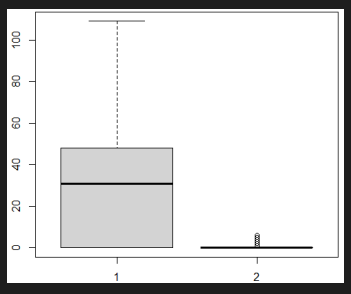
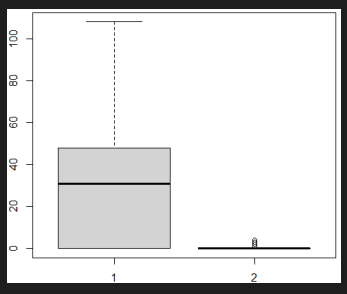
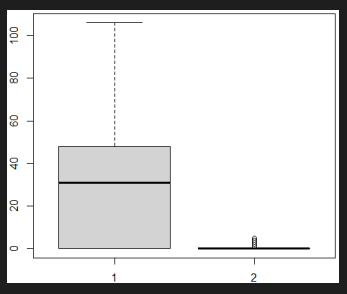
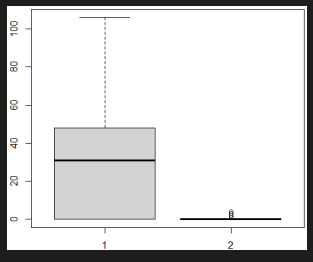
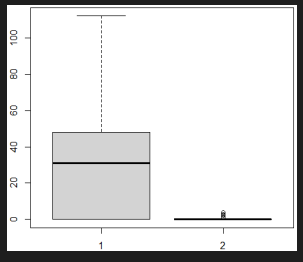
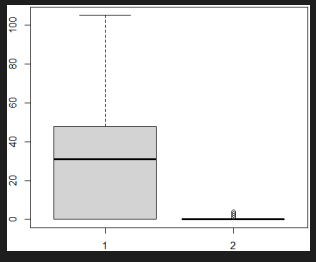
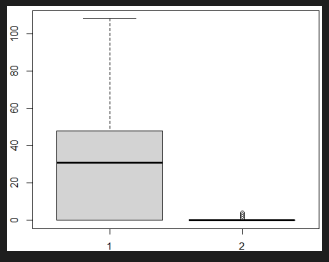
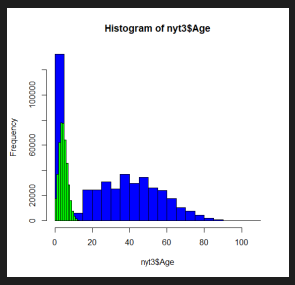
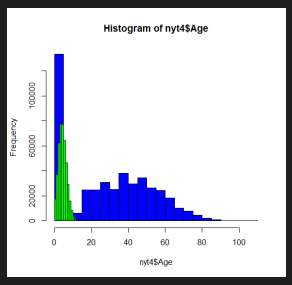
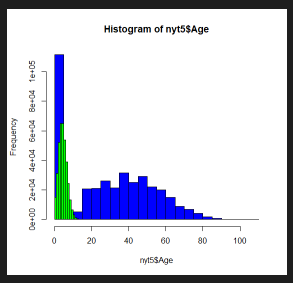
```
# Assignment 3 Question 1
setwd("C:/Users/Shrey Jain/Documents/Study/Data Analytics/DataAnalyticsFall2022_SHREY_JAIN/Lab/DataAnalytics_A3_SHREY_JAIN/nytimes/")
nyt3 <- read.csv("nyt3.csv")
nyt4 <- read.csv("nyt4.csv")
nyt5 <- read.csv("nyt5.csv")
nyt6 <- read.csv("nyt6.csv")
nyt7 <- read.csv("nyt7.csv")
nyt8 <- read.csv("nyt8.csv")
nyt9 <- read.csv("nyt9.csv")

# Question 1 (a)
boxplot(nyt3$Age, nyt3$Clicks)
boxplot(nyt4$Age, nyt4$Clicks)
boxplot(nyt5$Age, nyt5$Clicks)
boxplot(nyt6$Age, nyt6$Clicks)
boxplot(nyt7$Age, nyt7$Clicks)
boxplot(nyt8$Age, nyt8$Clicks)
boxplot(nyt9$Age, nyt9$Clicks)

# After plotting the boxplots for age and clicks, it seems that the median value of age is about 30.
# This goes for all 7 datasets from nyt3 to nyt9.
# Secondly, the max-age value is roughly about 50 for all 7 datasets.
# For clicks, it seems the average value or the most encountered value is 0. Meaning that most users have not clicked.
# Secondly, the max value for clicks is around 5. That's the max click count basis for the given datasets.
```

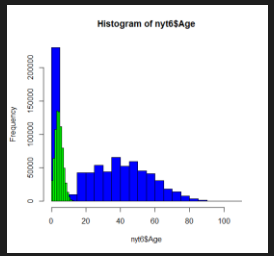








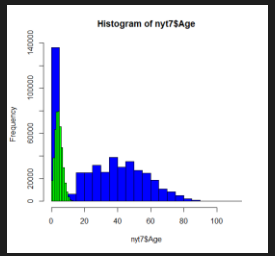
```r
# Question 1 (b)
hist(nyt3$Age, col='blue')
hist(nyt3$Impressions, col='green', add=TRUE)

hist(nyt4$Age, col='blue')
hist(nyt4$Impressions, col='green', add=TRUE)

hist(nyt5$Age, col='blue')
hist(nyt5$Impressions, col='green', add=TRUE)

hist(nyt6$Age, col='blue')
hist(nyt6$Impressions, col='green', add=TRUE)

hist(nyt7$Age, col='blue')
hist(nyt7$Impressions, col='green', add=TRUE)

hist(nyt8$Age, col='blue')
hist(nyt8$Impressions, col='green', add=TRUE)

hist(nyt9$Age, col='blue')
hist(nyt9$Impressions, col='green', add=TRUE)

# It seems age and impression give a little better insight as compared to age and clicks.
# That is primarily because most of the users didn't click making the majority of values in clicks column 0.
# This goes for all 7 datasets from nyt3 to nyt9.
# Looking at the histograms, both columns seem to follow a normal distribution. Especially, impressions.
# For Age, it seems the data is a bit left skewed until age 10, however, from 10 to 90, the distribution is normal.
```

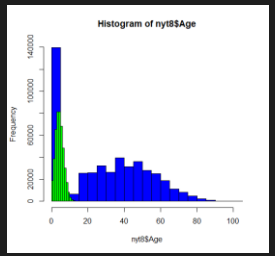


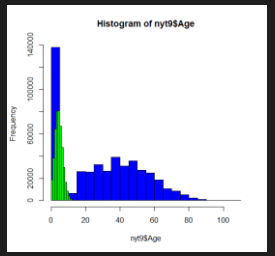




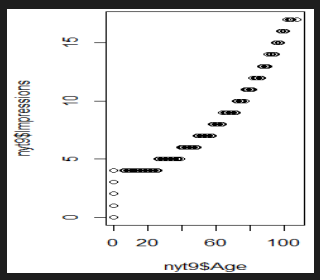


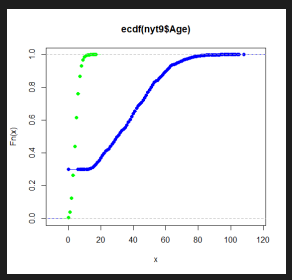


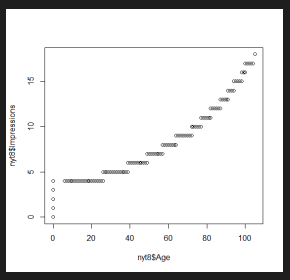


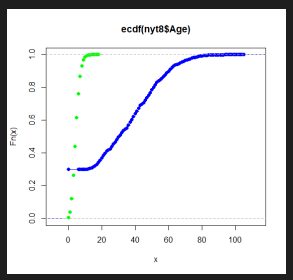


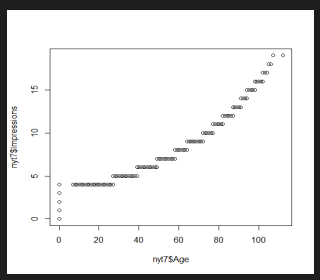
```r
# Question 1 (c)
plot(ecdf(nyt3$Age), col='blue')
plot(ecdf(nyt3$Impressions), col='green', add=TRUE)
qqplot(nyt3$Age, nyt3$Impressions)

plot(ecdf(nyt4$Age), col='blue')
plot(ecdf(nyt4$Impressions), col='green', add=TRUE)
qqplot(nyt4$Age, nyt4$Impressions)

plot(ecdf(nyt5$Age), col='blue')
plot(ecdf(nyt5$Impressions), col='green', add=TRUE)
qqplot(nyt5$Age, nyt5$Impressions)

plot(ecdf(nyt6$Age), col='blue')
plot(ecdf(nyt6$Impressions), col='green', add=TRUE)
qqplot(nyt6$Age, nyt6$Impressions)

plot(ecdf(nyt7$Age), col='blue')
plot(ecdf(nyt7$Impressions), col='green', add=TRUE)
qqplot(nyt7$Age, nyt7$Impressions)

plot(ecdf(nyt8$Age), col='blue')
plot(ecdf(nyt8$Impressions), col='green', add=TRUE)
qqplot(nyt8$Age, nyt8$Impressions)

plot(ecdf(nyt9$Age), col='blue')
plot(ecdf(nyt9$Impressions), col='green', add=TRUE)
qqplot(nyt9$Age, nyt9$Impressions)

# Looking at the qqplots across all 7 datasets between age and impression, it seems, both the values do come from a population with a common distribution.
# Similarly, the ECDF plots also convey that the although the curve is different, many values tend to reach a tangent to y=1
# It again seems age and impression give a little better insight as compared to age and clicks. This goes for all 7 datasets from nyt3 to nyt9.
```

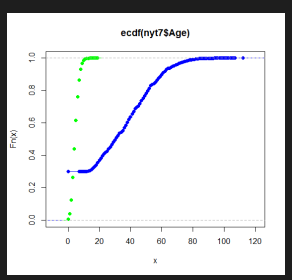


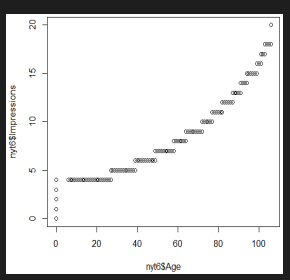


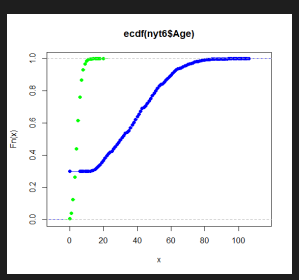


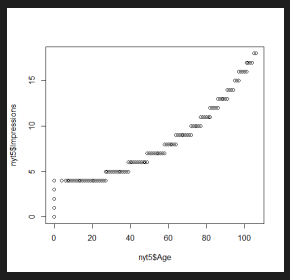


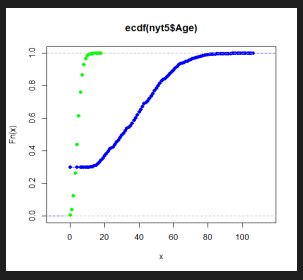


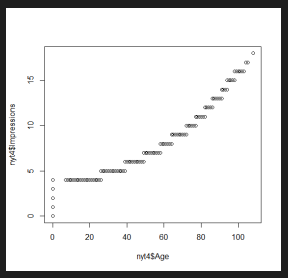


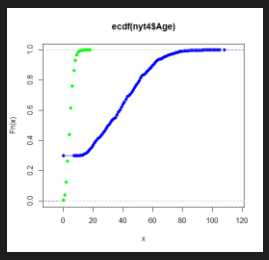


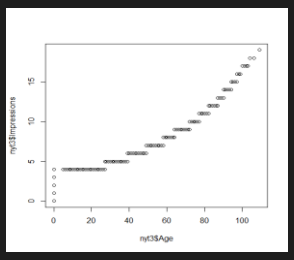


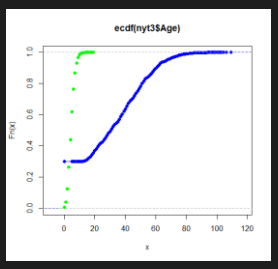












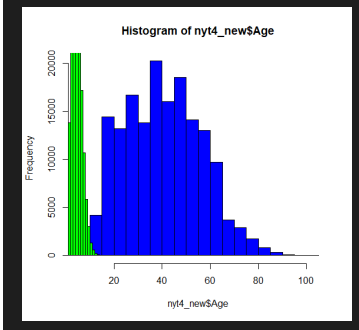
Question 1 (d)

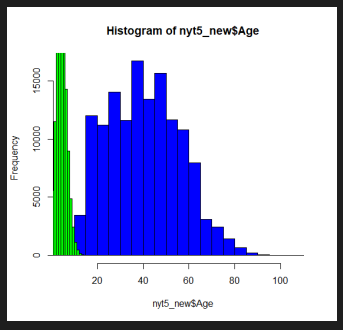
```
# Shapiro test for checking normal distribution
shapiro.test(nyt4$Age[0:5000])
shapiro.test(nyt4$Impressions[0:5000])
# Both columns are not normally distributed as the p-value is very low

# Wilcox test for checking co-relation
wilcox.test(nyt4$Age, nyt4$Impressions, data=nyt4)
# Both are independent as the p-value is very low
```

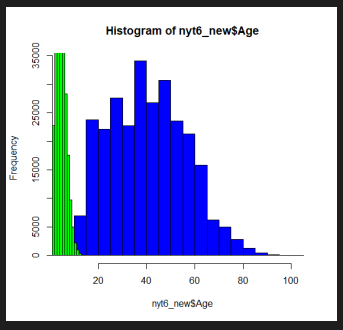
Question 1 (e)

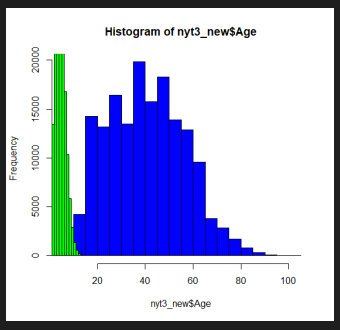
```
# All the 7 datasets seems to be evenly split meaning that after plotting all the various plots accross all the 7 dataframes,
# I see that almost all the plots follow the same patten. Some of the columns also seem to have not much insights.
```

```r
# Assignment 3 Question 2
nyt3_new <- nyt3[nyt3$Gender == "1", ]
nyt4_new <- nyt4[nyt4$Gender == "1", ]
nyt5_new <- nyt5[nyt5$Gender == "1", ]
nyt6_new <- nyt6[nyt6$Gender == "1", ]

# Histograms
hist(nyt3_new$Age, col='blue')
hist(nyt3_new$Impressions, col='green', add=TRUE)
hist(nyt4_new$Age, col='blue')
hist(nyt4_new$Impressions, col='green', add=TRUE)
hist(nyt5_new$Age, col='blue')
hist(nyt5_new$Impressions, col='green', add=TRUE)
hist(nyt6_new$Age, col='blue')
hist(nyt6_new$Impressions, col='green', add=TRUE)
```

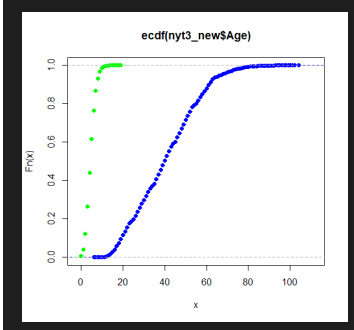


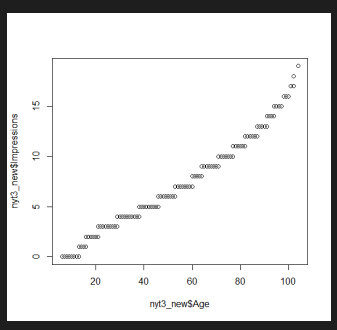


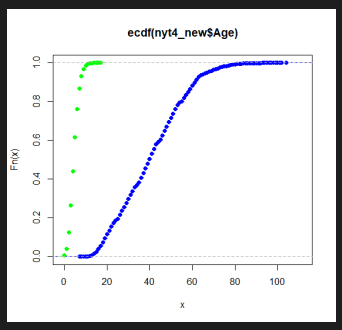


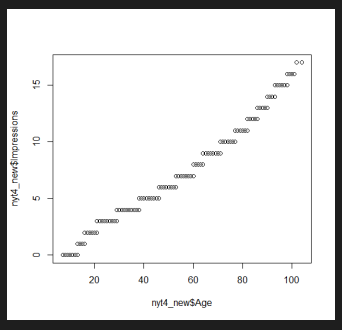


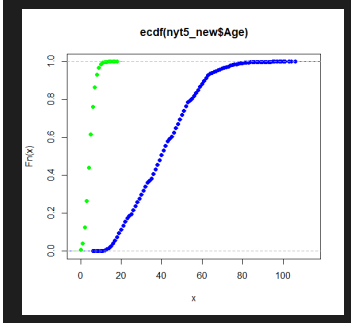

```r
# ECDF and QQPlots
plot(ecdf(nyt3_new$Age), col='blue')
plot(ecdf(nyt3_new$Impressions), col='green', add=TRUE)
qqplot(nyt3_new$Age, nyt3_new$Impressions)

plot(ecdf(nyt4_new$Age), col='blue')
plot(ecdf(nyt4_new$Impressions), col='green', add=TRUE)
qqplot(nyt4_new$Age, nyt4_new$Impressions)

plot(ecdf(nyt5_new$Age), col='blue')
plot(ecdf(nyt5_new$Impressions), col='green', add=TRUE)
qqplot(nyt5_new$Age, nyt5_new$Impressions)

plot(ecdf(nyt6_new$Age), col='blue')
plot(ecdf(nyt6_new$Impressions), col='green', add=TRUE)
qqplot(nyt6_new$Age, nyt6_new$Impressions)
```

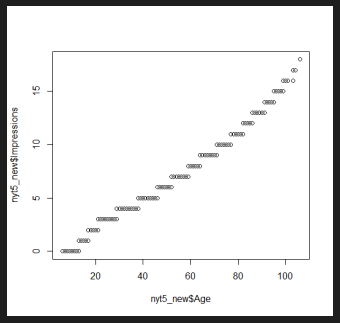


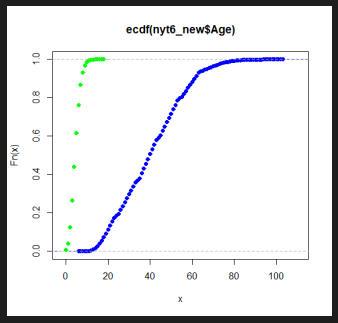


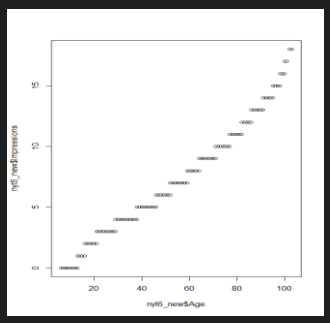













```
# Shapiro test and Wilcox test
shapiro.test(nyt4_new$Age[0:5000])
shapiro.test(nyt4_new$Impressions[0:5000])
wilcox.test(nyt4_new$Age, nyt4_new$Impressions, data=nyt4_new)

# Histograms seem to follow normal distribution without any skew when we filter data with
Gender==1.
# ECDFs and QQplots still follow the same trend, as the characteristics of the data have
not changed through filtering. However, some outliers were removed.
# Shapiro test still results in roughly the same results meaning both age and impressions
are independent as the p-value is very low
# Similarly, the Wilcox test also results in the same. And this is in fact obvious, as we
have just filtered the data, this does not change the characteristics of the data
```