Assignment 3

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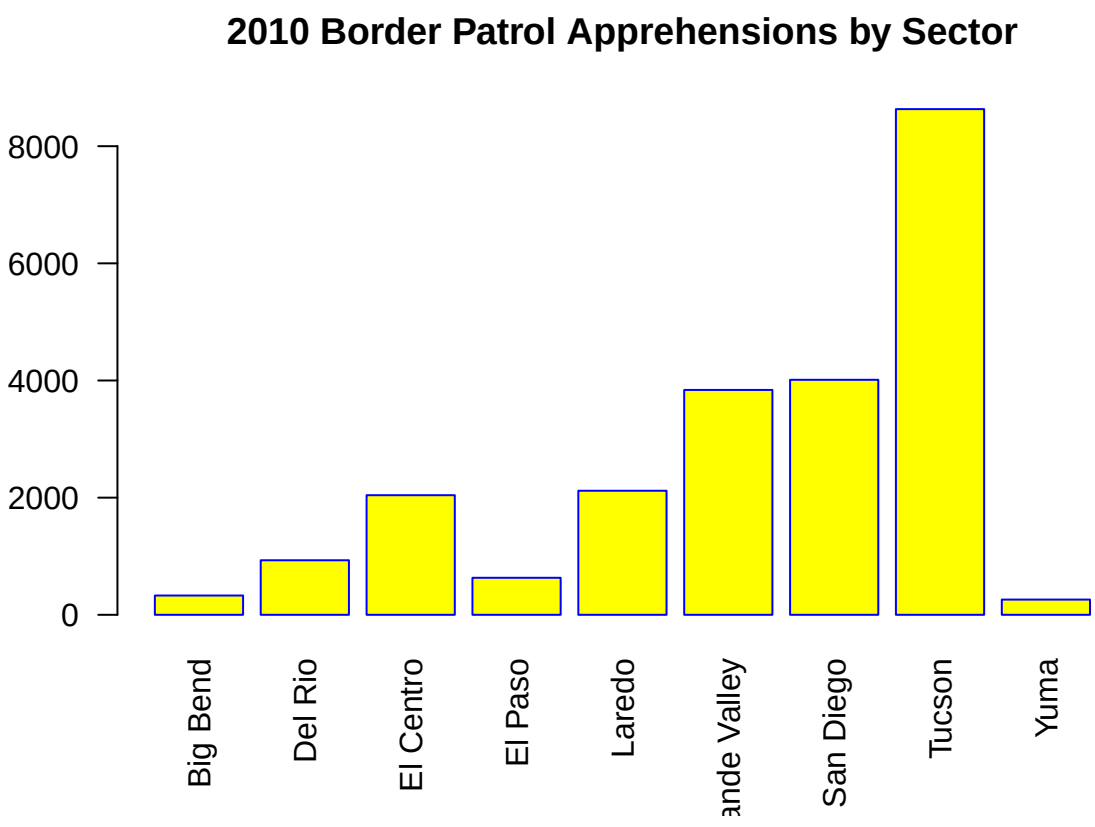
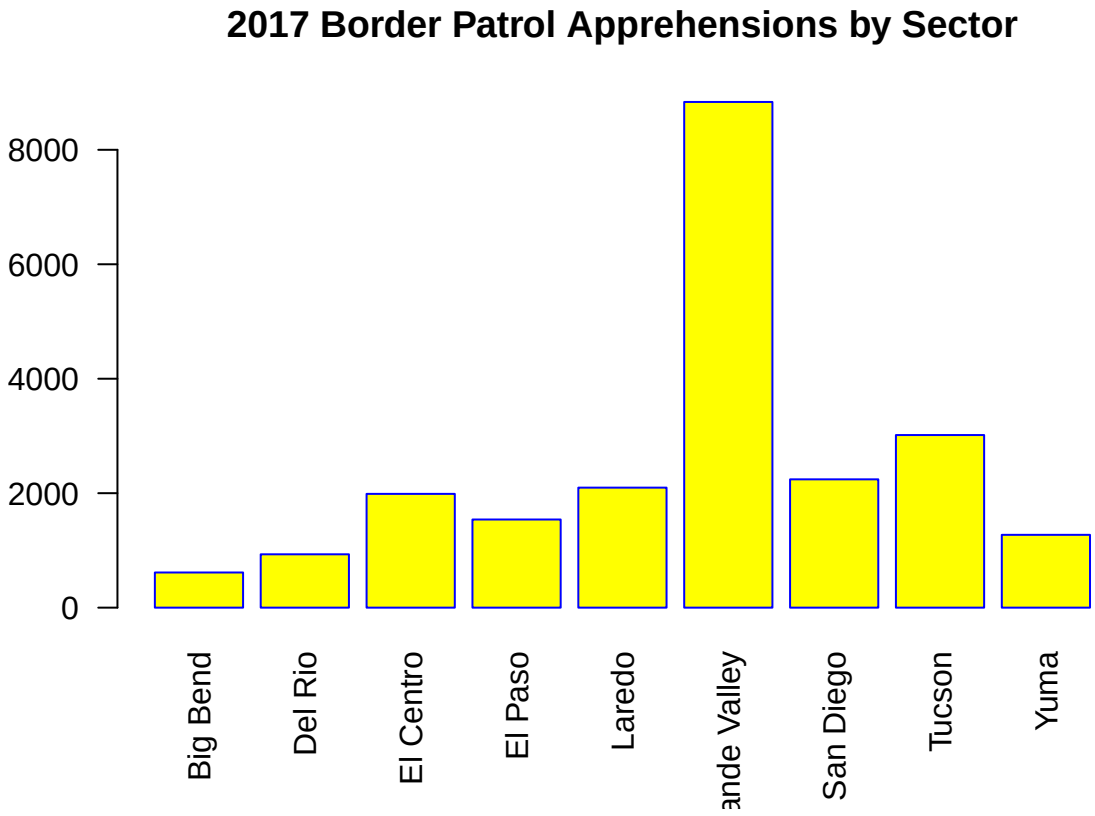
```
## Reading in Data
BP2010 <- read.csv("BP Apprehensions 2010.csv", header = TRUE, stringsAsFactors = FALSE)
PB2017 <- read.csv("PB Apprehensions 2017.csv", header = TRUE, stringsAsFactors = TRUE)
PBmonthly <- read.csv("monthly_sum.csv", header = TRUE, stringsAsFactors = TRUE)
rownames(PBmonthly) <- PBmonthly[,1]

## Displaying Data By Sector
rownames(BP2010) <- BP2010[,1]
x <- barplot(BP2010[1:9,13], names.arg = rownames(BP2010)[1:9],
        las=2,
        axisnames=TRUE,
        main="2010 Border Patrol Apprehensions by Sector",
        border="blue",
        col="yellow")
```

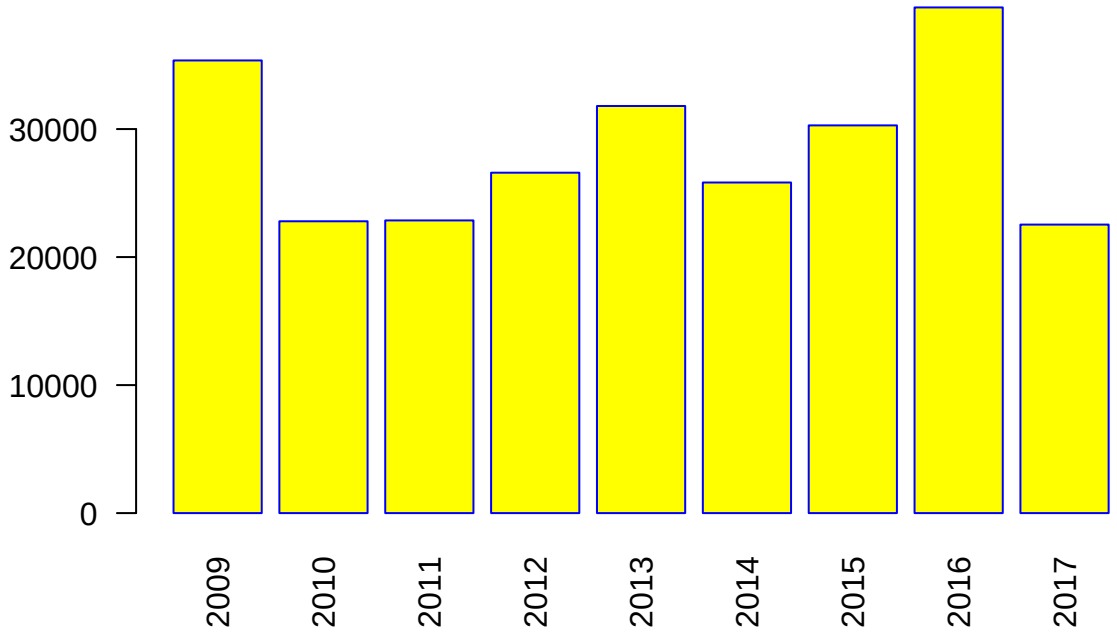



```
rownames(PB2017) <- PB2017[,1]
barplot(PB2017[1:9,13], names.arg = rownames(PB2017)[1:9],
        las=2,
        axisnames=TRUE,
        main="2017 Border Patrol Apprehensions by Sector",
        border="blue",
```

```
        col="yellow")
```




```
##Display Data By Year
barplot(rev(PBmonthly[1:9,13]), names.arg = rev(rownames(PBmonthly)[1:9]),
        las=2,
        axisnames=TRUE,
        main="Border Patrol Apprehensions by Year",
        border="blue",
        col="yellow")
```

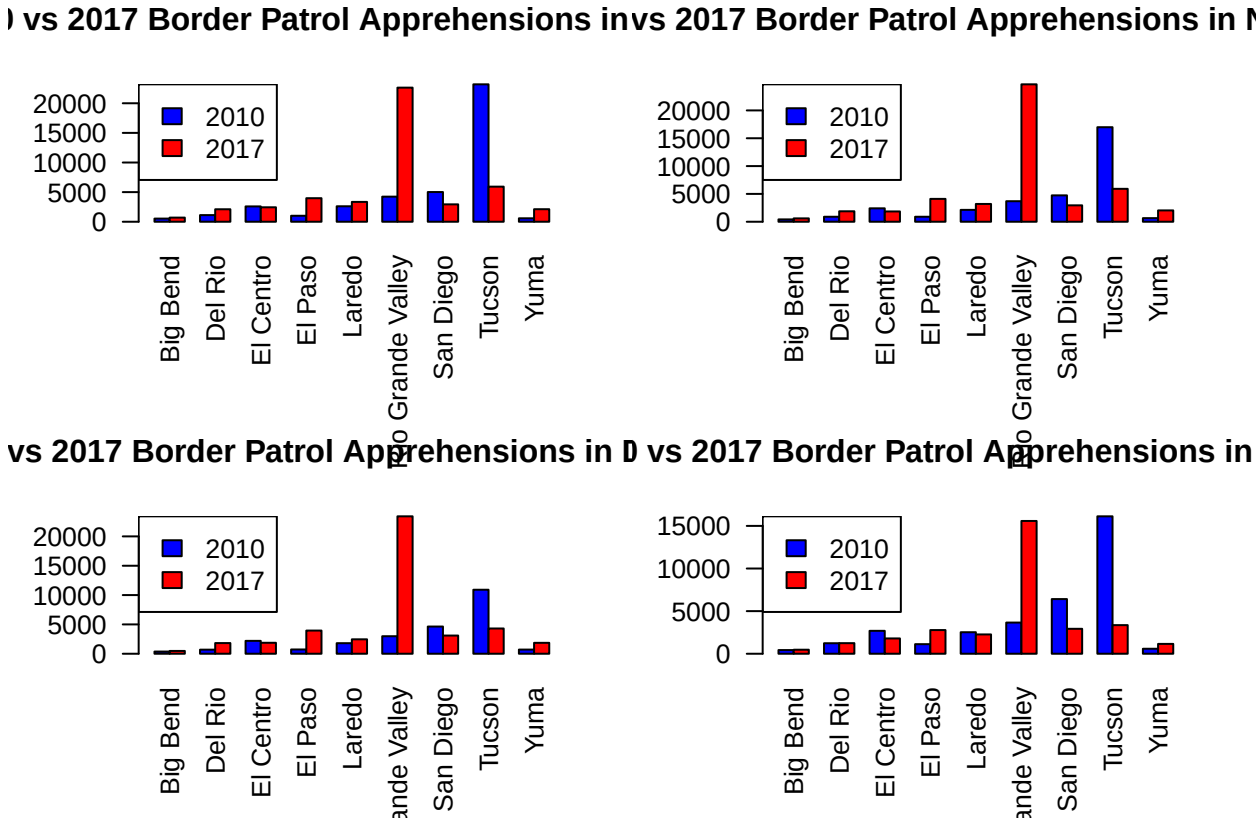



```
## T-test for Tucson in 2010 and Rio Grande Valley in 2017
t2010 <- t(BP2010)
t2017 <- t(PB2017)
t.test(as.numeric(t2010[2:13, 8]), as.numeric(t2017[2:13, 6]))
```

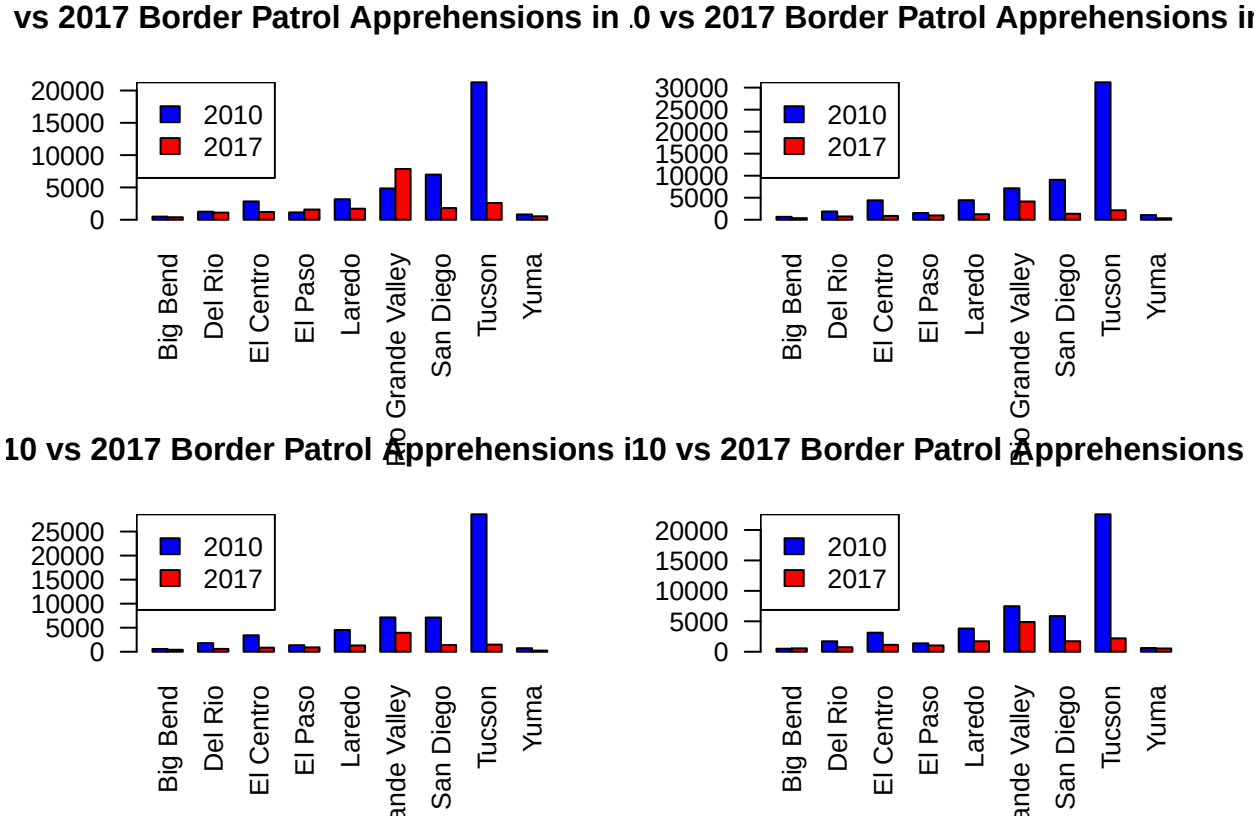
```
##
##  Welch Two Sample t-test
##
## data:  as.numeric(t2010[2:13, 8]) and as.numeric(t2017[2:13, 6])
## t = 1.9547, df = 21.973, p-value = 0.06346
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##   -379.5935 12819.5935
## sample estimates:
## mean of x mean of y
##   17683.5   11463.5
```

```
plot (PBmonthly$year,rowSums(PBmonthly[1:18 , 2:13]), xlab = "Year", ylab = "Apprehensions", type = "p"
lines(PBmonthly$year,rowSums(PBmonthly[1:18 , 2:13]), col = "red")
points(PBmonthly$year,rowSums(PBmonthly[1:18 , 2:13]), col = "red")
```

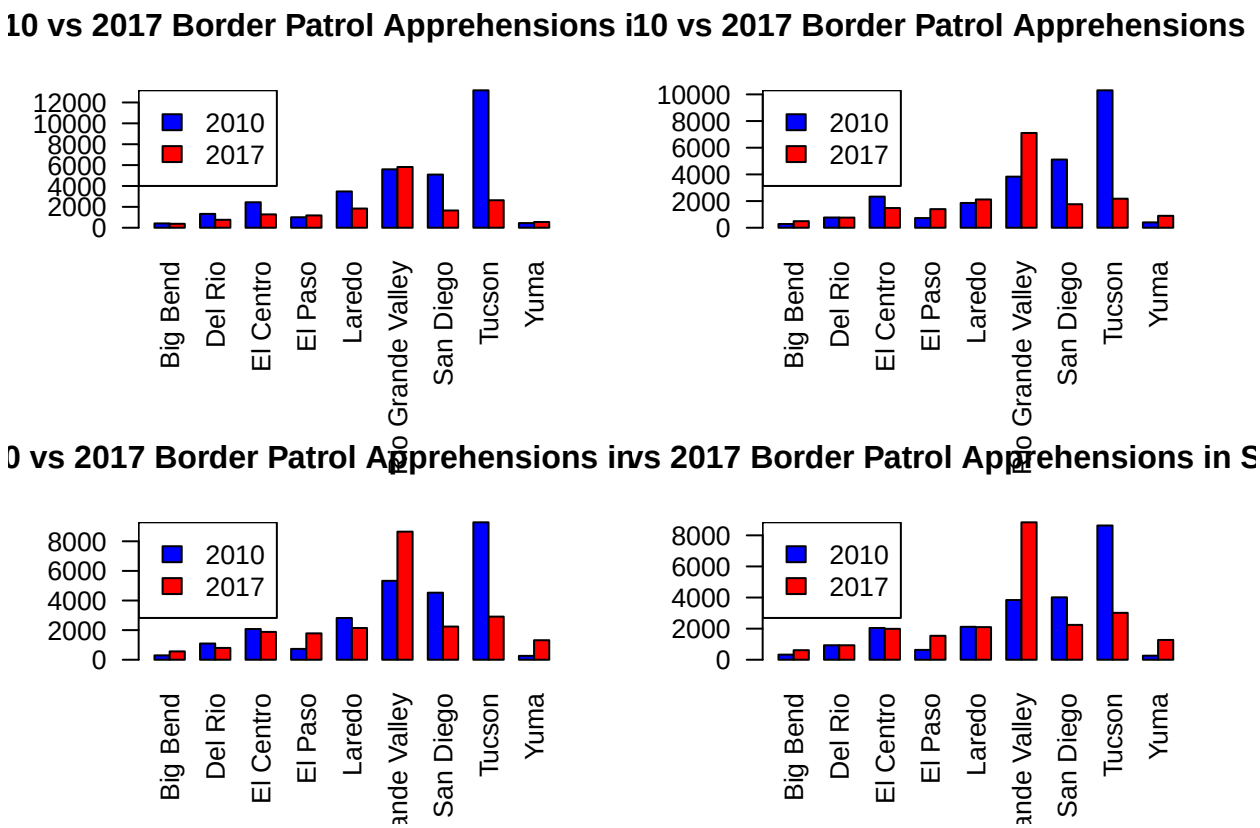

```
## Creates a 2 x 9 matrix from the 2010 data and 2017 for specified month
sideBySideMatrix <- function(month){
  matrix(c(BP2010[1:9,month], PB2017[1:9,month]), nrow = 2, byrow = TRUE)
}

## Creates the barplot for a given month
sideBySideBarPlot <- function(month, monthString){
  barplot(sideBySideMatrix(month), names.arg = rownames(BP2010),
          las=2,
          axisnames=TRUE,
          beside=TRUE,
          col=c("blue", "red"),
          main = paste("2010 vs 2017 Border Patrol Apprehensions in", monthString, sep=" "))
  legend("topleft",
       c("2010", "2017"),
       fill = c("blue", "red"))
}

## Creates the side by side bar plots for each month
par(mfrow=c(2,2))
sideBySideBarPlot(2, "October")
sideBySideBarPlot(3, "November")
sideBySideBarPlot(4, "December")
sideBySideBarPlot(5, "January")
```



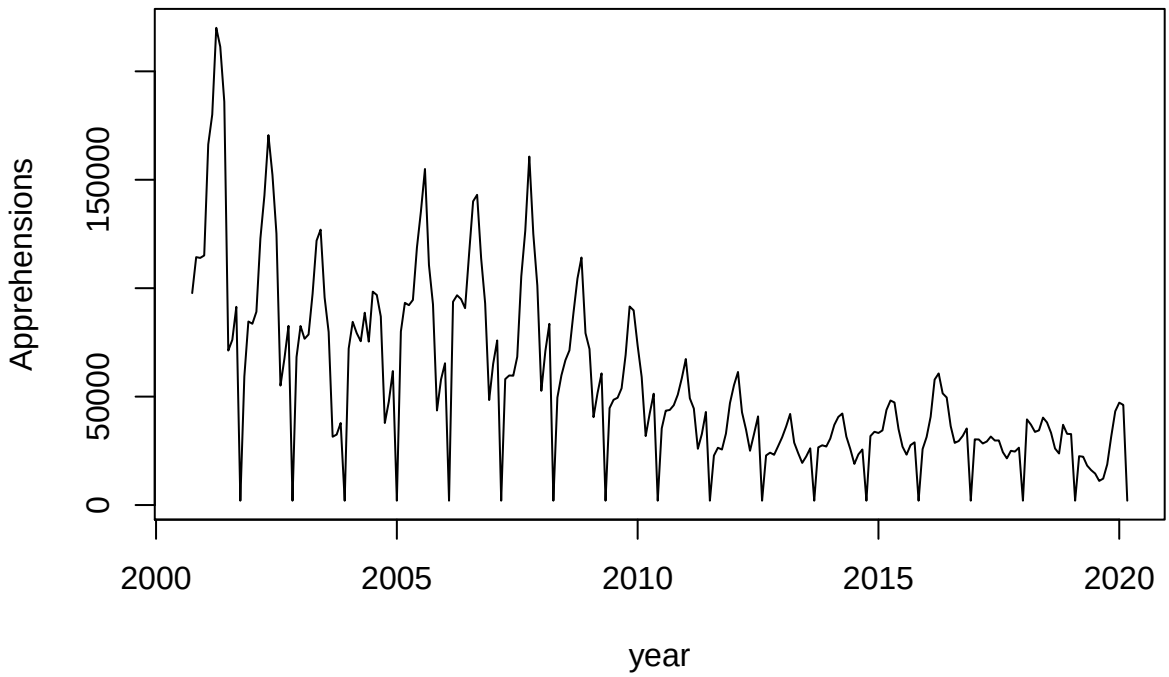

```
sideBySideBarPlot(6, "February")
sideBySideBarPlot(7, "March")
sideBySideBarPlot(8, "April")
sideBySideBarPlot(9, "May")
```




```
sideBySideBarPlot(10, "June")
sideBySideBarPlot(11, "July")
sideBySideBarPlot(12, "August")
sideBySideBarPlot(13, "September")
```




```
par(mfrow=c(1,1))
x <- as.vector(t(PBmonthly))
y <- ts(rev(x), start = c(2000, 10), frequency = 12)
ts.plot(y, gpars=list(xlab="year", ylab="Apprehensions", lty=c(1:3)))
```




```
twolineplot <- function(){
```

```r
  #overlays the plots of 2 lines 1 blue and 1 red; for use with the apprehensions by month of 2010 and
  x <-  factor(2:13, labels = c("October", "November", "December", "January", "February", "March", "Apr
  t2010 <- as.numeric(PBmonthly[1,2:13])
  t2017 <- as.numeric(PBmonthly[8, 2:13])
  plot.default(t2010 ~ x, type="n", xlab = "Month", ylab = "Apprehensions", main = "Apprehensions By Mo
  axis(1, at = as.numeric(x), labels = levels(x))
  lines(t2010 ~ x, col="blue")
  lines(t2017 ~ x, col="red")
  legend("topleft",
         c("2010", "2017"),
         fill = c("blue", "red"))

}
```

Here we can see the plots of 2010 and 2017 monthly overlayed. As you can tell, the number of apprehensions rose steeply from the beginning to the April 2017, decreasing thereafter, whilst there was a fairly steady decline in apprehensions in 2010 until April 2010, followed by a slight incline.

```r
twolineplot()
```