Analysis of NFL data

Introduction

The National Football league is a professional American football league consiting of 32 teams. The NFL's 17-week regular season runs from the week after Labor Day to the week after Christmas with each team playing 16 games.

Here, the analysis of NFL data for a set of players from various teams played in 2012, 2013, 2014 and 2015 seasons are made. Each player has information with regards to his team name, number of games played, touchdown, Interception, Yrds, Attempts,completion percentage and Quarterback ratings across all four seasons.

```
## Warning: package 'randomcoloR' was built under R version 3.3.1
```

```
## Warning: package 'modes' was built under R version 3.3.1
```

```
## Warning: package 'ggplot2' was built under R version 3.3.1
```

Analysis of NFL data in the year 2015

```
nfl_2015 <- read.csv('C:/Users/Raghavendran/Documents/UN 5550/nfl-passing-2015.csv')
nfl_2015_cond1 <- nfl_2015[nfl_2015$Att >=100 & nfl_2015$Yds >= 1000,]
```

Mean, median and mode of Touchdowns and Interceptions

The mean,median and mode for Touchdowns and Interceptions are calcualted

```
nfl_2015_TD_mean <- mean(nfl_2015_cond1$TD)
nfl_2015_Int_mean <- mean(nfl_2015_cond1$Int)

print(paste("The mean of touchdown is ",nfl_2015_TD_mean))
```

```
## [1] "The mean of touchdown is  20.6578947368421"
```

```
print(paste("The mean of Interception is ",nfl_2015_Int_mean))
```

```
## [1] "The mean of Interception is  10"
```

```
nfl_2015_TD_median <- median(nfl_2015_cond1$TD)
nfl_2015_Int_median <- median(nfl_2015_cond1$Int)

print(paste("The median of touchdown is ",nfl_2015_TD_median))
```

```
## [1] "The median of touchdown is  20.5"
```

```r
print(paste("The median of Interception is ",nfl_2015_Int_median))
```

```
## [1] "The median of Interception is  10"
```

```r
nfl_2015_TD_mode <- modes(nfl_2015_cond1$TD)[1,]
nfl_2015_Int_mode <- modes(nfl_2015_cond1$Int)[1,]

print(paste("The mode of touchdown is ",nfl_2015_TD_mode))
```

```
## [1] "The mode of touchdown is  35"
```

```r
print(paste("The mode of Interception is ",nfl_2015_Int_mode))
```

```
## [1] "The mode of Interception is  7"
```

Quartiles of Yards and Rate

The quartiles Q1 and Q3 are calculated for Yards and Rate and plotted in a boxplot.

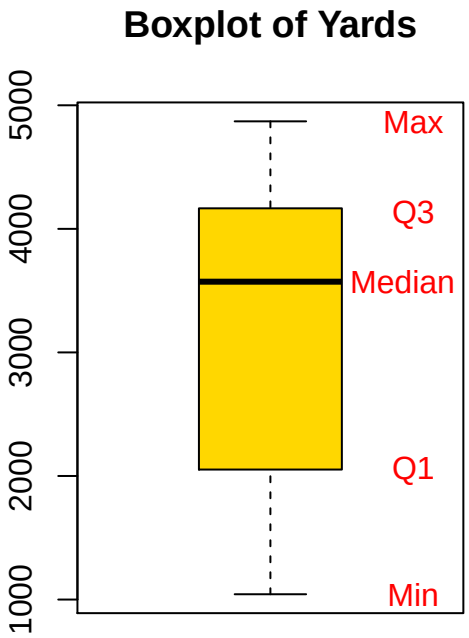
```r
Q1_Yds <- summary(nfl_2015_cond1$Yds)[2]
Q3_Yds <- summary(nfl_2015_cond1$Yds)[5]
print(paste("The First and the Third quartiles of Yards are ",Q1_Yds," and ",Q3_Yds," respectively"))
```

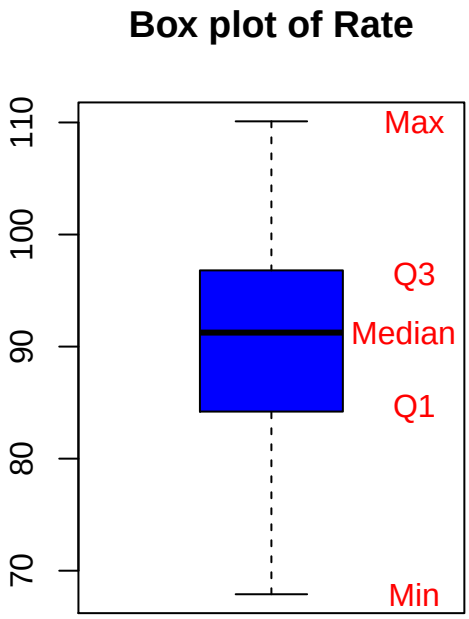
```
## [1] "The First and the Third quartiles of Yards are  2066  and  4135  respectively"
```

```r
Q1_Rate <- summary(nfl_2015_cond1$Rate)[2]
Q3_Rate <- summary(nfl_2015_cond1$Rate)[5]
print(paste("The First and the Third quartiles of Rate are ",Q1_Rate," and ",Q3_Rate," respectively"))
```

```
## [1] "The First and the Third quartiles of Rate are  84.7  and  96.45  respectively"
```

```r
par(mfrow=c(1,2))
boxplot(nfl_2015_cond1$Yds,col = "gold",main="Boxplot of Yards")
text(1.4,2066,"Q1",col="red")
text(1.4,4135,"Q3",col="red")
text(1.37,3572.5,"Median",col="red")
text(1.4,1043,"Min",col="red")
text(1.4,4870,"Max",col="red")
boxplot(nfl_2015_cond1$Rate,col="blue",main="Box plot of Rate")
text(1.4,84.70,"Q1",col="red")
text(1.4,96.45,"Q3",col="red")
text(1.37,91.25,"Median",col="red")
text(1.4,67.90,"Min",col="red")
text(1.4,110.10,"Max",col="red")
```





Summary of Cmp, Cmp% and Yards

The five-number summary consisting of Minimum value, 1st Quartile, Median, Mean, 3rd Quartile and Maximum value are calclualet for Cmp, Cmp% and Yards and implemented in a table.

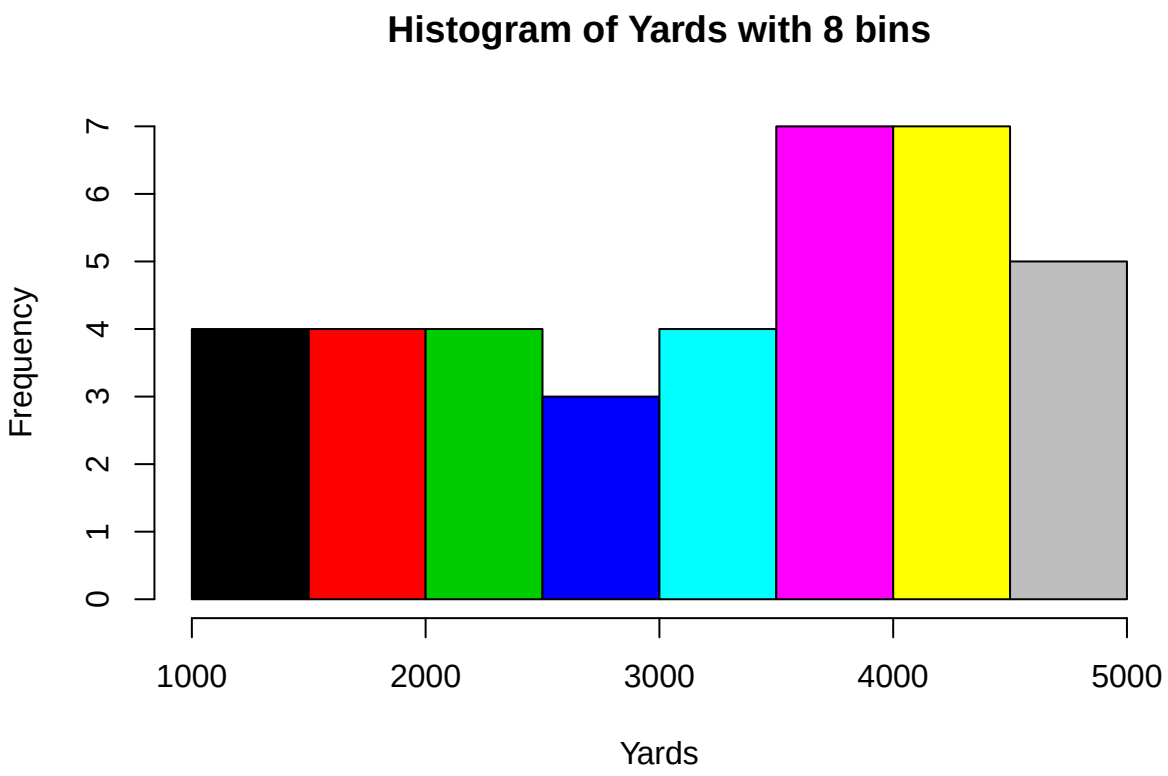
```
summary_detail <- as.data.frame(rbind(summary(nfl_2015_cond1$Cmp),summary(nfl_2015_cond1$Cmp.),summary(n
rownames(summary_detail) <- c("Cmp","Cmp%","Yds")
print(summary_detail)
```

```
##         Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
## Cmp     97.0   187.0  301.50  276.9   349.2  437.0
## Cmp%    55.3    59.8   62.85   62.7    65.3   69.8
## Yds   1043.0  2066.0 3572.00 3213.0  4135.0 4870.0
```

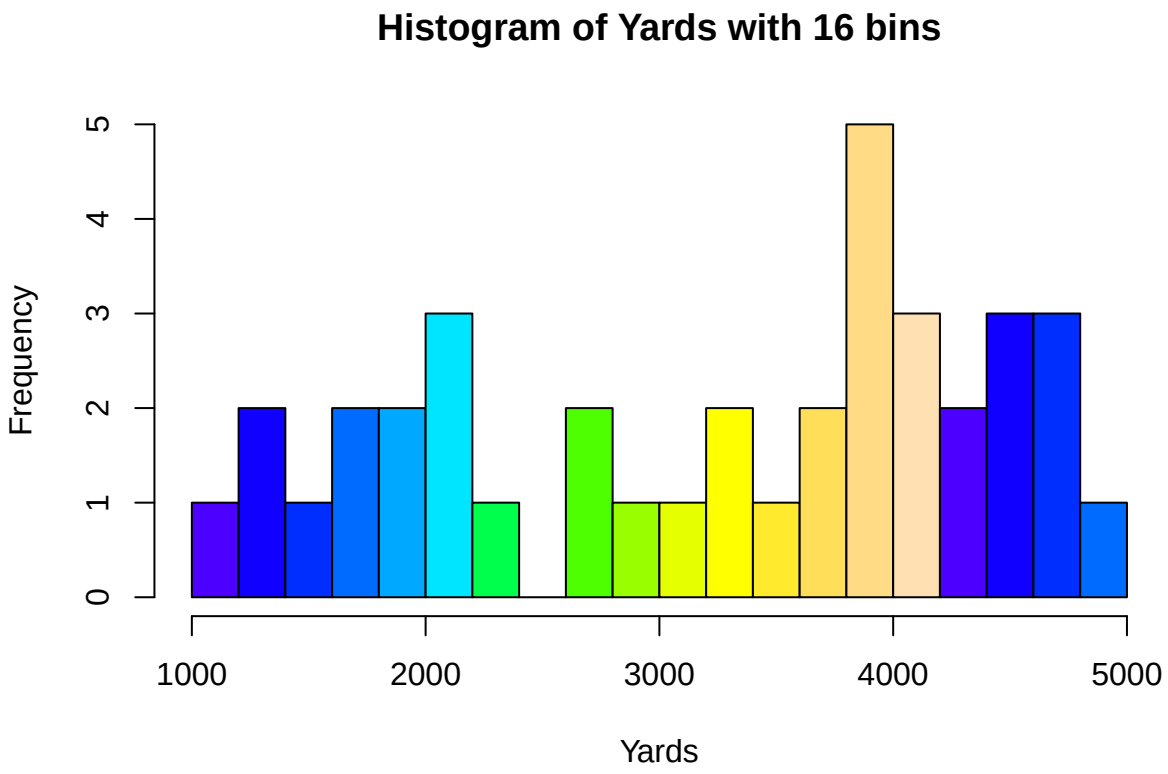
Histogram of Yards

The Histogram of Yards with bin sizes of 8, 16 and 24 are plotted.

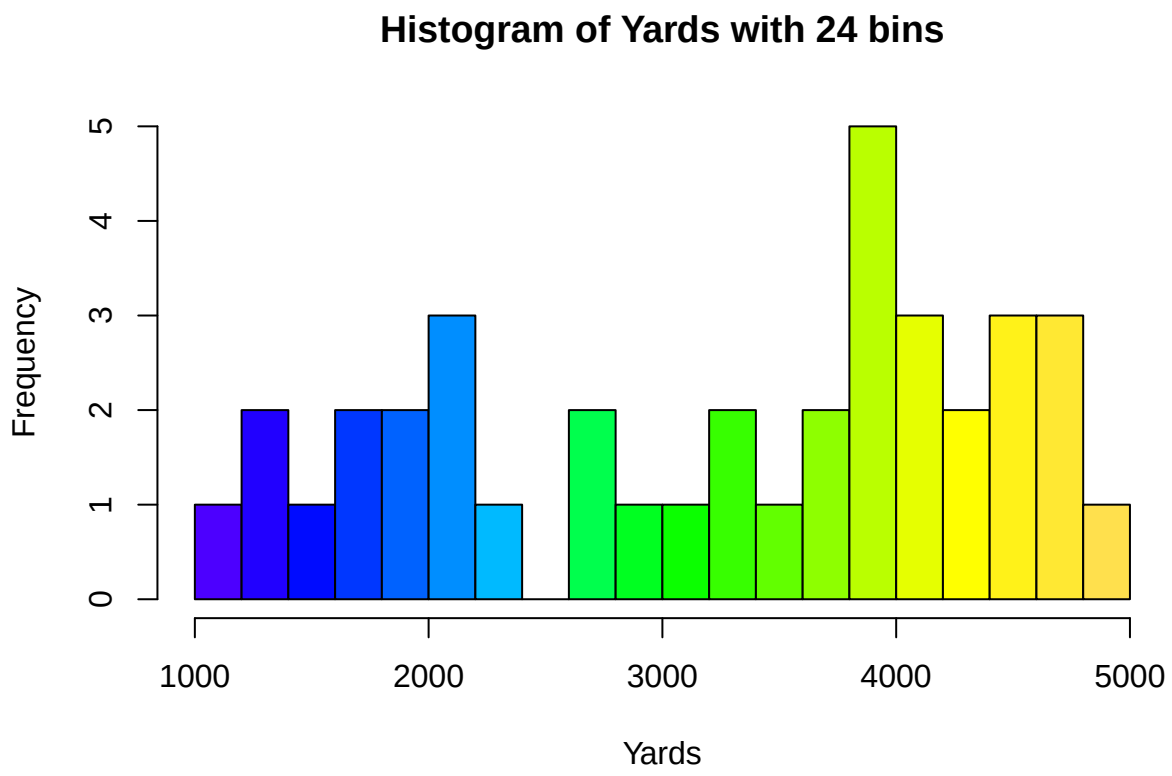
```
par(mfrow=c(1,1))
hist(nfl_2015_cond1$Yds,main="Histogram of Yards with 8 bins",col=1:8,xlab="Yards",breaks=8)
```




```
palette(topo.colors(16))
hist(nfl_2015_cond1$Yds,main="Histogram of Yards with 16 bins",col=palette(topo.colors(16)),xlab="Yards
```




```
palette(topo.colors(24))
hist(nfl_2015_cond1$Yds,main="Histogram of Yards with 24 bins",col=palette(topo.colors(24)),xlab="Yards
```

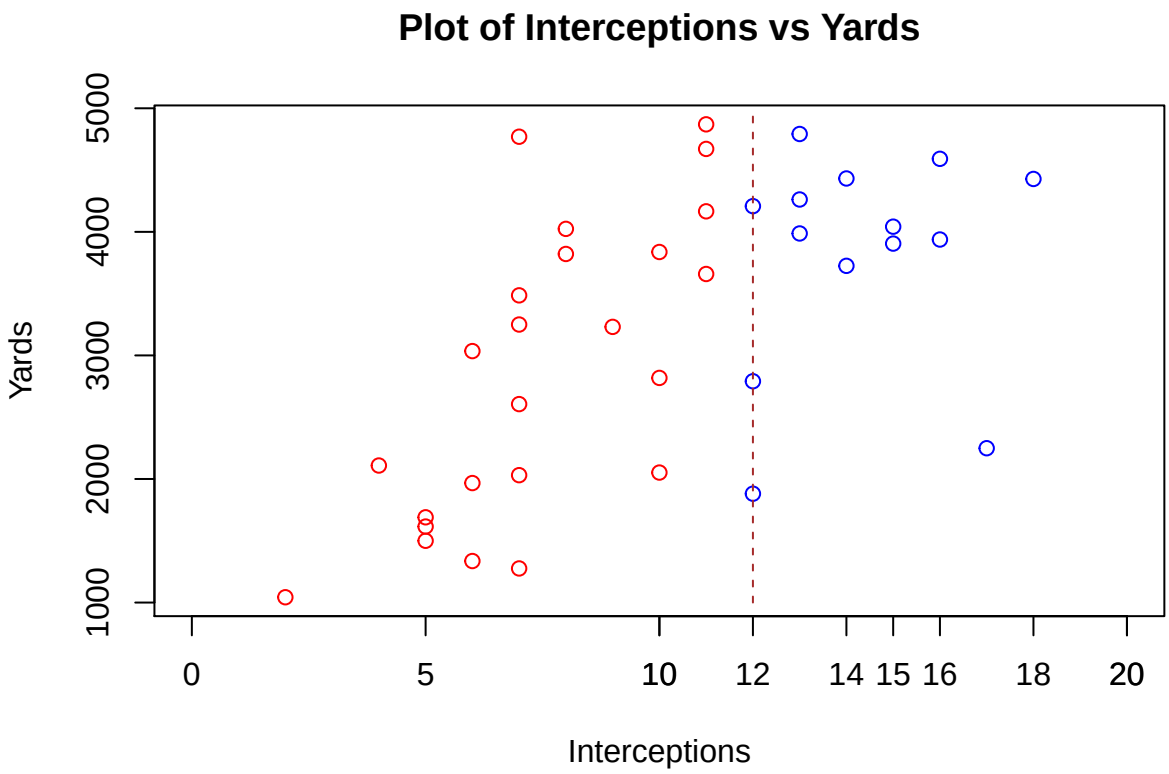



```
palette("default")
```

Comparison of Yards with Interceptions

The distribution of yards according to Interceptions ang the segregation of data with respect to the consition of Interceptions less than 12 is shown.

```
plot(nfl_2015_cond1$Int,nfl_2015_cond1$Yds,main='Plot of Interceptions vs Yards',xlim = c(0,20),col=ifel
axis(1,seq(10,20,by=2))
segments(x0 = 12,y0 = 1000,y1=5000,lty=2,col = "brown")
```

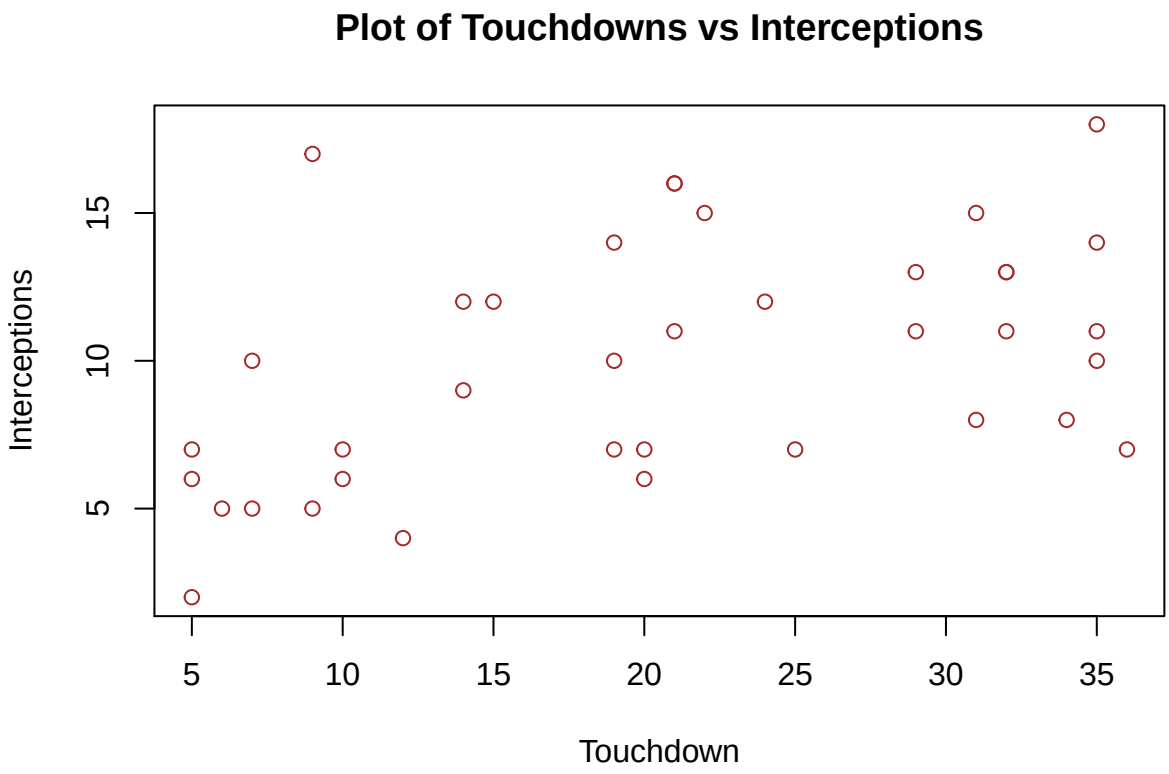


Conclusion: The yards range from '1000' to '5000' for Interceptions less than 12. For Interceptions greater than 12, the yards are above 3500 with an outlier in the range of 2200.

Touchdowns Vs Interceptions

The touchdown and Interceptions plot is shown

```
plot(nfl_2015_cond1$TD,nfl_2015_cond1$Int,main='Plot of Touchdowns vs Interceptions',xlab="Touchdown",yl
```



Analysis of NFL data in the year 2014

```
library(utils)
nfl_2014 <- read.csv('C:/Users/Raghavendran/Documents/UN 5550/nfl-passing-2014.csv')
nfl_2014_cond1 <- nfl_2014[nfl_2014$Att >=100 & nfl_2014$Yds >= 1000,]
```

Mean, median and mode of Touchdowns and Interceptions

The mean,median and mode for Touchdowns and Interceptions are calcualted

```
nfl_2014_TD_mean <- mean(nfl_2014_cond1$TD)
nfl_2014_Int_mean <- mean(nfl_2014_cond1$Int)

print(paste("The mean of touchdown is ",nfl_2014_TD_mean))
```

```
## [1] "The mean of touchdown is  19.5128205128205"
```

```
print(paste("The mean of Interception is ",nfl_2014_Int_mean))
```

```
## [1] "The mean of Interception is  10.4871794871795"
```

```r
nfl_2014_TD_median <- median(nfl_2014_cond1$TD)
nfl_2014_Int_median <- median(nfl_2014_cond1$Int)

print(paste("The median of touchdown is ",nfl_2014_TD_median))
```

```
## [1] "The median of touchdown is  18"
```

```r
print(paste("The median of Interception is ",nfl_2014_Int_median))
```

```
## [1] "The median of Interception is  10"
```

```r
nfl_2014_TD_mode <- modes(nfl_2014_cond1$TD)[1,]
nfl_2014_Int_mode <- modes(nfl_2014_cond1$Int)[1,]

print(paste("The mode of touchdown is ",nfl_2014_TD_mode))
```

```
## [1] "The mode of touchdown is  11" "The mode of touchdown is  18"
```

```r
print(paste("The mode of Interception is ",nfl_2014_Int_mode))
```

```
## [1] "The mode of Interception is  12"
```

Quartiles of Yards and Rate

The quartiles Q1 and Q3 are calculated for Yards and Rate and plotted in a boxplot.

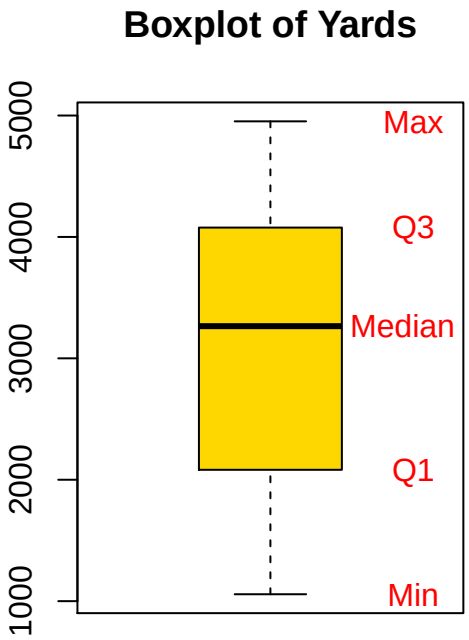
```r
Q1_Yds <- summary(nfl_2014_cond1$Yds)[2]
Q3_Yds <- summary(nfl_2014_cond1$Yds)[5]
print(paste("The First and the Third quartiles of Yards are ",Q1_Yds," and ",Q3_Yds," respectively"))
```

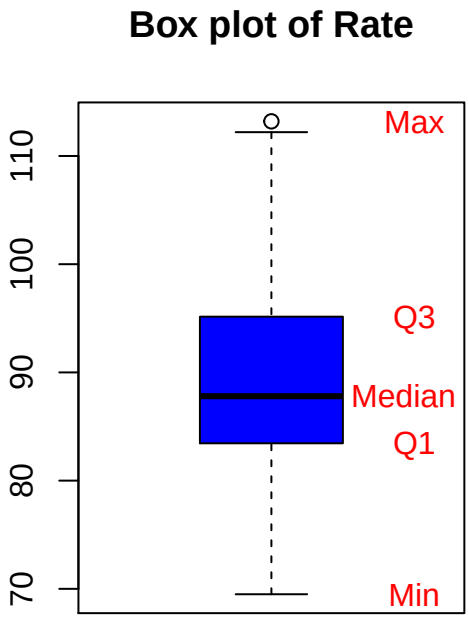
```
## [1] "The First and the Third quartiles of Yards are  2082  and  4077  respectively"
```

```r
Q1_Rate <- summary(nfl_2014_cond1$Rate)[2]
Q3_Rate <- summary(nfl_2014_cond1$Rate)[5]
print(paste("The First and the Third quartiles of Rate are ",Q1_Rate," and ",Q3_Rate," respectively"))
```

```
## [1] "The First and the Third quartiles of Rate are  83.45  and  95.15  respectively"
```

```r
par(mfrow=c(1,2))
boxplot(nfl_2014_cond1$Yds,col = "gold",main="Boxplot of Yards")
text(1.4,2082,"Q1",col="red")
text(1.4,4077,"Q3",col="red")
text(1.37,3265,"Median",col="red")
text(1.4,1057,"Min",col="red")
text(1.4,4952,"Max",col="red")
boxplot(nfl_2014_cond1$Rate,col="blue",main="Box plot of Rate")
text(1.4,83.45,"Q1",col="red")
text(1.4,95.15,"Q3",col="red")
text(1.37,87.80,"Median",col="red")
text(1.4,69.50,"Min",col="red")
text(1.4,113.20,"Max",col="red")
```





Summary of Cmp, Cmp% and Yards

The five-number summary consisting of Minimum value, 1st Quartile, Median, Mean, 3rd Quartile and Maximum value are calclualet for Cmp, Cmp% and Yards and implemented in a table.

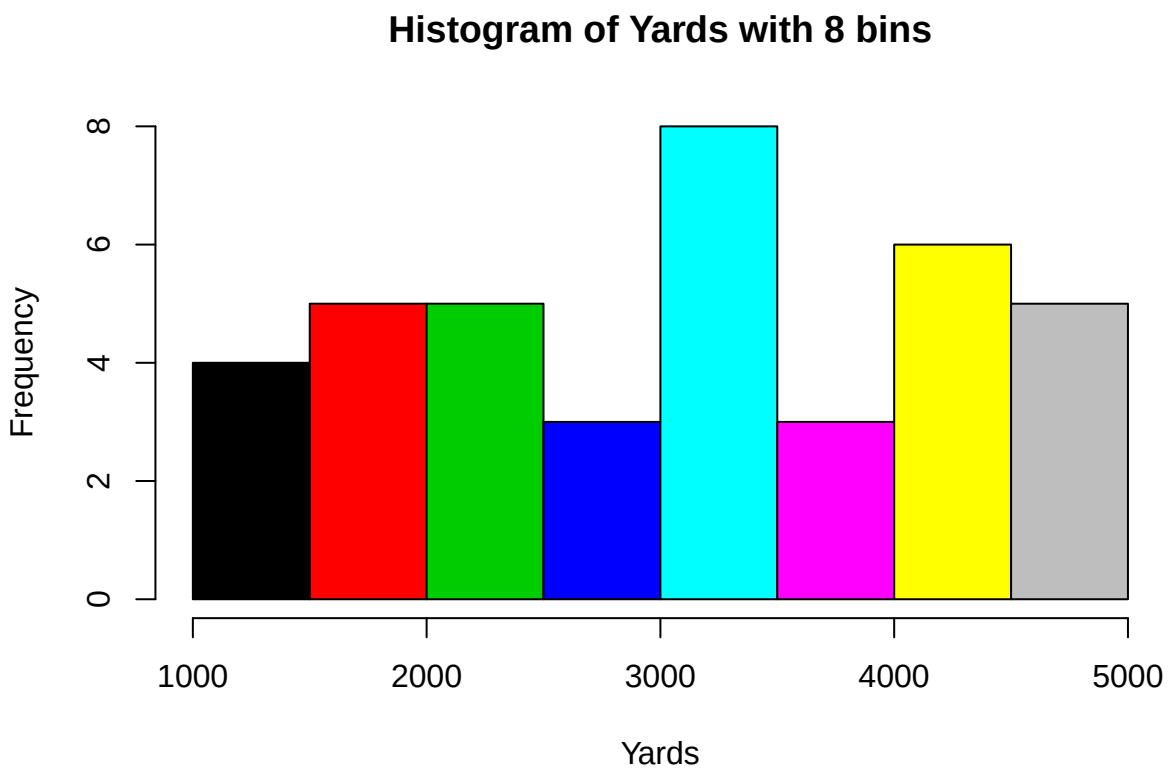
```
summary_detail <- as.data.frame(rbind(summary(nfl_2014_cond1$Cmp),summary(nfl_2014_cond1$Cmp.),summary(n
rownames(summary_detail) <- c("Cmp","Cmp%","Yds")
print(summary_detail)
```

```
##      Min. 1st Qu. Median    Mean 3rd Qu.   Max.
## Cmp    91   182.0  285.0  267.60   366.5  456.0
## Cmp%   55    59.8   63.1   62.83    65.8   71.1
## Yds  1057  2082.0 3265.0 3091.00  4077.0 4952.0
```

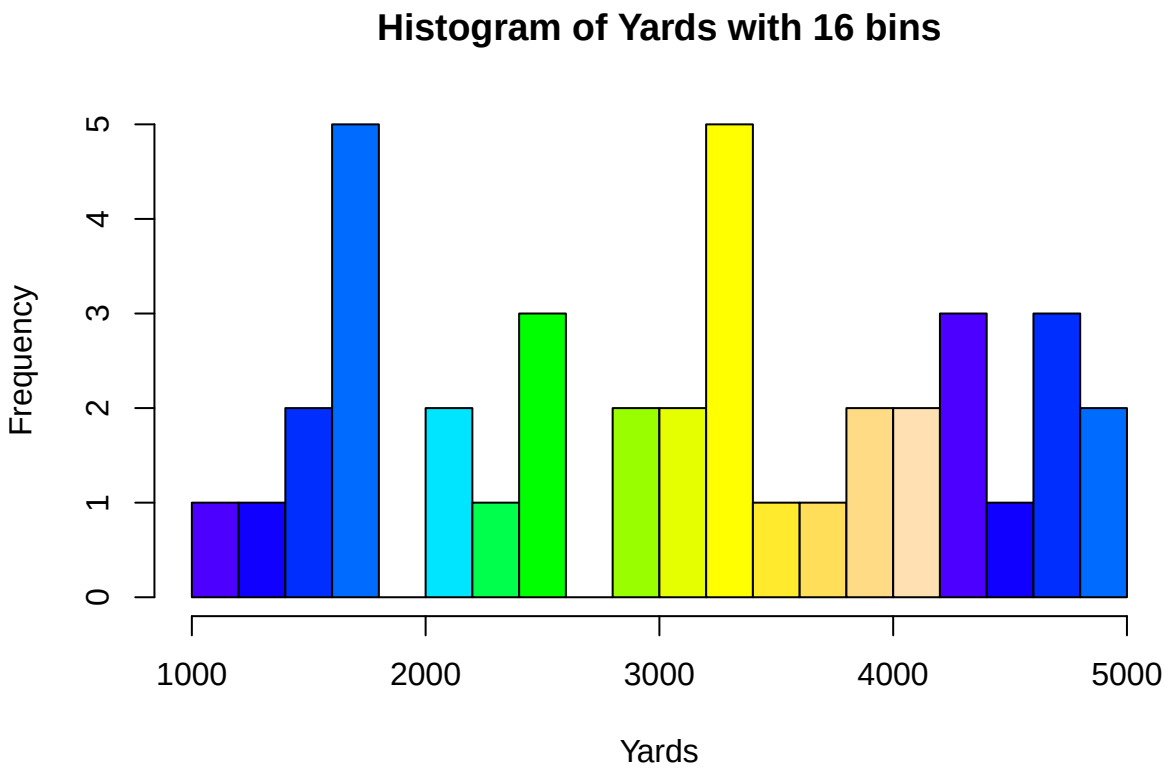
Histogram of Yards

The Histogram of Yards with bin sizes of 8, 16 and 24 are plotted.

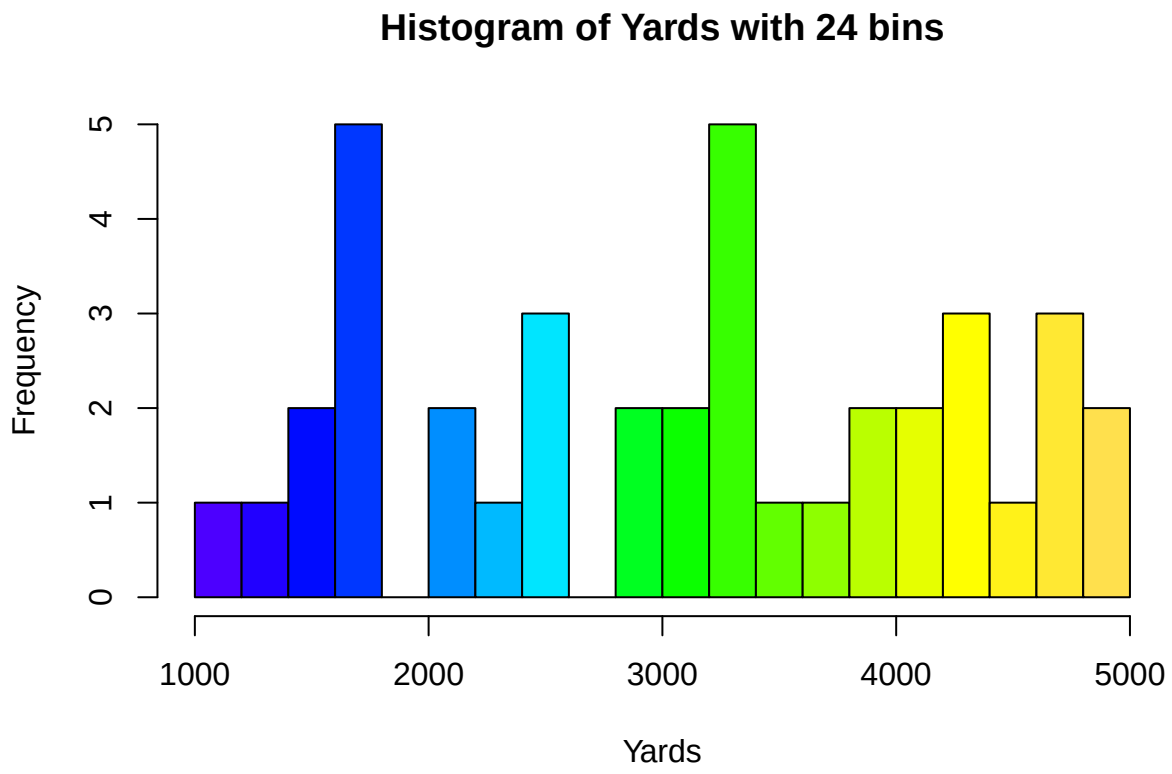
```
par(mfrow=c(1,1))
hist(nfl_2014_cond1$Yds,main="Histogram of Yards with 8 bins",col=1:8,xlab="Yards",breaks=8)
```




```
palette(topo.colors(16))
hist(nfl_2014_cond1$Yds,main="Histogram of Yards with 16 bins",col=palette(topo.colors(16)),xlab="Yards
```




```
palette(topo.colors(24))
hist(nfl_2014_cond1$Yds,main="Histogram of Yards with 24 bins",col=palette(topo.colors(24)),xlab="Yards
```

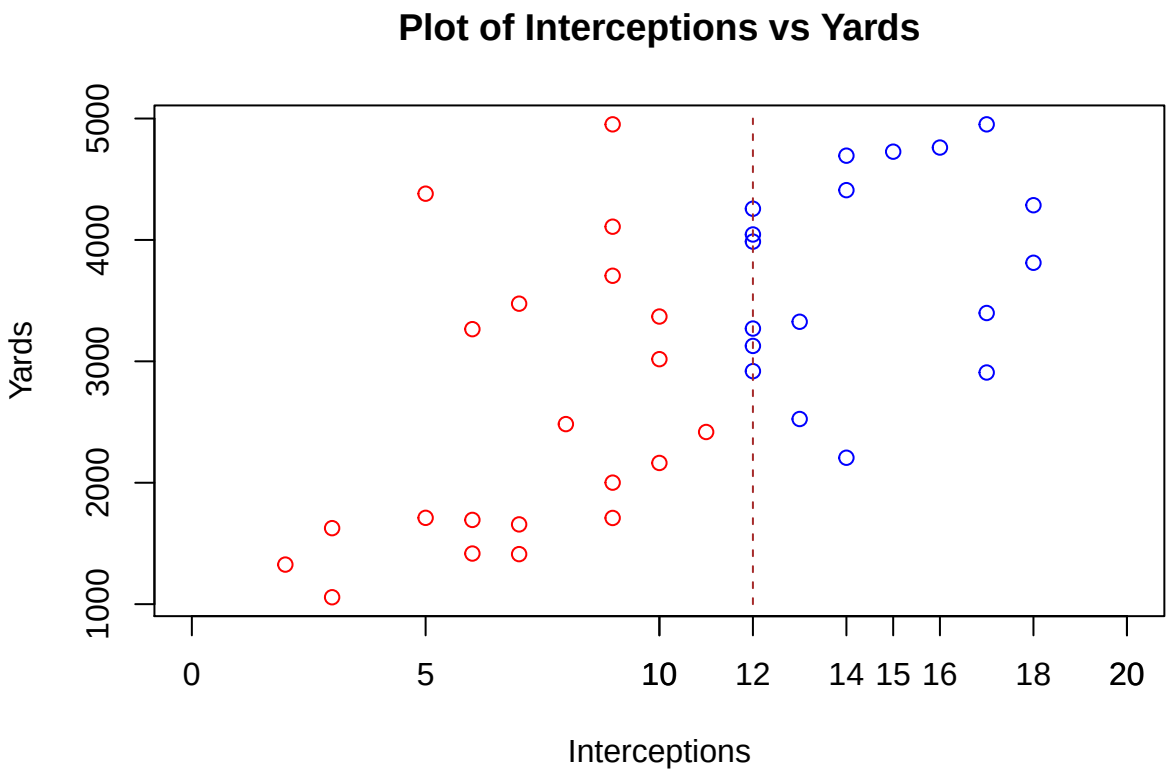



```
palette("default")
```

Comparison of Yards with Interceptions

The distribution of yards according to Interceptions ang the segregation of data with respect to the consition of Interceptions less than 12 is shown.

```
plot(nfl_2014_cond1$Int,nfl_2014_cond1$Yds,main='Plot of Interceptions vs Yards',xlim = c(0,20),col=ifel
axis(1,seq(10,20,by=2))
segments(x0 = 12,y0 = 1000,y1=5000,lty=2,col = "brown")
```

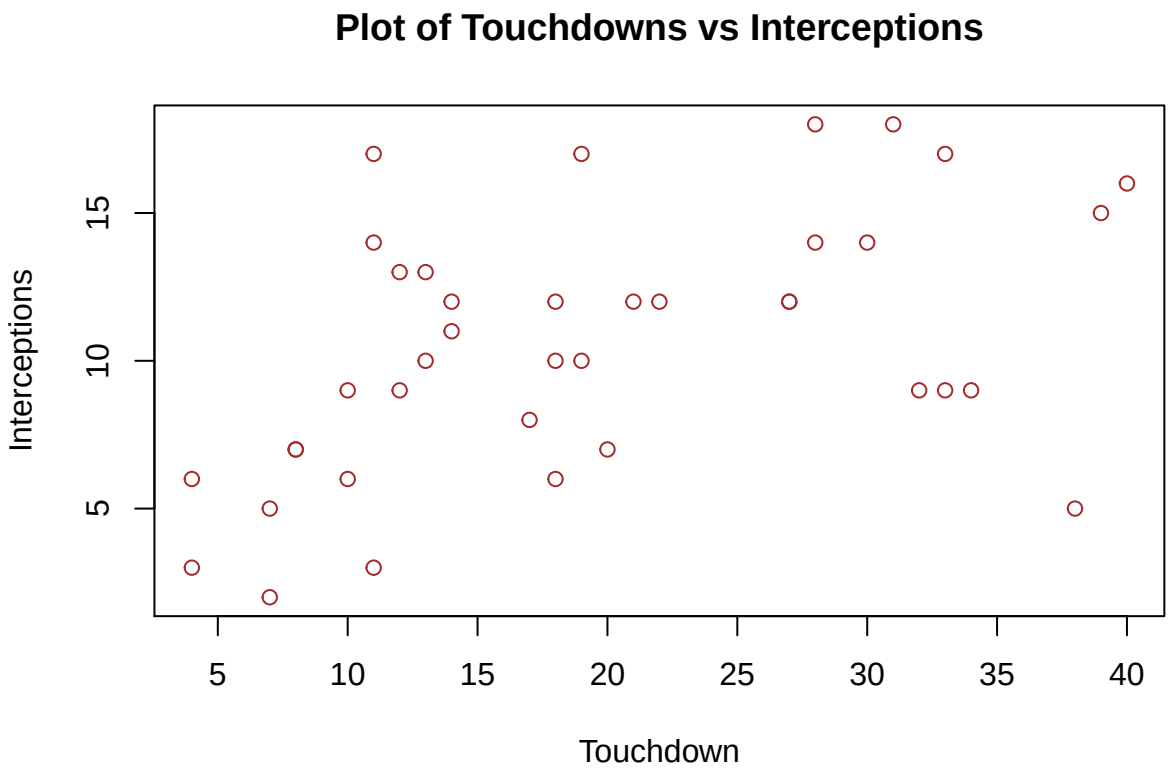


Conclusion: The yards range from '1000' to '5000' with more yards measuring less than 2200 for Interceptions less than 12. For Interceptions greater than 12, the yard measures are scattered around 3500 to 5000 range with none less than 2000.

Touchdowns Vs Interceptions

The touchdown and Interceptions plot is shown

```
plot(nfl_2014_cond1$TD,nfl_2014_cond1$Int,main='Plot of Touchdowns vs Interceptions',xlab="Touchdown",y
```



Analysis of NFL data for all four seasons

The nfl data for the four seasons are imported and merged with respect to the player names. Duplicated Data is copied from the original data and then subjected to cleansing(removing of special characters) and filtered according to those players who have played atleast 5 games and who have atleast made 100 attempts.

```
nfl_2012 <- read.csv('C:/Users/Raghavendran/Documents/UN 5550/nfl-passing-2012.csv')
nfl_2013 <- read.csv('C:/Users/Raghavendran/Documents/UN 5550/nfl-passing-2013.csv')
nfl_2014 <- read.csv('C:/Users/Raghavendran/Documents/UN 5550/nfl-passing-2014.csv')
nfl_2015 <- read.csv('C:/Users/Raghavendran/Documents/UN 5550/nfl-passing-2015.csv')

nfl_2012_clean <- nfl_2012
colnames(nfl_2012_clean) <- c("Rk_12","X", "Tm_12","Age_12","G_12", "GS_12","QBrec_12", "Cmp_12","Att_12
"TD._12","Int_12","Int._12" , "Lng_12","Y.A_12","AY.A_12" , "Y.C_12","Y.G_12","Rate_12" , "QBR_12","Sk_
"ANY.A_12", "Sk._12","X4QC_12" ,"GWD_12")
#nfl_2012_clean$X <- str_replace_all(nfl_2012_clean$X,"[*+]","")
nfl_2012_clean$X <- gsub( "[^[:alnum:],]", "", nfl_2012_clean$X)
nfl_2013_clean <- nfl_2013
colnames(nfl_2013_clean) <- c("Rk_13","X", "Tm_13","Age_13","Pos_13","G_13", "GS_13","QBrec_13", "Cmp_13
"TD._13","Int_13","Int._13" , "Lng_13","Y.A_13","AY.A_13" , "Y.C_13","Y.G_13","Rate_13" , "QBR_13","Sk_
"ANY.A_13", "Sk._13","X4QC_13" ,"GWD_13")
#nfl_2013_clean$X <- str_replace_all(nfl_2013_clean$X,"[*+]","")
nfl_2013_clean$X <- gsub( "[^[:alnum:],]", "", nfl_2013_clean$X)
nfl_2014_clean <- nfl_2014
colnames(nfl_2014_clean) <- c("Rk_14","X", "Tm_14","Age_14","Pos_14","G_14", "GS_14","QBrec_14", "Cmp_14
```

```
"TD._14","Int_14","Int._14" , "Lng_14","Y.A_14","AY.A_14" , "Y.C_14","Y.G_14","Rate_14" , "QBR_14","Sk_
"ANY.A_14", "Sk._14","X4QC_14" ,"GWD_14")
#nfl_2014_clean$X <- str_replace_all(nfl_2014_clean$X,"[*+]","")
nfl_2014_clean$X <- gsub( "[^[:alnum:],]", "", nfl_2014_clean$X)
nfl_2015_clean <- nfl_2015
nfl_2015_clean$X <- substr(as.character(nfl_2015_clean$X),1,nchar(as.character(nfl_2015_clean$X))-9)
colnames(nfl_2015_clean) <- c("Rk_15","X", "Tm_15","Age_15","Pos_15","G_15", "GS_15","QBrec_15", "Cmp_15
"TD._15","Int_15","Int._15" , "Lng_15","Y.A_15","AY.A_15" , "Y.C_15","Y.G_15","Rate_15" , "QBR_15","Sk_
"ANY.A_15", "Sk._15","X4QC_15" ,"GWD_15" )

#nfl_2015_clean$X <- str_replace_all(nfl_2015_clean$X,"[*+]","")
nfl_2015_clean$X <- gsub( "[^[:alnum:],]", "", nfl_2015_clean$X)
```

```
nfl_12_13 <- merge(nfl_2012_clean,nfl_2013_clean, by = 'X')
nfl_12_13_14 <- merge(nfl_12_13,nfl_2014_clean, by ='X')
nfl <- merge(nfl_12_13_14,nfl_2015_clean,by = 'X')
```

```
nfl <- nfl[(nfl$G_12 >=5 & nfl$Att_12 >=100) & (nfl$G_13 >= 5 & nfl$Att_13 >=100) & (nfl$G_14 >=5 & nfl$
nfl[is.na(nfl)] = 0
```

The nfl data that is cleansed and filtered according to the consition now has 19 observations which denotes that only 19 players in all four seasons have played atleast 5 games and 100 attempts in each season.

Average Touchdown for each player across four seasons

```
nfl_TD <- as.data.frame(cbind(nfl$TD_12,nfl$TD_13,nfl$TD_14,nfl$TD_15))
colnames(nfl_TD) <- c("TD_12","TD_13","TD_14","TD_15")
rownames(nfl_TD) <- nfl$X
Avg_touchdown <- rowMeans(nfl_TD)
print(Avg_touchdown)
```

```
##      AaronRodgers        AndrewLuck        AndyDalton BenRoethlisberger
##             31.25             25.25             26.00             26.75
##         CamNewton      CarsonPalmer         DrewBrees        EliManning
##             24.00             23.00             36.75             27.25
##         JayCutler         JoeFlacco   MatthewStafford          MattRyan
##             21.75             20.50             25.75             26.75
##         NickFoles     PeytonManning      PhilipRivers     RussellWilson
##             13.25             35.00             29.50             26.50
##   RyanFitzpatrick     RyanTannehill          TomBrady
##             21.50             21.75             32.00
```

Calculation of Mean, median and mode of average touchdowns

```
print(paste("Mean of average touchdown is",mean(Avg_touchdown)))
```

```
## [1] "Mean of average touchdown is 26.0263157894737"
```

```
print(paste("Median of average touchdown is",median(Avg_touchdown)))
```

```
## [1] "Median of average touchdown is 26"
```

```
print(paste("Mode of average touchdown is",modes(Avg_touchdown)[1,]))
```

```
## [1] "Mode of average touchdown is 26"
```

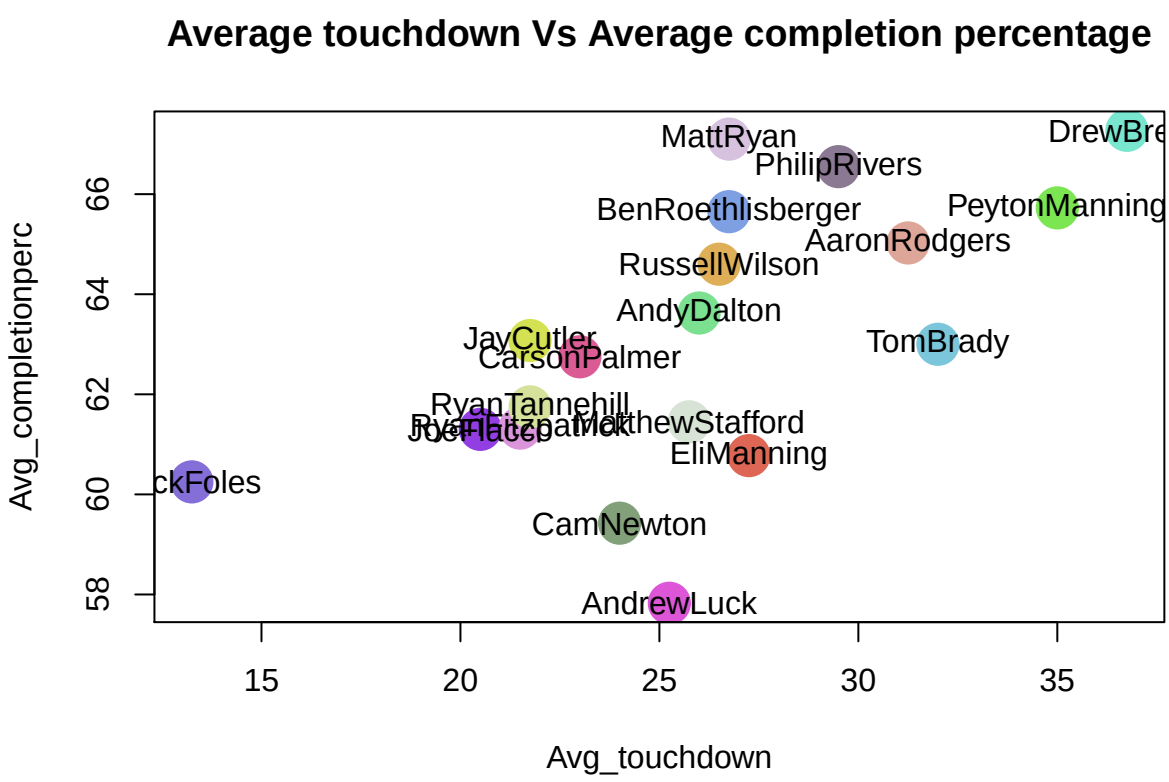
Calculation of Mean, median and mode of average Completion percentage

```
nfl_Cmp <- as.data.frame(cbind(nfl$Cmp._12,nfl$Cmp._13,nfl$Cmp._14,nfl$Cmp._15))
colnames(nfl_Cmp) <- c("Cmp._12","Cmp._13","Cmp._14","Cmp._15")
rownames(nfl_Cmp) <- nfl$X
Avg_completionperc <- rowMeans(nfl_Cmp)
print(Avg_completionperc)
```

```
##      AaronRodgers        AndrewLuck        AndyDalton BenRoethlisberger
##            65.025            57.825            63.625            65.650
##         CamNewton      CarsonPalmer         DrewBrees        EliManning
##            59.425            62.750            67.275            60.775
##         JayCutler         JoeFlacco   MatthewStafford          MattRyan
##            63.075            61.300            61.450            67.100
##         NickFoles     PeytonManning      PhilipRivers     RussellWilson
##            60.250            65.725            66.550            64.600
##   RyanFitzpatrick     RyanTannehill          TomBrady
##            61.325            61.750            63.000
```

Scatter plot of Average touchdown and Average completion percentage

```
palette <- distinctColorPalette(19)
plot(Avg_touchdown,Avg_completionperc,main="Average touchdown Vs Average completion percentage",col=pal
text(Avg_touchdown,Avg_completionperc,labels = nfl$X)
```



From the plot, we are able to find that Drew Beers has the highest average touchdown and average competion percentage followed by Peyton Manning, Aaron Rodgers and Tom Brady. AndrewLuck has lowest average completion percentage at an average touchdown of approximately 25. Nick Foles has the lowest average touchdown with an average completion percentage of approximately 60.

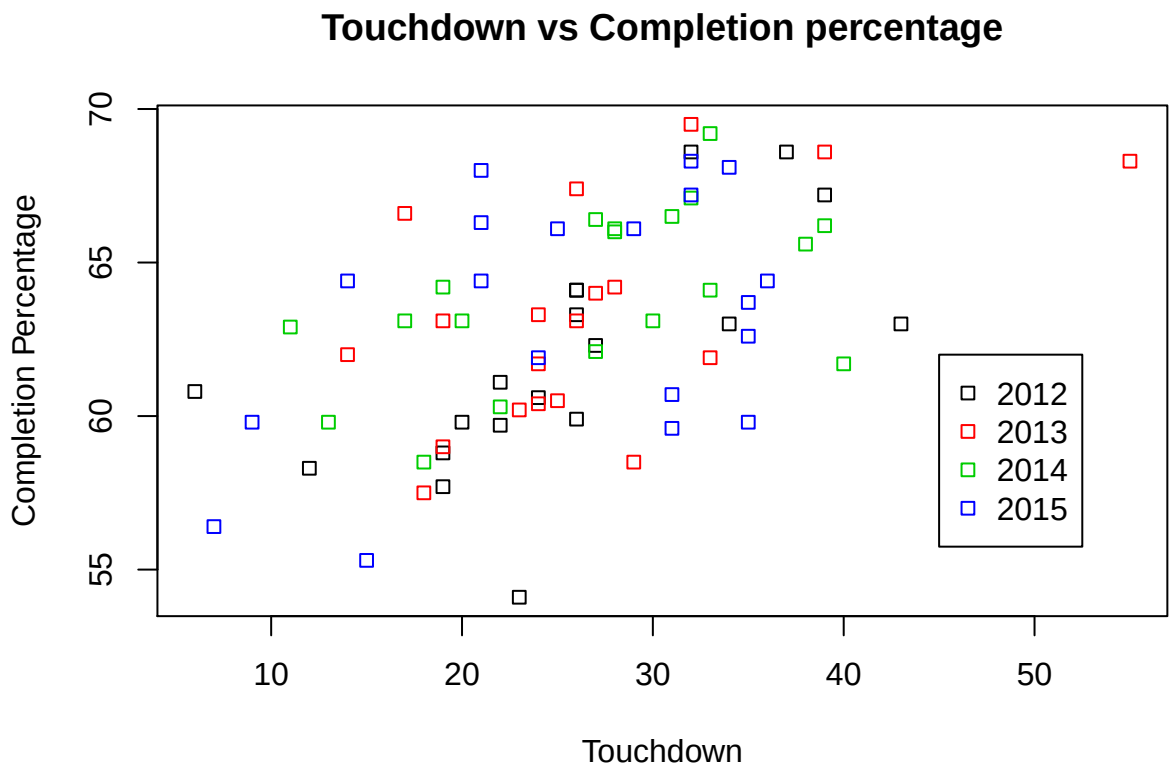
Scatter plot of Touchdown and Completion percentage across four seasons

Here, the touchdowns and completion percentages of all the players with respect to seasons are plotted. Here the touchdowns of season 2015 are scattered to a great extent according to the completion percentage. The touchdowns in 2012 mostly lie between 20 to 30 with completion percentage around 60.

```
nfl_TD_cmp <- as.data.frame(cbind(nfl_TD,nfl$Cmp._12,nfl$Cmp._13,nfl$Cmp._14,nfl$Cmp._15))
colnames(nfl_TD_cmp) <- c("TD_12","TD_13","TD_14","TD_15","Cmp._12","Cmp._13","Cmp._14","Cmp._15")

plot(c(nfl_TD_cmp$TD_12,nfl_TD_cmp$TD_13,nfl_TD_cmp$TD_14,nfl_TD_cmp$TD_15),c(nfl_TD_cmp$Cmp._12,nfl_TD_

legend(45,62,col=1:19,c("2012","2013","2014","2015"),pch=22)
```



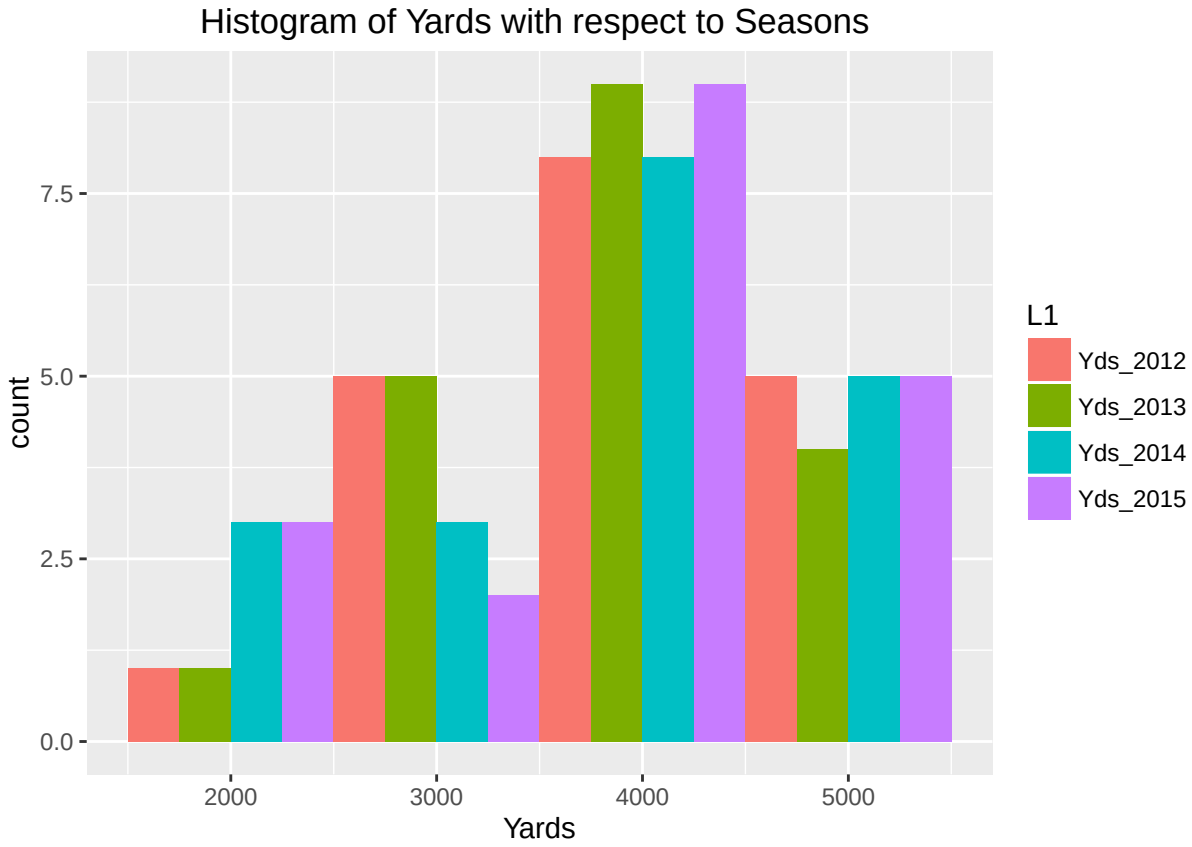
Histogram of Yards across four seasons

The Histogram of Yards across the four seasons are plotted

```
nfl_Yds <- as.data.frame(cbind(nfl$Yds_12,nfl$Yds_13,nfl$Yds_14,nfl$Yds_15))
colnames(nfl_Yds) <- c("Yds_12","Yds_13","Yds_14","Yds_15")
rownames(nfl_Yds) <- nfl$X

nfl_Yds_lst <- list(Yds_2012=nfl_Yds$Yds_12,Yds_2013=nfl_Yds$Yds_13,Yds_2014=nfl_Yds$Yds_14,Yds_2015=nf

ggplot(melt(nfl_Yds_lst),aes(x=value,fill= L1)) + geom_histogram(position="dodge",binwidth = 1000) + la
```



From the Histogram, we can see that the count of Yards are highest in season 2015 and lowest in 2012 and 2013.

Calculating Average quarterback rating of top 3 quarterbacks for all seasons

The average quarterback rating of top 3 quarterbacks across four seasons are calculated .

```
nfl_Rate <- as.data.frame(cbind(nfl$Rate_12,nfl$Rate_13,nfl$Rate_14,nfl$Rate_15))
colnames(nfl_Rate) <- c("Rate_12","Rate_13","Rate_14","Rate_15")
rownames(nfl_Rate) <- nfl$X
Avg_Rate <- rowMeans(nfl_Rate)
tail(sort(Avg_Rate),3)
```

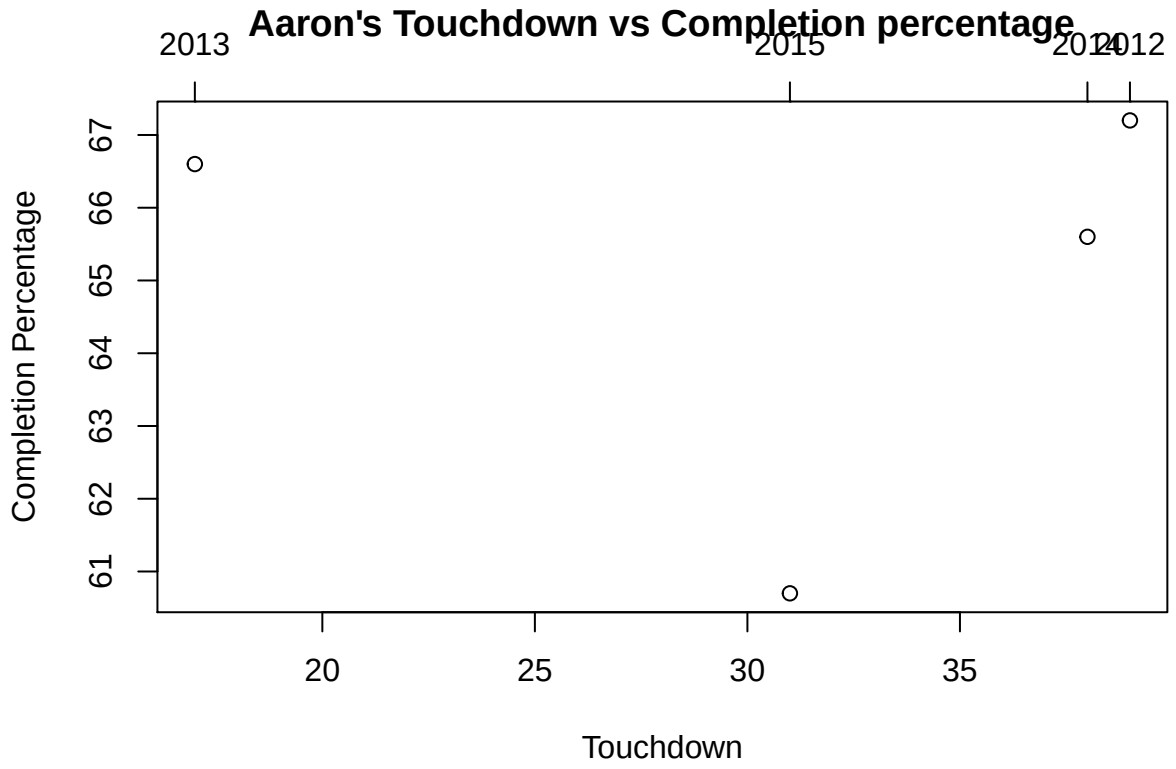
```
##     DrewBrees RussellWilson  AaronRodgers
##        99.750       101.575       104.450
```

From the calculation, I have displayed the top 3 Quarterbacks who are Aaron Rodgers, Russell Wilson and Drew Brees.

Plotting the Touchdown and Completion percentage of Aaron Rodgers

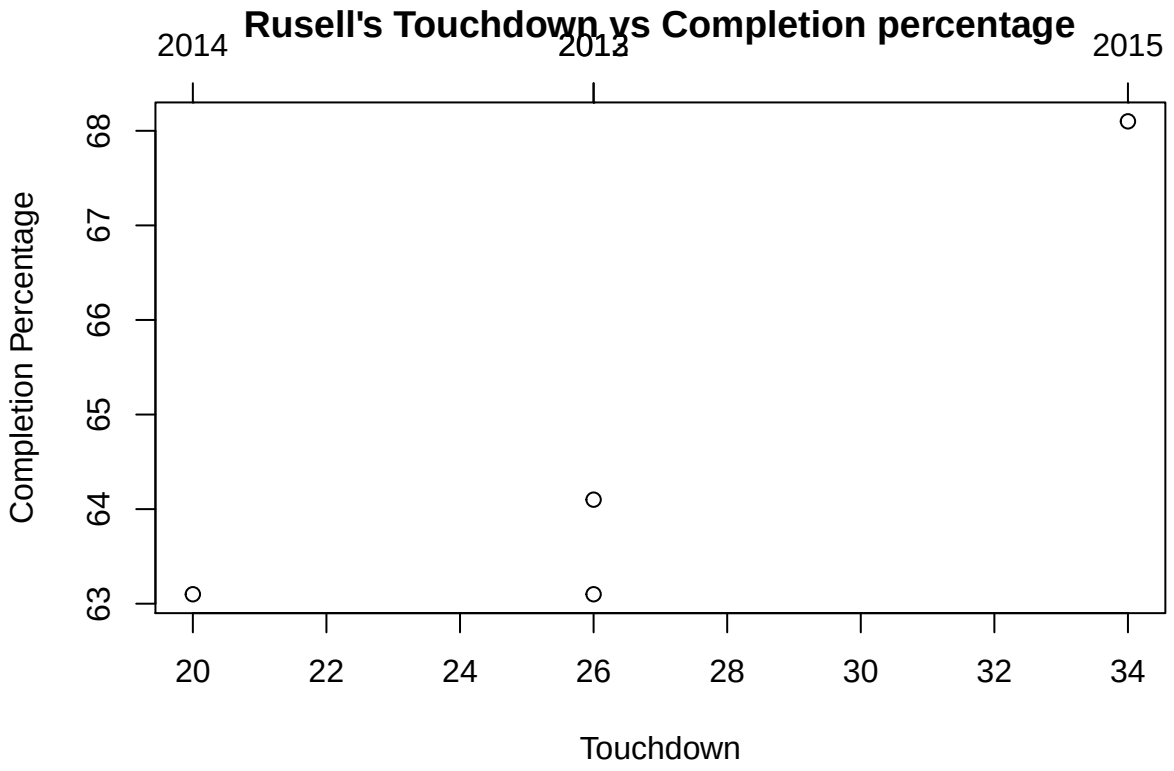
```
plot(c(nfl_TD_cmp[1,]$TD_12,nfl_TD_cmp[1,]$TD_13,nfl_TD_cmp[1,]$TD_14,nfl_TD_cmp[1,]$TD_15),c(nfl_TD_cm
#segments(39,60,39,68,lty=3)
#segments(17,60,17,68,lty=3)
#segments(38,60,38,68,lty=3)
```

```
#segments(31,60,31,68,lty=3)
axis(3,39,labels = "2012")
axis(3,17,labels = "2013")
axis(3,38,labels = "2014")
axis(3,31,labels = "2015")
```



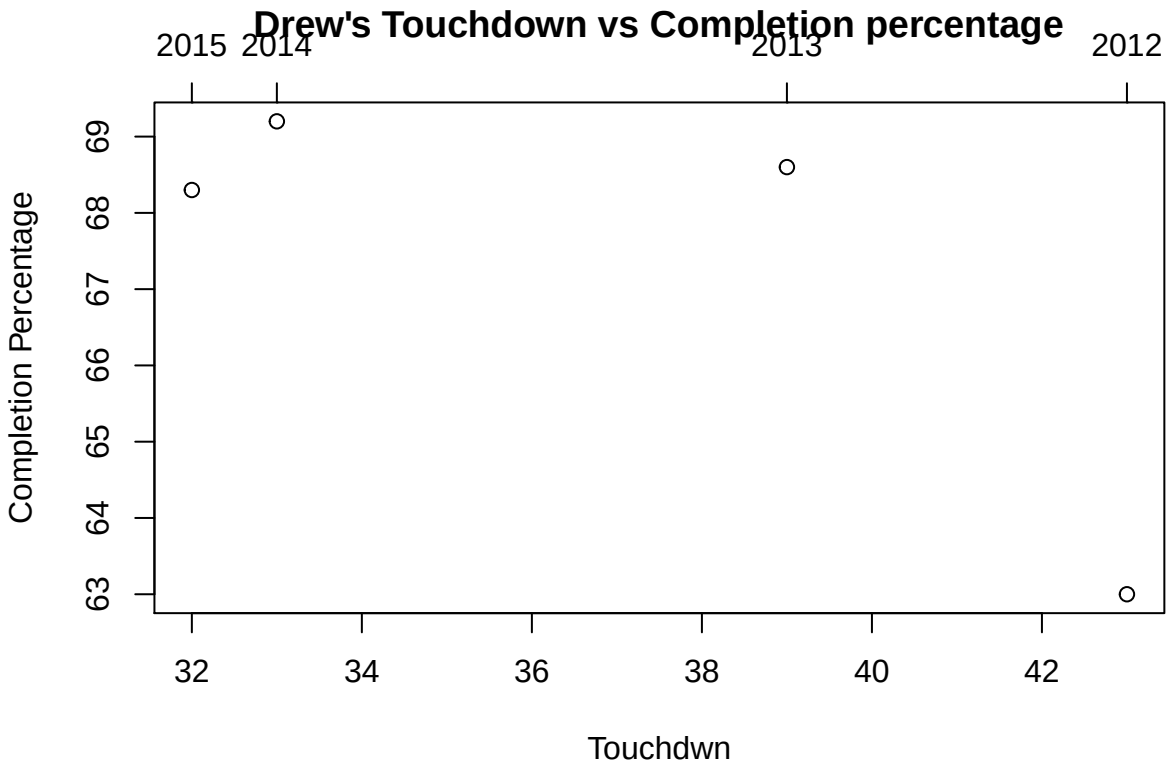
Plotting the Touchdown and Completion percentage of Russell Wilson

```
plot(c(nfl_TD_cmp[16,]$TD_12,nfl_TD_cmp[16,]$TD_13,nfl_TD_cmp[16,]$TD_14,nfl_TD_cmp[16,]$TD_15),c(nfl_TD
#segments(26,62.0,26,69,lty=3)
#segments(26,62.0,26,69,lty=3)
#segments(20,62.0,20,69,lty=3)
#segments(34,62.0,34,69,lty=3)
axis(3,26,labels = "2012")
axis(3,26,labels = "2013")
axis(3,20,labels = "2014")
axis(3,34,labels = "2015")
```



Plotting the Touchdown and Completion percentage of Drew Beers

```
plot(c(nfl_TD_cmp[7,]$TD_12,nfl_TD_cmp[7,]$TD_13,nfl_TD_cmp[7,]$TD_14,nfl_TD_cmp[7,]$TD_15),c(nfl_TD_cm
#segments(43,62,43,70,lty=3)
#segments(39,62,39,70,lty=3)
#segments(33,62,33,70,lty=3)
#segments(32,62,32,70,lty=3)
axis(3,43,labels = "2012")
axis(3,39,labels = "2013")
axis(3,33,labels = "2014")
axis(3,32,labels = "2015")
```



Selection of top 5 Quarterbacks with respect to ESPN Quarterback rating

The top 5 quarterbacks for ach season are calculated with respect to ESPN Quarterback rating.

```
QBR_ESPN_12 <- data.frame(nfl$X,nfl$QBR_12,nfl$Yds_12,nfl$TD_12,nfl$Int_12,nfl$Cmp._12)
QBR_ESPN_12 <- QBR_ESPN_12[order(QBR_ESPN_12$nfl.QBR_12,decreasing = TRUE),]
QBR_ESPN_12[1:5,]
```

```
##            nfl.X nfl.QBR_12 nfl.Yds_12 nfl.TD_12 nfl.Int_12 nfl.Cmp._12
## 14 PeytonManning      84.11       4659        37         11        68.6
## 19      TomBrady      77.05       4827        34          8        63.0
## 12      MattRyan      74.50       4719        32         14        68.6
## 1   AaronRodgers      72.48       4295        39          8        67.2
## 16 RussellWilson      69.59       3118        26         10        64.1
```

In 2012, Peytor Manning has the highest ESPN quarterback rating followed by Tom Brady and Matt ryan. The quarterback with the lowest rating is Russell Wilson.

```
QBR_ESPN_13 <- data.frame(nfl$X,nfl$QBR_13,nfl$Yds_13,nfl$TD_13,nfl$Int_13,nfl$Cmp._13)
QBR_ESPN_13 <- QBR_ESPN_13[order(QBR_ESPN_13$nfl.QBR_13,decreasing = TRUE),]
QBR_ESPN_13[1:5,]
```

```
##            nfl.X nfl.QBR_13 nfl.Yds_13 nfl.TD_13 nfl.Int_13 nfl.Cmp._13
## 14 PeytonManning      82.93       5477        55         10        68.3
```

```
## 15  PhilipRivers      71.69       4478        32         11        69.5
## 7      DrewBrees      70.51       5162        39         12        68.6
## 13     NickFoles      69.04       2891        27          2        64.0
## 1   AaronRodgers      68.66       2536        17          6        66.6
```

In 2013, Peytor Manning has the highest ESPN quarterback rating followed by Philip Rivers and Drew Beers. The quarterback with the lowest rating is Aaron Rodgers.

```
QBR_ESPN_14 <- data.frame(nfl$X,nfl$QBR_14,nfl$Yds_14,nfl$TD_14,nfl$Int_14,nfl$Cmp._14)
QBR_ESPN_14 <- QBR_ESPN_14[order(QBR_ESPN_14$nfl.QBR_14,decreasing = TRUE),]
QBR_ESPN_14[1:5,]
```

```
##                nfl.X nfl.QBR_14 nfl.Yds_14 nfl.TD_14 nfl.Int_14
## 1       AaronRodgers      82.64       4381        38          5
## 14     PeytonManning      77.25       4727        39         15
## 19          TomBrady      74.32       4109        33          9
## 4  BenRoethlisberger      72.48       4952        32          9
## 7          DrewBrees      71.56       4952        33         17
##    nfl.Cmp._14
## 1         65.6
## 14        66.2
## 19        64.1
## 4         67.1
## 7         69.2
```

In 2014, Aaron Rodgers has the highest ESPN quarterback rating followed by Peter Manning and Tom Brady. The quarterback with the lowest rating is Drew Beers.

```
QBR_ESPN_15 <- data.frame(nfl$X,nfl$QBR_15,nfl$Yds_15,nfl$TD_15,nfl$Int_15,nfl$Cmp._15)
QBR_ESPN_15 <- QBR_ESPN_15[order(QBR_ESPN_15$nfl.QBR_15,decreasing = TRUE),]
QBR_ESPN_15[1:5,]
```

```
##                nfl.X nfl.QBR_15 nfl.Yds_15 nfl.TD_15 nfl.Int_15
## 6       CarsonPalmer      82.15       4671        35         11
## 4  BenRoethlisberger      76.86       3938        21         16
## 7          DrewBrees      75.47       4870        32         11
## 16     RussellWilson      74.91       4024        34          8
## 3         AndyDalton      73.11       3250        25          7
##    nfl.Cmp._15
## 6         63.7
## 4         68.0
## 7         68.3
## 16        68.1
## 3         66.1
```

In 2015, Carson Palmer has the highest ESPN quarterback rating followed by Ben Roethlisberger and Drew beers. The quarterback with the lowest rating is Andy Dalton.