C3T4

```
require(pacman)
```

```
## Loading required package: pacman
```

```
pacman:: p_load(pacman, dplyr, GGally, ggplot2, ggrepel, patchwork, gifski, ggforce, ggthemes, maps, sf
```

```
Transactions <- read.transactions("ElectronidexTransactions2017.csv", format = "basket", sep=",", skip =
```

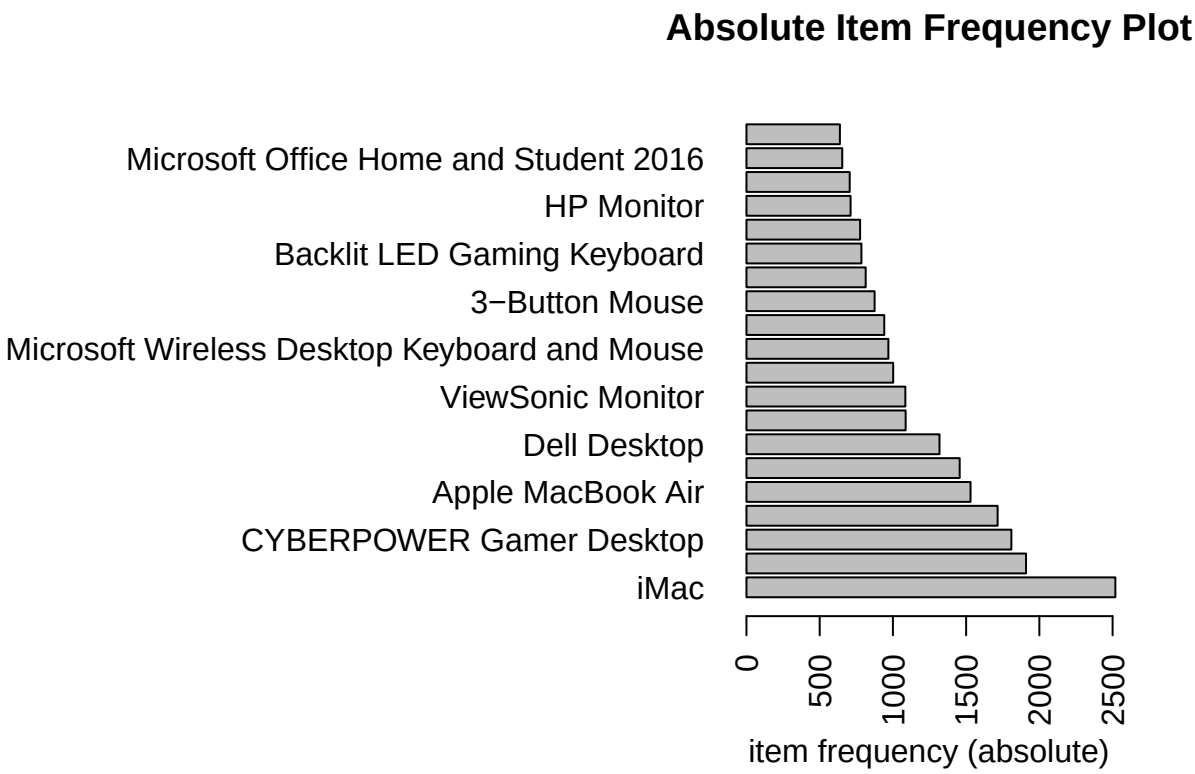
```
## Warning in readLines(file, encoding = encoding): incomplete final line found on
## 'ElectronidexTransactions2017.csv'
```

```
## Warning in asMethod(object): removing duplicated items in transactions
```

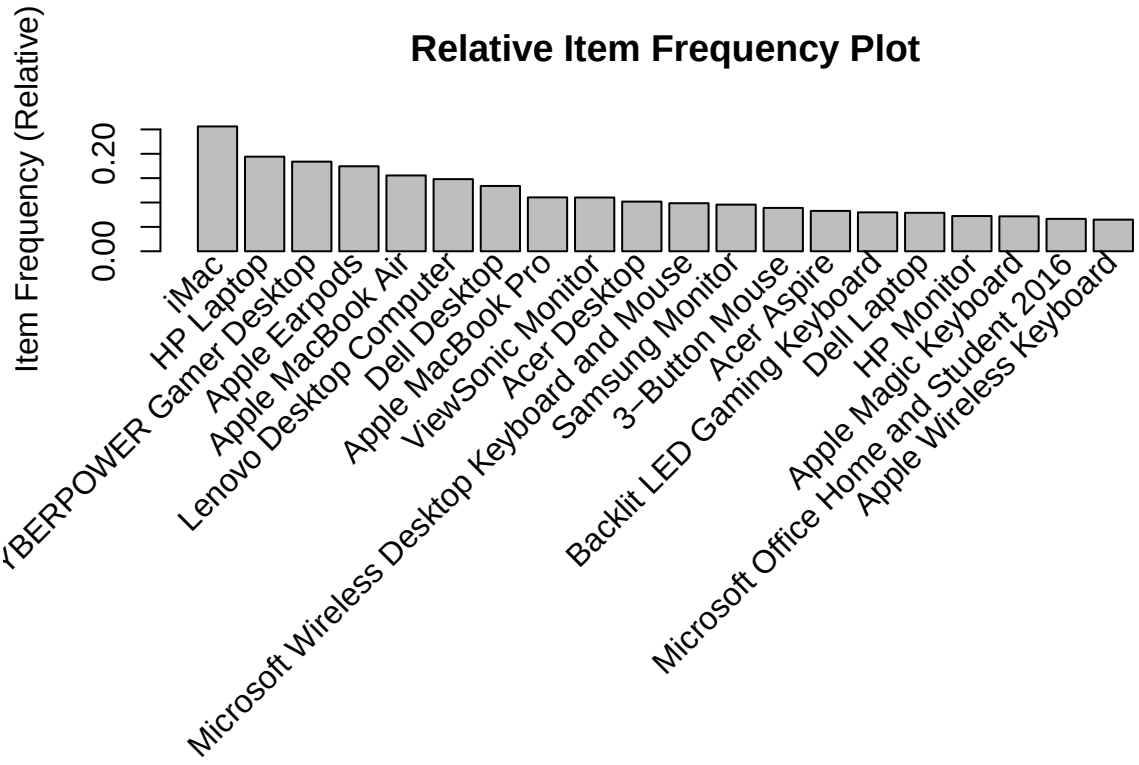
```
inspect(head(Transactions)) #cant use head, need inspect command for basket analysis
```

```
##     items
## [1] {Acer Aspire,
##      Belkin Mouse Pad,
##      Brother Printer Toner,
##      VGA Monitor Cable}
## [2] {Apple Wireless Keyboard,
##      Dell Desktop,
##      Lenovo Desktop Computer}
## [3] {iMac}
## [4] {Acer Desktop,
##      Intel Desktop,
##      Lenovo Desktop Computer,
##      XIBERIA Gaming Headset}
## [5] {ASUS Desktop,
##      Epson Black Ink,
##      HP Laptop,
##      iMac}
## [6] {ASUS Monitor,
##      Gaming Mouse Professional,
##      iMac,
##      Lenovo Desktop Computer,
##      Mackie CR Speakers}
```

```
itemFrequencyPlot( Transactions, topN=20, main = 'Absolute Item Frequency Plot', type="absolute", horiz=
```




```
itemFrequencyPlot(Transactions, topN = 20, main = 'Relative Item Frequency Plot', type = "relative", yla
```



#Finding Rules

apriori!

```
rules <- apriori(Transactions, parameter = list(supp = 0.001, conf = 0.8, minlen=2, maxlen=5), control=
```

```
rules
```

```
## set of 602 rules
```

```
inspect(rules[1:5])
```

```
##     lhs                                rhs                     support confidence    coverage     lift
## [1] {Backlit LED Gaming Keyboard,
##      Large Mouse Pad}             => {Apple MacBook Air} 0.001321810  0.8125000 0.001626843 5.222835
## [2] {ASUS 2 Monitor,
##      Generic Black 3-Button}      => {iMac}              0.001016777  0.9090909 0.001118454 3.549388
## [3] {Dell Desktop,
##      Generic Black 3-Button}      => {iMac}              0.001220132  0.8571429 0.001423488 3.346566
## [4] {Generic Black 3-Button,
##      Lenovo Desktop Computer}     => {iMac}              0.001728521  0.8095238 0.002135231 3.160646
## [5] {ASUS Monitor,
##      HDMI Adapter}                => {iMac}              0.001016777  0.8333333 0.001220132 3.253606
```

Count = #baskets that satify rule Support = fraction of baskets that satisfy rule or fraction of baskets that have all items referenced in rule Confidence = (posterior) probability that cart has item on RHS given it

has all items on LHS of rule coverage = fraction baskets that have all items in the LHS of rule. lift = how many times more likely that item in RHS appears in a cart when it contains all items in LHS RHS = right hand side LHS = left hand side

```
#Sorting by quality measure
inspect( sort(rules, by="lift", decreasing=TRUE)[1:5])
```

```
##     lhs                            rhs                     support confidence    coverage      lift co
## [1] {Apple MacBook Pro,
##      HP Black & Tri-color Ink,
##      HP Laptop,
##      iMac}                     => {Acer Aspire}       0.001016777  0.8333333 0.001220132 10.068591
## [2] {Dell Desktop,
##      iMac,
##      Lenovo Desktop Computer,
##      Mackie CR Speakers}       => {ViewSonic Monitor} 0.001118454  1.0000000 0.001118454  9.064516
## [3] {Dell Desktop,
##      Lenovo Desktop Computer,
##      Mackie CR Speakers}       => {ViewSonic Monitor} 0.001220132  0.9230769 0.001321810  8.367246
## [4] {Dell Desktop,
##      HP Laptop,
##      Lenovo Desktop Computer,
##      Mackie CR Speakers}       => {ViewSonic Monitor} 0.001118454  0.9166667 0.001220132  8.309140
## [5] {Acer Aspire,
##      Apple Earpods,
##      HP Laptop,
##      HP Monitor}               => {ViewSonic Monitor} 0.001016777  0.9090909 0.001118454  8.240469
```

```
inspect( sort(rules, by="confidence", decreasing=TRUE)[1:5])
```

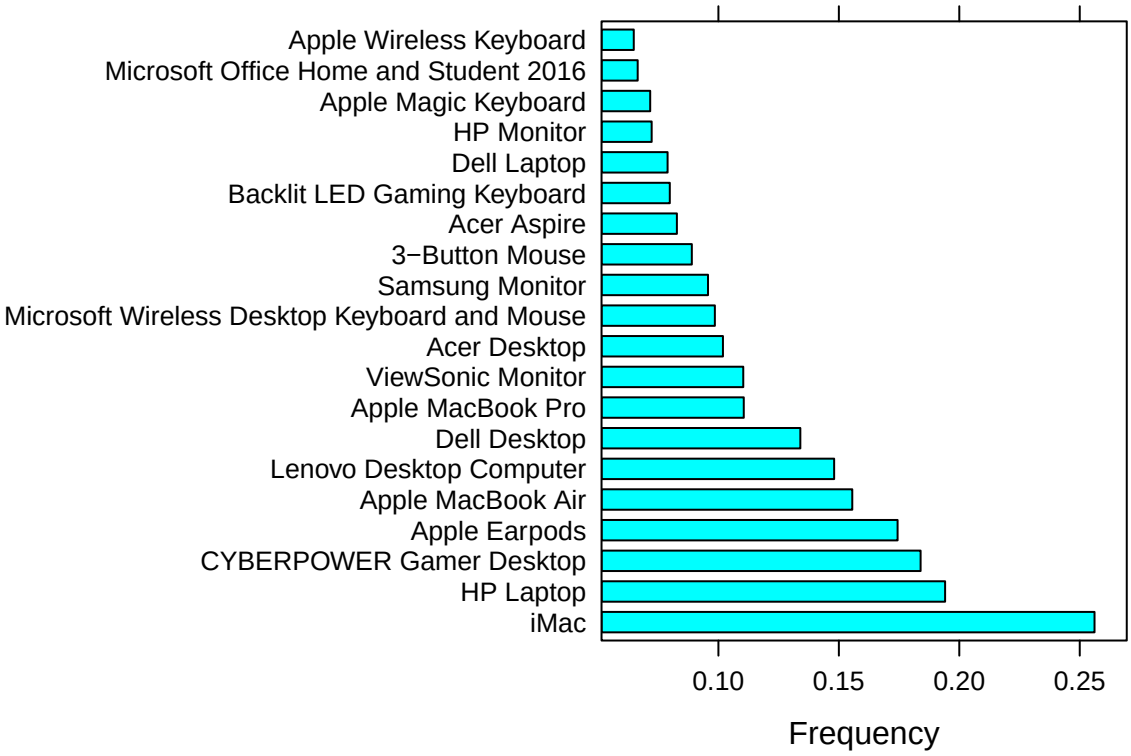
```
##     lhs                                        rhs             support confidence    coverage     li
## [1] {Brother Printer,
##      Halter Acrylic Monitor Stand}          => {iMac}      0.001118454          1 0.001118454 3.9043
## [2] {ASUS Monitor,
##      Mackie CR Speakers,
##      ViewSonic Monitor}                     => {iMac}      0.001016777          1 0.001016777 3.9043
## [3] {Apple Magic Keyboard,
##      Rii LED Gaming Keyboard & Mouse Combo,
##      ViewSonic Monitor}                     => {iMac}      0.001728521          1 0.001728521 3.9043
## [4] {ASUS Monitor,
##      Koss Home Headphones,
##      Microsoft Office Home and Student 2016} => {iMac}      0.001016777          1 0.001016777 3.9043
## [5] {Acer Aspire,
##      Koss Home Headphones,
##      ViewSonic Monitor}                     => {HP Laptop} 0.001220132          1 0.001220132 5.1519
```

```
redundant<-is.redundant(rules)
redundant
```

```
##   [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [13] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [25] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

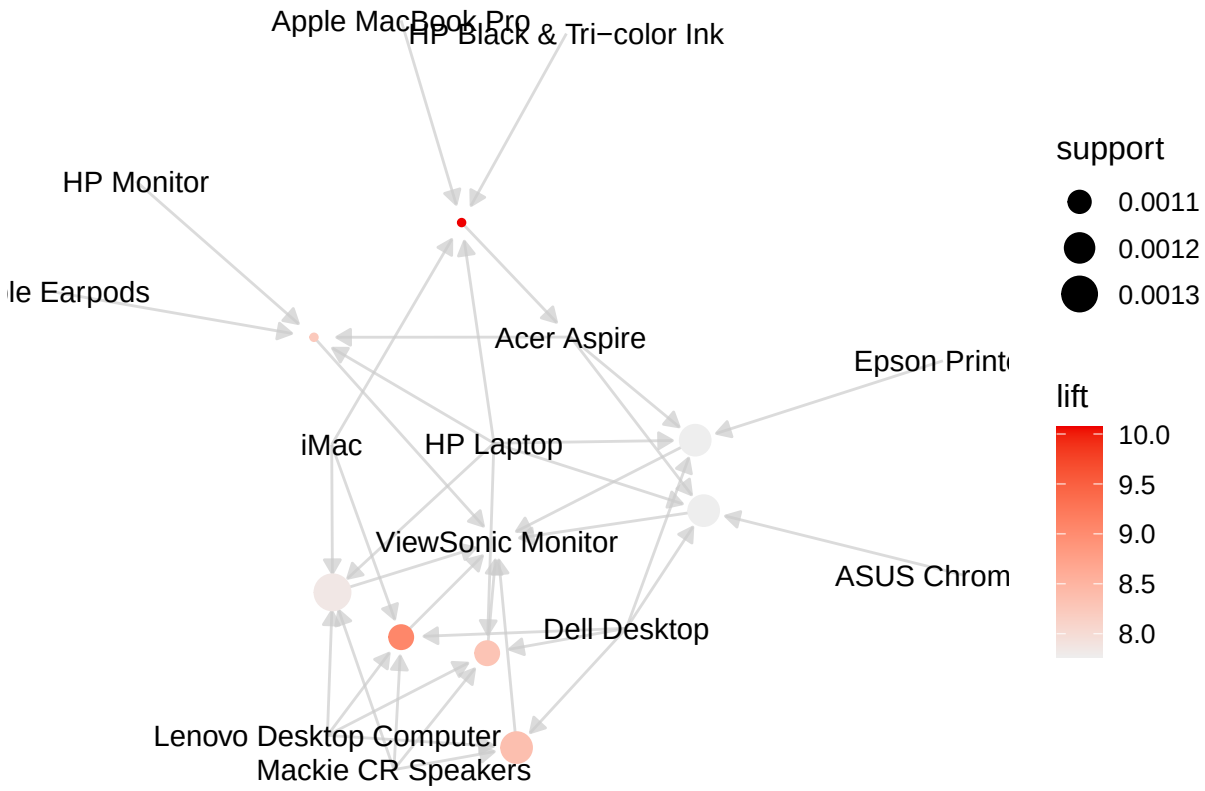
```
##  [37] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE
##  [49] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [61] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [73] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [85] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [97] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [109] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [121] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [133] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [145] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [157] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [169] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [181] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [193] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [205] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [217] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [229] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [241] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [253] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [265] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [277] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [289] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [301] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [313] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [325] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE  TRUE
## [337] FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE
## [349]  TRUE  TRUE  TRUE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE
## [361] FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [373] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE
## [385] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [397] FALSE FALSE FALSE  TRUE  TRUE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE
## [409]  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [421] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [433] FALSE FALSE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [445] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [457] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE
## [469] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [481] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [493] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [505] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [517] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE
## [529] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [541] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [553] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [565] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [577] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [589] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [601] FALSE FALSE
```

```
items <- itemFrequency(Transactions)
sorted<-sort(items,decreasing=TRUE)
Frequency<-sorted[1:20]
barchart(Frequency)
```




```
#Visualize them

simplerules <- sort(rules, by="lift")[c(1:8)]
plot(simplerules, method="graph")
```




```
#plot(simplerules, method="graph", engine="htmlwidget")
```