "ifault"

kmean\_withinss <- function(k)   
{cluster <- kmeans(clusteringdata, k)   
return (cluster$tot.withinss)   
}  
  
  
# Set maximum cluster   
max\_k <-20   
# Run algorithm over a range of k   
wss <- sapply(2:max\_k, kmean\_withinss)  
  
elbow <-data.frame(2:max\_k, wss)  
library("ggplot2")



ggplot(elbow, aes(x = X2.max\_k, y = wss)) + geom\_point() + geom\_line() +scale\_x\_continuous(breaks = seq(1, 20, by = 1))



Note that the echo = FALSE parameter was added to the code chunk to prevent printing of the R code that generated the plot.

## References

install.packages(“knitr”)