Hotel Room Pricing In The Indian Market

```
# Hotel Room Pricing In The Indian Market
# NAME: SANJAY HANSDAK
```

1. Reading the raw data into a data frame

```
##setting the directory and assigning a variabel to the data frame
setwd("D:/Data Science and Analytics using R/Final Project")

#Reading the dataset and creating a data frame
hotel.df<-read.csv(paste("Cities42.csv",sep = ""))

#Viewing the data
View(hotel.df)
```

2. Changing the irregularity of dates in the data frame

Use of gsub() command to replace the wrong format of the date

```
#Removing the repeated date by gsub command

hotel.df$Date<-gsub("18-Dec-16", "Dec 18 2016", hotel.df$Date)
hotel.df$Date<-gsub("21-Dec-16", "Dec 21 2016", hotel.df$Date)
hotel.df$Date<-gsub("24-Dec-16", "Dec 24 2016", hotel.df$Date)
hotel.df$Date<-gsub("25-Dec-16", "Dec 25 2016", hotel.df$Date)
hotel.df$Date<-gsub("28-Dec-16", "Dec 28 2016", hotel.df$Date)
hotel.df$Date<-gsub("31-Dec-16", "Dec 31 2016", hotel.df$Date)
hotel.df$Date<-gsub("4-Jan-17", "Jan 04 2017", hotel.df$Date)
hotel.df$Date<-gsub("4-Jan-16", "Jan 04 2017", hotel.df$Date)
hotel.df$Date<-gsub("8-Jan-16", "Jan 08 2017", hotel.df$Date)
hotel.df$Date<-gsub("8-Jan-17", "Jan 08 2017", hotel.df$Date)
hotel.df$Date<-gsub("Jan 4 2017", "Jan 04 2017", hotel.df$Date)
hotel.df$Date<-gsub("Jan 8 2017", "Jan 08 2017", hotel.df$Date)



#Checking the dates

table(hotel.df$Date)
##
## Dec 18 2016 Dec 21 2016 Dec 24 2016 Dec 25 2016 Dec 28 2016 Dec 31
2016
##        1652        1655        1655        1655        1655
1655
```

```
## Jan 04 2017 Jan 08 2017
##        1652        1653
#Changing dates to factors for labelling

hotel.df$Date<-factor(hotel.df$Date)
is.factor(hotel.df$Date)
## [1] TRUE
#Checking the labelling
levels(hotel.df$Date)
## [1] "Dec 18 2016" "Dec 21 2016" "Dec 24 2016" "Dec 25 2016" "Dec 28
2016"
## [6] "Dec 31 2016" "Jan 04 2017" "Jan 08 2017"
```

DATA SUMMARY

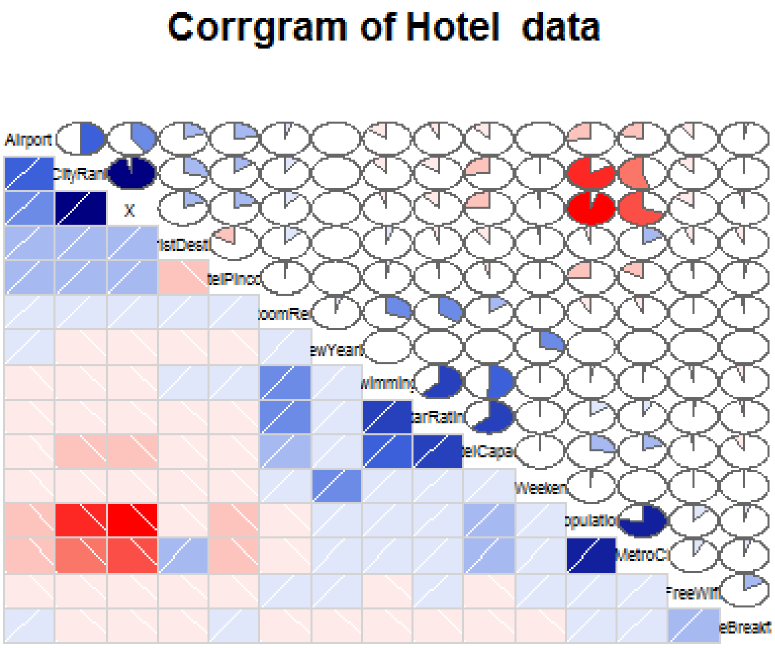
3. Summary Statistics - mean, sd, median, min, max of variables

```
#Analyzing the summary of the data and describing the variables

library(psych)
describe(hotel.df)
##                      vars     n       mean         sd    median
trimmed
## X                       1 13232    6616.50    3819.89    6616.5
6616.50
## CityName*               2 13232      18.07      11.72      16.0
17.29
## Population              3 13232 4416836.87 4258386.00 3046163.0
4040816.22
## CityRank                4 13232      14.83      13.51       9.0
13.30
## IsMetroCity             5 13232       0.28       0.45       0.0
0.23
## IsTouristDestination    6 13232       0.70       0.46       1.0
0.75
## IsWeekend               7 13232       0.62       0.48       1.0
0.65
## IsNewYearEve            8 13232       0.12       0.33       0.0
0.03
## Date*                   9 13232       4.50       2.29       4.0
4.50
## HotelName*             10 13232     841.19     488.16     827.0
841.18
## RoomRent               11 13232    5473.99    7333.12    4000.0
4383.33
## StarRating             12 13232       3.46       0.76       3.0
```

```
3.40
## Airport                13 13232      21.16      22.76      15.0
16.39
## HotelAddress*          14 13232    1202.53     582.17    1261.0
1233.25
## HotelPincode           15 13232  397430.26  259837.50  395003.0
388540.47
## HotelDescription*      16 13224     581.34     363.26     567.0
575.37
## FreeWifi               17 13232       0.93       0.26       1.0
1.00
## FreeBreakfast          18 13232       0.65       0.48       1.0
0.69
## HotelCapacity          19 13232      62.51      76.66      34.0
46.03
## HasSwimmingPool        20 13232       0.36       0.48       0.0
0.32
##                             mad      min      max      range  skew
## X                       4904.44      1.0    13232    13231.0  0.00
## CityName*                 11.86      1.0       42       41.0  0.48
## Population           3846498.95   8096.0 12442373 12434277.0  0.68
## CityRank                  11.86      0.0       44       44.0  0.69
## IsMetroCity                0.00      0.0        1        1.0  0.96
## IsTouristDestination       0.00      0.0        1        1.0 -0.86
## IsWeekend                  0.00      0.0        1        1.0 -0.51
## IsNewYearEve               0.00      0.0        1        1.0  2.28
## Date*                      2.97      1.0        8        7.0  0.00
## HotelName*               641.97      1.0     1670     1669.0  0.01
## RoomRent                2653.85    299.0   322500   322201.0 16.75
## StarRating                 0.74      0.0        5        5.0  0.48
## Airport                   11.12      0.2      124      123.8  2.73
## HotelAddress*            668.65      1.0     2108     2107.0 -0.37
## HotelPincode          257975.37 100025.0  7000157  6900132.0  9.99
## HotelDescription*        472.95      1.0     1226     1225.0  0.11
## FreeWifi                   0.00      0.0        1        1.0 -3.25
## FreeBreakfast              0.00      0.0        1        1.0 -0.62
## HotelCapacity             28.17      0.0      600      600.0  2.95
## HasSwimmingPool            0.00      0.0        1        1.0  0.60
##                      kurtosis       se
## X                       -1.20    33.21
## CityName*               -0.88     0.10
## Population              -1.08 37019.65
## CityRank                -0.76     0.12
## IsMetroCity             -1.08     0.00
## IsTouristDestination    -1.26     0.00
## IsWeekend               -1.74     0.00
## IsNewYearEve             3.18     0.00
## Date*                   -1.24     0.02
## HotelName*              -1.25     4.24
## RoomRent               582.06    63.75
## StarRating               0.25     0.01
## Airport                7.89     0.20
## HotelAddress*         -0.88     5.06
## HotelPincode         249.76  2258.86
## HotelDescription*     -1.25     3.16
## FreeWifi               8.57     0.00
## FreeBreakfast         -1.61     0.00
## HotelCapacity         11.39     0.67
## HasSwimmingPool       -1.64     0.00
summary(hotel.df)
##       X              CityName      Population         CityRank    

##  Min.   :    1   Delhi    :2048   Min.   :    8096   Min.   : 0.00  

##  1st Qu.: 3309   Jaipur   : 768   1st Qu.:  744983   1st Qu.: 2.00  

##  Median : 6616   Mumbai   : 712   Median : 3046163   Median : 9.00  

##  Mean   : 6616   Bangalore: 656   Mean   : 4416837   Mean   :14.83  

##  3rd Qu.: 9924   Goa      : 624   3rd Qu.: 8443675   3rd Qu.:24.00  

##  Max.   :13232   Kochi    : 608   Max.   :12442373   Max.   :44.00  

##                  (Other)  :7816                                     

##   IsMetroCity     IsTouristDestination   IsWeekend     
IsNewYearEve   
##  Min.   :0.0000   Min.   :0.0000       Min.   :0.0000   
Min.   :0.0000  
##  1st Qu.:0.0000   1st Qu.:0.0000       1st Qu.:0.0000   1st 
Qu.:0.0000  
##  Median :0.0000   Median :1.0000       Median :1.0000   
Median :0.0000  
##  Mean   :0.2842   Mean   :0.6972       Mean   :0.6228   
Mean   :0.1244  
##  3rd Qu.:1.0000   3rd Qu.:1.0000       3rd Qu.:1.0000   3rd 
Qu.:0.0000  
##  Max.   :1.0000   Max.   :1.0000       Max.   :1.0000   
Max.   :1.0000  
##                                                         

##            Date                            HotelName        RoomRent     
##  Dec 21 2016:1655   Vivanta by Taj          :   32   Min.   :   299  
##  Dec 24 2016:1655   Goldfinch Hotel         :   24   1st Qu.:  2436  
##  Dec 25 2016:1655   OYO Rooms               :   24   Median :  4000  
##  Dec 28 2016:1655   The Gordon House Hotel:   24   Mean   :  5474  
##  Dec 31 2016:1655   Apnayt Villa            :   16   3rd Qu.:  6299  
##  Jan 08 2017:1653   Bentleys Hotel Colaba :   16   Max.   :322500  
##  (Other)    :3304   (Other)               :13096                   
##    StarRating       Airport      
##  Min.   :0.000   Min.   :  0.20
##  1st Qu.:3.000   1st Qu.:  8.40
##  Median :3.000   Median : 15.00
##  Mean   :3.459   Mean   : 21.16
##  3rd Qu.:4.000   3rd Qu.: 24.00
##  Max.   :5.000   Max.   :124.00
##
##
HotelAddress
##  The Mall, Shimla
:   32
##  #2-91/14/8, White Fields, Kondapur, Hitech City, Hyderabad, 500084
India:   16
##  121, City Terrace, Walchand Hirachand Marg, Mumbai, Maharashtra
:   16
##  14-4507/9, Balmatta Road, Near Jyothi Circle, Hampankatta
:   16
##  144/7, Rajiv Gandi Salai (OMR), Kottivakkam, Chennai, Tamil Nadu
:   16
##  17, Oliver Road, Colaba, Mumbai, Maharashtra
:   16
##  (Other)
:13120
##   HotelPincode          HotelDescription    FreeWifi
FreeBreakfast
##  Min.   : 100025   3           :  120   Min.   :0.0000
Min.   :0.0000
##  1st Qu.: 221001   Abc         :  112   1st Qu.:1.0000   1st
Qu.:0.0000
##  Median : 395003   3-star hotel:  104   Median :1.0000
Median :1.0000
##  Mean   : 397430   3.5         :   88   Mean   :0.9259
Mean   :0.6491
##  3rd Qu.: 570001   4           :   72   3rd Qu.:1.0000   3rd
Qu.:1.0000
##  Max.   :7000157   (Other)     :12728   Max.   :1.0000
Max.   :1.0000
##                    NA's        :    8

##  HotelCapacity    HasSwimmingPool
##  Min.   :  0.00   Min.   :0.0000
##  1st Qu.: 16.00   1st Qu.:0.0000
##  Median : 34.00   Median :0.0000
##  Mean   : 62.51   Mean   :0.3558
##  3rd Qu.: 75.00   3rd Qu.:1.0000
##  Max.   :600.00   Max.   :1.0000
##
```

4. Identifying the idependent variable Y and independent variables X1,X2 and X3 from the dataframe.

```
#Taking Y = RoomRent, identifying the most relevent predictor
variables by  correlation corrgram


#Corrgram

library(corrgram)

corrgram(hotel.df, order=TRUE, lower.panel=panel.shade,
         upper.panel=panel.pie, text.panel=panel.txt,
         main="Corrgram of Hotel  data")
```



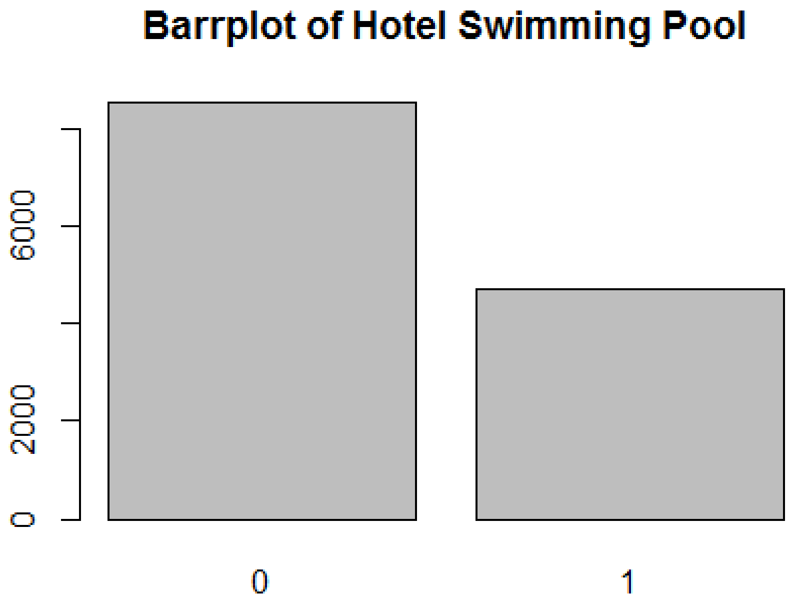
```
  ##through corrgram HasSwimming, StarRating, HotelCapital are very
well correlated to RoomRent
  ##so we can take them as predictors
```

```
##Visualizing data for Y as Room rent and X1,X2,X3 as HasSwimmingPool,
StarRating and HotelCapacity respectively
```

VISUALIZATION

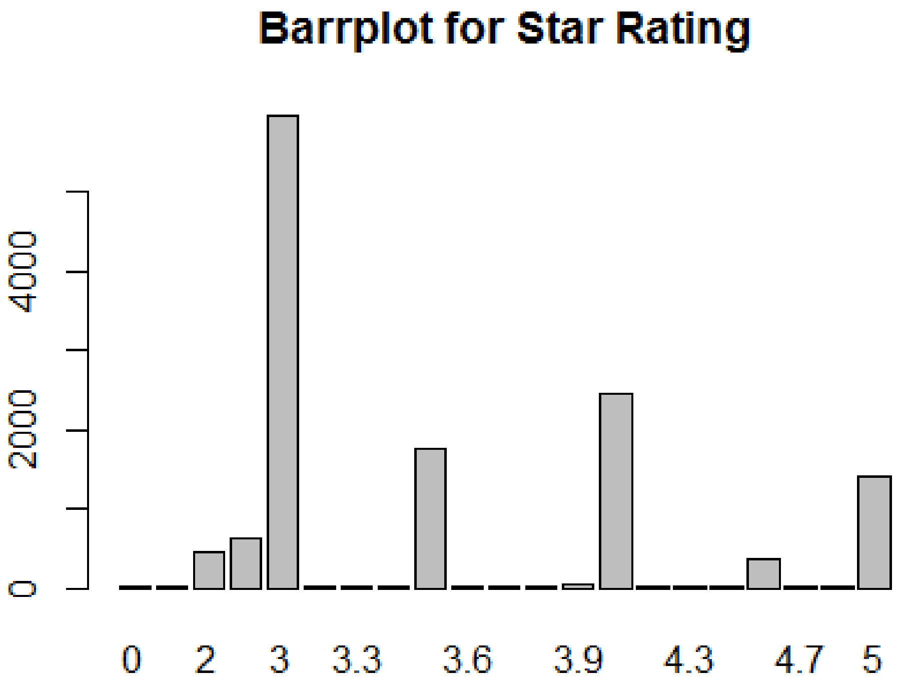
5. Visualizing the independent variables X1,X2 and X3 in the dataframe

```
  #Table for HasSwimmingPool
    table(hotel.df$HasSwimmingPool)
##
##    0    1
## 8524 4708
    Swim<-table(hotel.df$HasSwimmingPool)
    barplot(Swim,main="Barrplot of Hotel Swimming Pool")
```



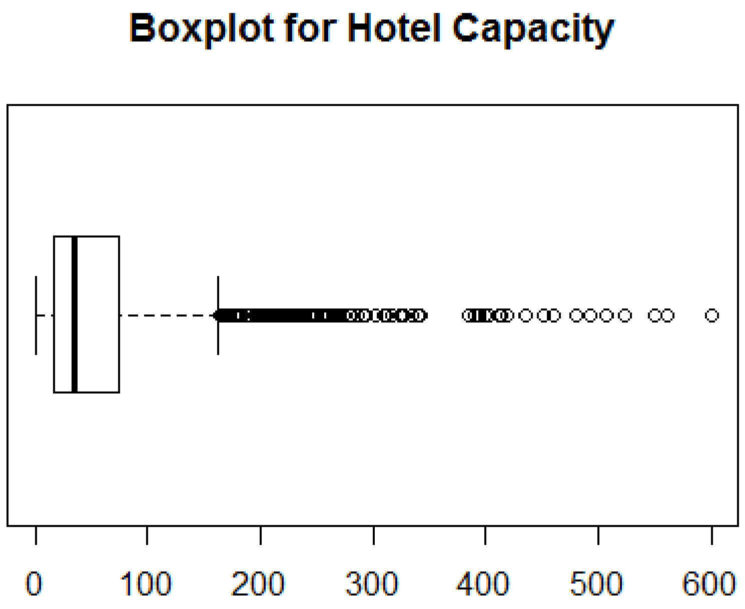
Result: The above visualization tells us that the number of hotel not having swimming pools is greater than the number of hotels having swimming pool.

```
  #Table for StarRating
    table(hotel.df$StarRating)
##
##    0    1    2  2.5    3  3.2  3.3  3.4  3.5  3.6  3.7  3.8  3.9
4  4.1
##   16    8  440  632 5953    8   16    8 1752    8   24   16   32
2463   24
##  4.3  4.4  4.5  4.7  4.8    5
##   16    8  376    8   16 1408
    starRating<-table(hotel.df$StarRating)
    barplot(starRating,main = "Barrplot for Star Rating")
```



Result: The above data reveals the class of hotels in India , with 3 star hotels at it’s maximum i.e., the nmber of 3 star hotels is India I too large.

```
 #BoxPlot for HotelCapacity
    boxplot(hotel.df$HotelCapacity, main="Boxplot for Hotel
Capacity",horizontal = TRUE)
```



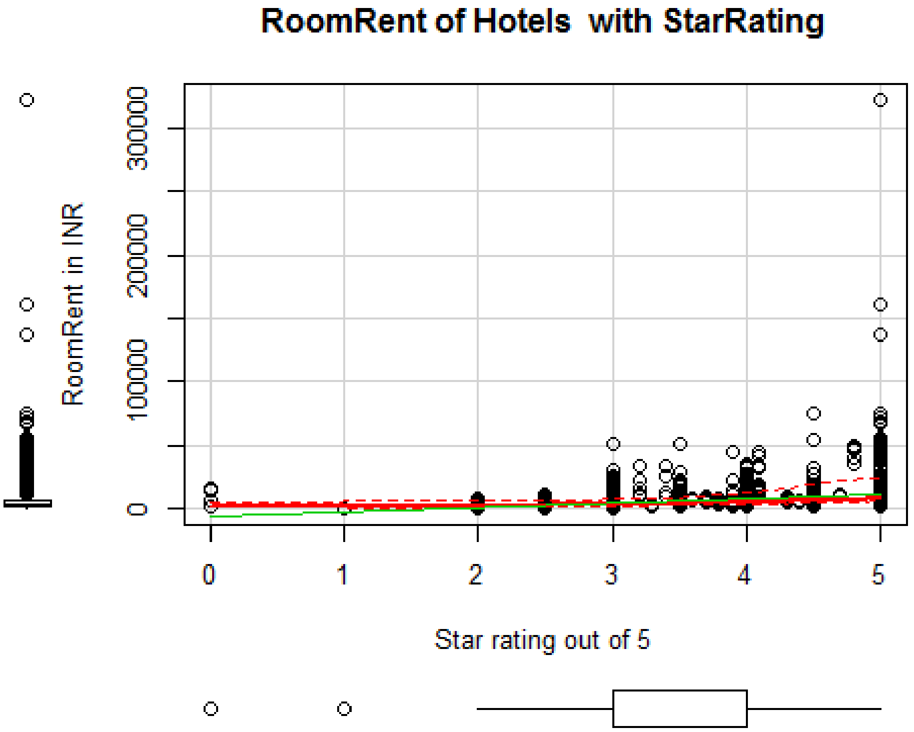
Result: There are a lot of outlier to the hotel capacity data which makes the data quite uncertain about the mean and median.

ROLE OF DIFFERENT DEPENDENT VARIABLES ON THE PRICNG OF THE HOTEL ROOM.

5a. Scattreplot distribution between Star Rating and RoomRent

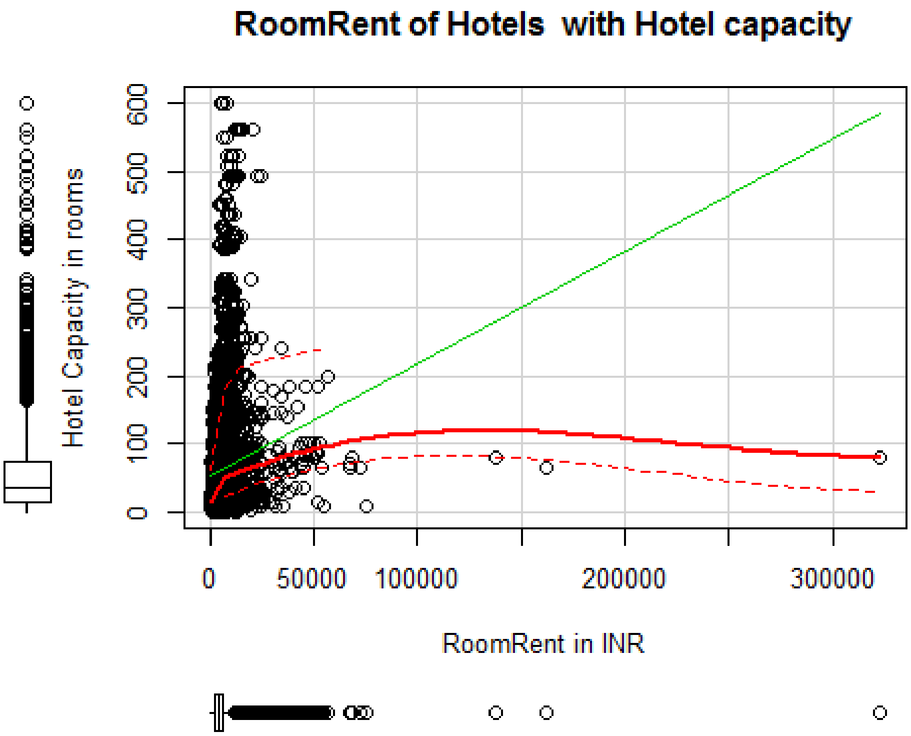
```
#Scatterplot pair wise for predictor variable

    library(car)
##
## Attaching package: 'car'
## The following object is masked from 'package:psych':
##
##     logit
```

```
    #StarRating Vs RoomRent

    scatterplot(hotel.df$StarRating,hotel.df$RoomRent,main="RoomRent
of Hotels  with StarRating",ylab = "RoomRent in INR", xlab="Star
rating out of 5",cex=1.1)
```



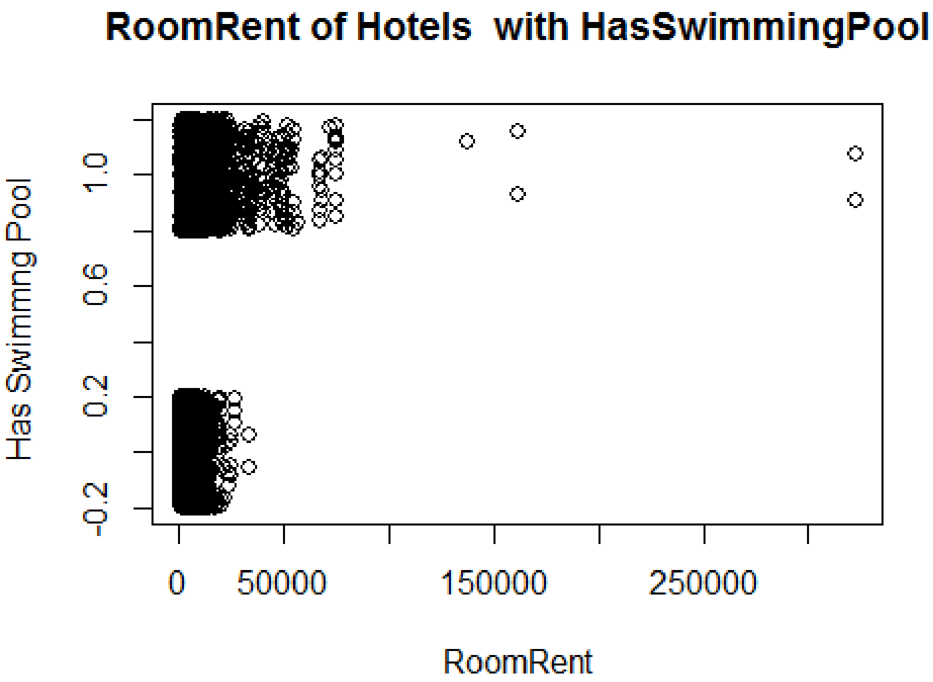
5b. Scattreplot distribution between Hotel Capacity and RoomRent

```
    #RoomRent Vs HotelCapacity


scatterplot(hotel.df$RoomRent,hotel.df$HotelCapacity,main="RoomRent of
Hotels  with Hotel capacity",ylab = "Hotel Capacity in rooms",
xlab="RoomRent in INR",cex=1.1)
```

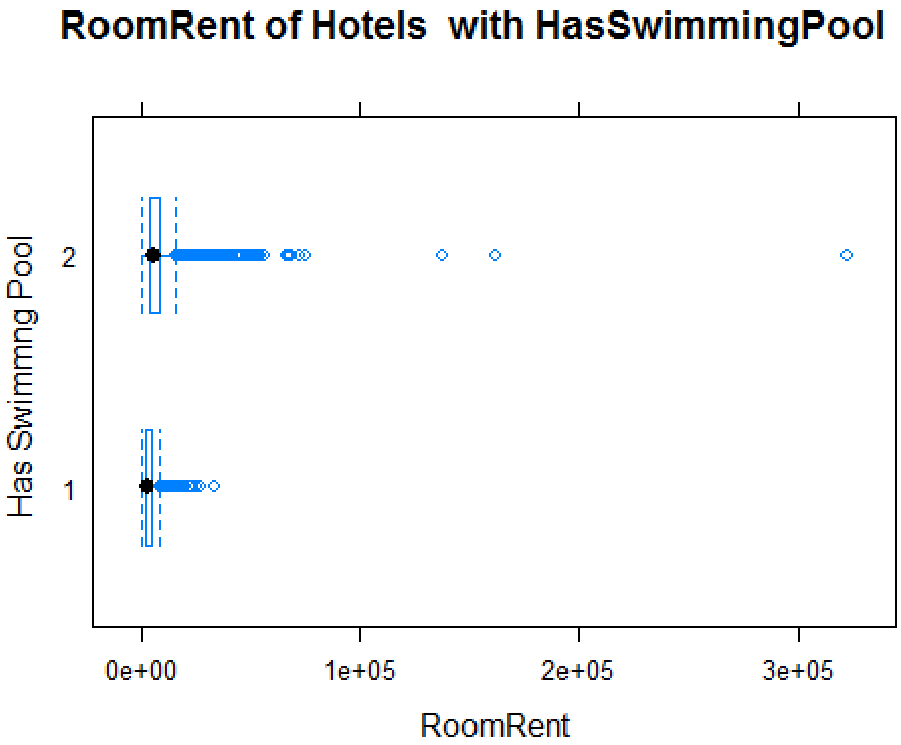


5c. Plot and bwplot distribution between HasSwimmingPool and RoomRent

```
    #RoomRent Vs HasSwimmingPool


plot(jitter(hotel.df$RoomRent),jitter(hotel.df$HasSwimmingPool),main="
RoomRent of Hotels  with HasSwimmingPool",ylab = "Has Swimmng Pool ",
xlab="RoomRent",cex=1.1)
```

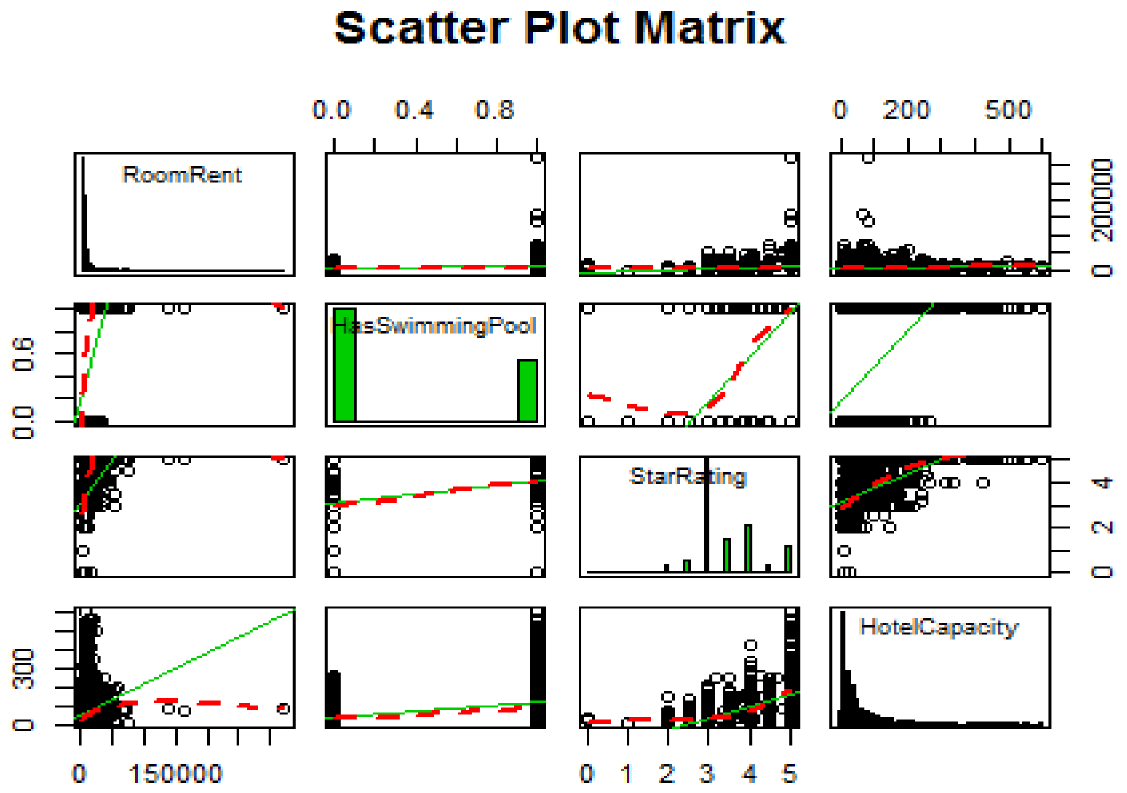


```
    library(lattice)
    bwplot(HasSwimmingPool~RoomRent, data = hotel.df,main="RoomRent of
Hotels  with HasSwimmingPool",ylab = "Has Swimmng Pool ",
xlab="RoomRent" )
```



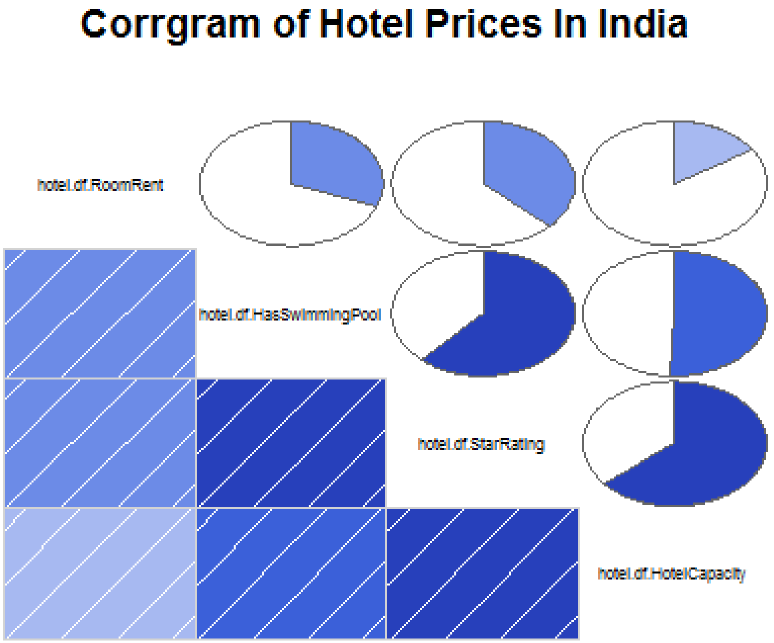
5d. Scattreplotmatrix distribution between Hotel Capacity, HasSwimmingPool, StarRating and RoomRent

```
    #Scatterplot matrix

    scatterplotMatrix(
      hotel.df[
        ,c("RoomRent","HasSwimmingPool","StarRating",
"HotelCapacity")],
      spread=FALSE, smoother.args=list(lty=2),
      main="Scatter Plot Matrix", diagonal = "histogram")
## Warning in smoother(x, y, col = col[2], log.x = FALSE, log.y =
FALSE,
## spread = spread, : could not fit smooth
```



5e. Corrggram of Hotel Capacity, HasSwimmingPool, StarRating and RoomRent

```
    #Corrgram of Y, x1, x2, x3

    library(corrgram)

    xyz<-data.frame(hotel.df$RoomRent, hotel.df$HasSwimmingPool,
hotel.df$HotelCapacity, hotel.df$StarRating)
    corrgram(xyz, order=TRUE, lower.panel=panel.shade,
             upper.panel=panel.pie, text.panel=panel.txt,
             main="Corrgram of Hotel Prices In India")
```



6. Covariance and Varaince matrix between Independent variables and RoomRent

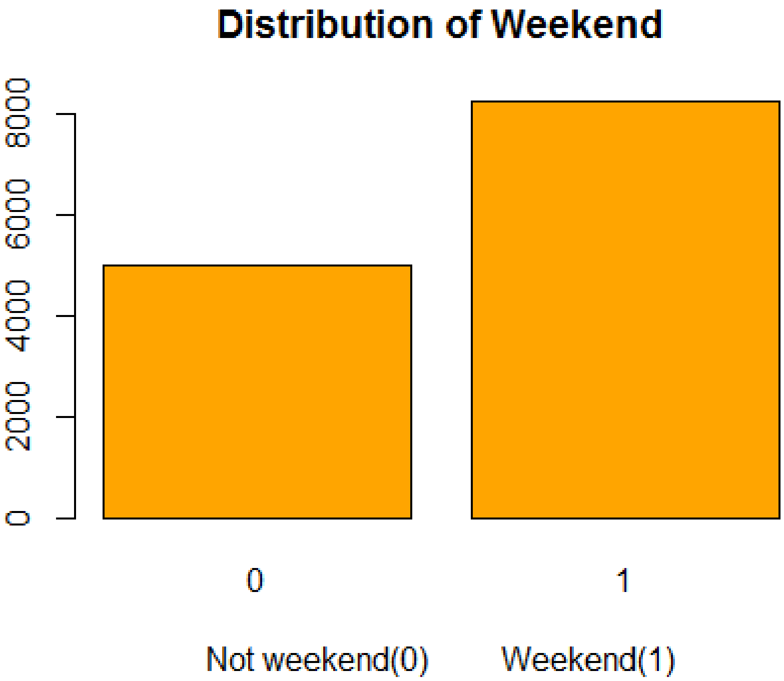
```
    #Variance-Covariance Matrix for Y, x1, x2, x3

    x<-hotel.df[,c("HasSwimmingPool","StarRating", "HotelCapacity")]
    y<-hotel.df[,c("RoomRent")]
    cor(x,y)
##                      [,1]
## HasSwimmingPool 0.3116577
## StarRating      0.3693734
## HotelCapacity   0.1578733
    cov(x,y)
##                      [,1]
## HasSwimmingPool  1094.202
## StarRating       2048.375
## HotelCapacity   88753.413
    var(x,y)
##                      [,1]
## HasSwimmingPool  1094.202
## StarRating       2048.375
## HotelCapacity   88753.413
    #Forming a variable which is having RoomRent less than 1 lakh
because the outliers effect the average
   RoomRent1.df <-hotel.df[which(hotel.df$RoomRent<100000),]
```

This data frame containing the room rent of hotels less than 100k will help us to get a clear
View of how really is the mean of the data without getting affected by the extreme outliers.

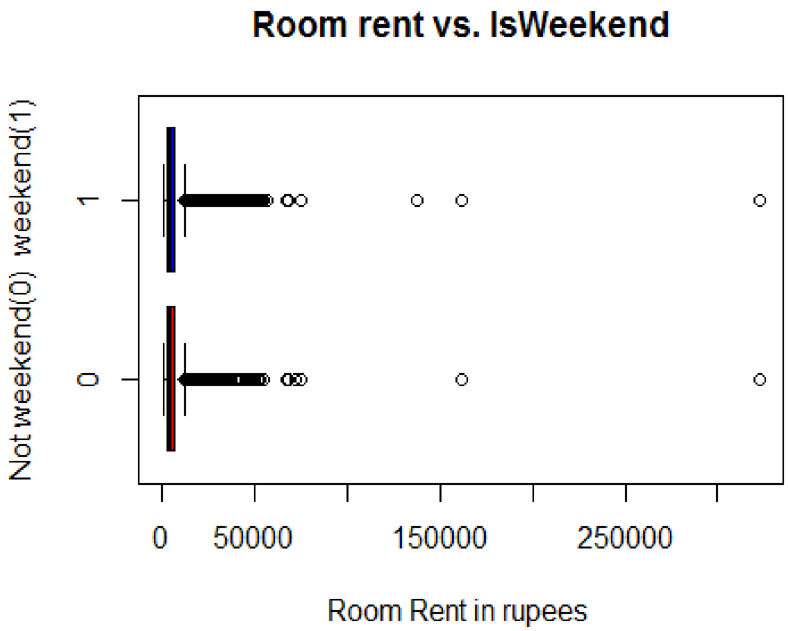
7. Summary and Visualization of other factors which affect RoomRent

```
   #Comparing other factors and their pattern using other trends with
roomrent
```

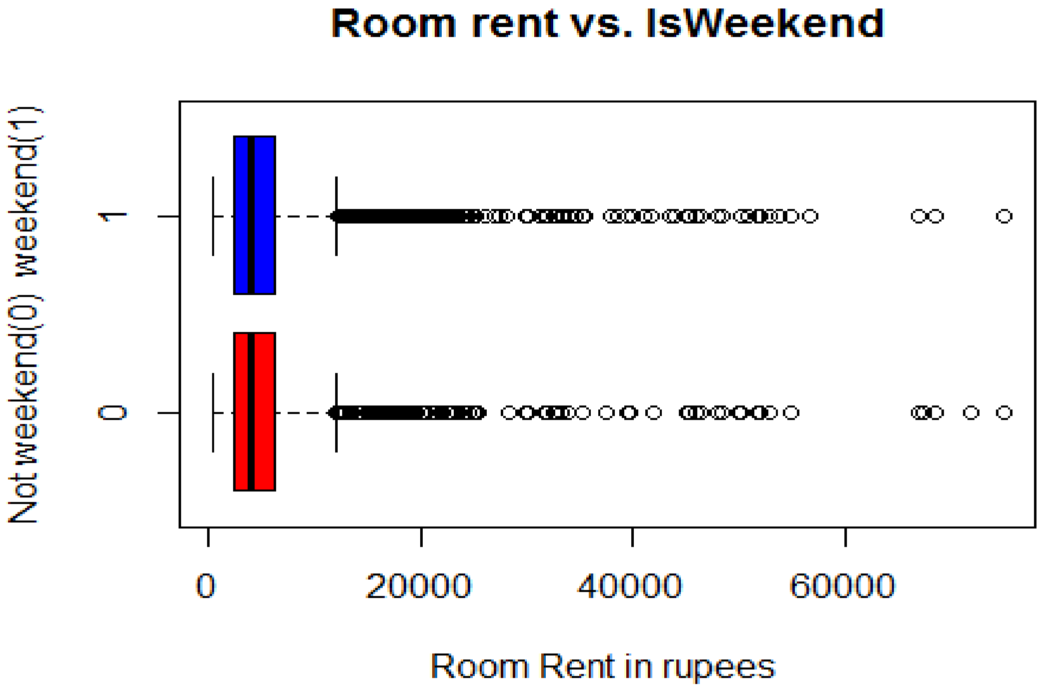
```
   #Analyzing IsWeekeng effect on RoomRent
   table(hotel.df$IsWeekend)
##
##    0    1
## 4991 8241
   table1<-table(hotel.df$IsWeekend)
   barplot(table1, main="Distribution of Weekend", xlab="Not
weekend(0)          Weekend(1)", col="orange")
```



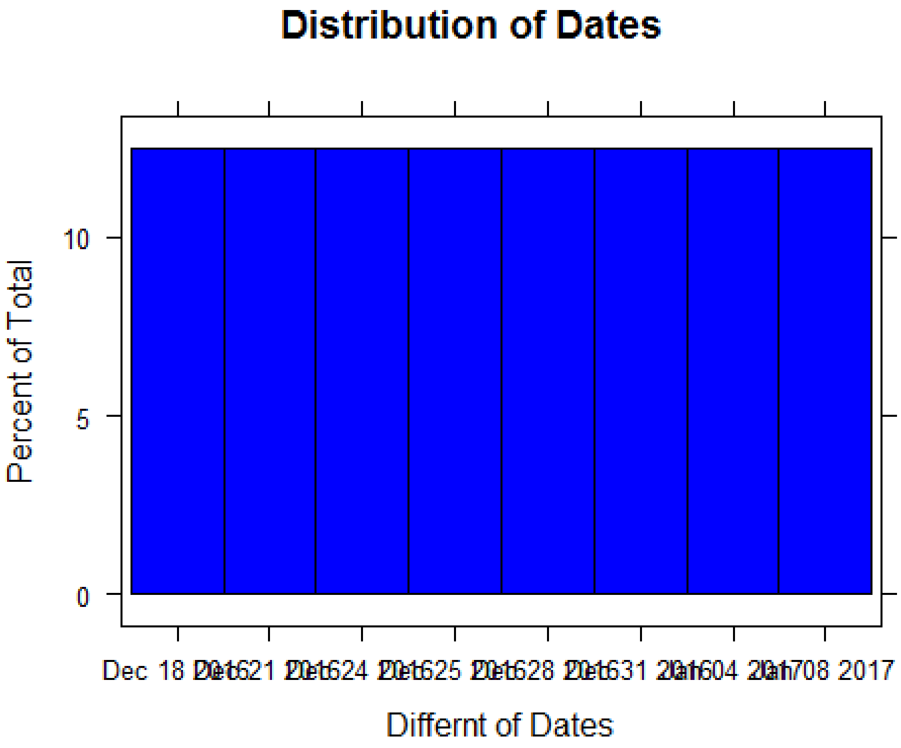
```
   #Effect of Isweekend on RoomRent
   iw= aggregate(RoomRent ~ IsWeekend, data=hotel.df,mean)
   iw
##   IsWeekend RoomRent
## 1         0 5430.835
## 2         1 5500.129
   boxplot(RoomRent~IsWeekend,data=hotel.df, main="Room rent vs.
IsWeekend", ylab="Not weekend(0)  weekend(1)", xlab="Room Rent in
rupees ", col=c("red","blue"),horizontal=TRUE)
```



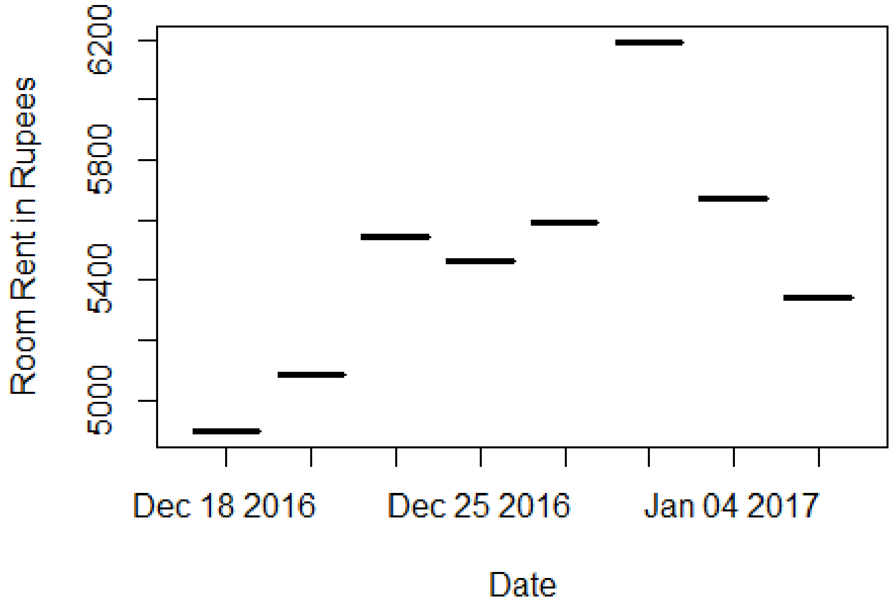
```
   #Without extreme outliers
   boxplot(RoomRent~IsWeekend,data=RoomRent1.df, main="Room rent vs.
IsWeekend", ylab="Not weekend(0)  weekend(1)", xlab="Room Rent in
rupees ", col=c("red","blue"),horizontal=TRUE)
```



```
   #Comapring RoomRent on different dates
   table(hotel.df$Date)
##
## Dec 18 2016 Dec 21 2016 Dec 24 2016 Dec 25 2016 Dec 28 2016 Dec 31
2016
##        1652        1655        1655        1655        1655
1655
## Jan 04 2017 Jan 08 2017
##        1652        1653
   library(lattice)
   histogram(~Date, data = hotel.df, main="Distribution of Dates",
xlab = "Differnt of Dates", col="Blue")
```

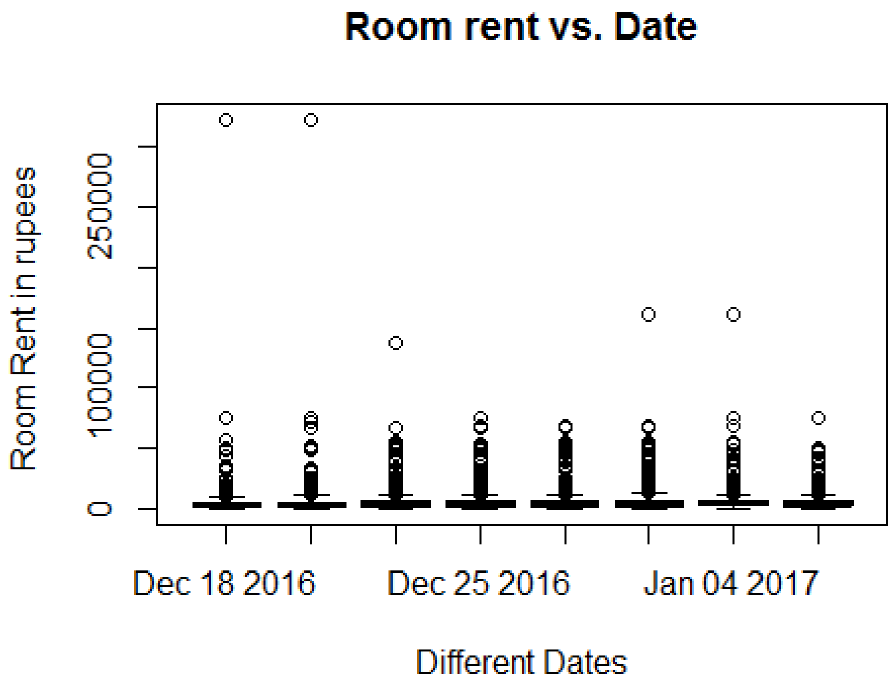


```
   #Effect of different dates on RoomRent

   d = aggregate(RoomRent ~ Date, data = hotel.df,mean)
   d
##          Date RoomRent
## 1 Dec 18 2016 4896.402
## 2 Dec 21 2016 5085.315
## 3 Dec 24 2016 5543.236
## 4 Dec 25 2016 5464.143
## 5 Dec 28 2016 5593.924
## 6 Dec 31 2016 6191.776
## 7 Jan 04 2017 5674.062
## 8 Jan 08 2017 5342.234
   scatterplot(d$Date,d$RoomRent, main="Scatterplot between Date and
RoomRent", xlab="Date", ylab = "Room Rent in Rupees")
```

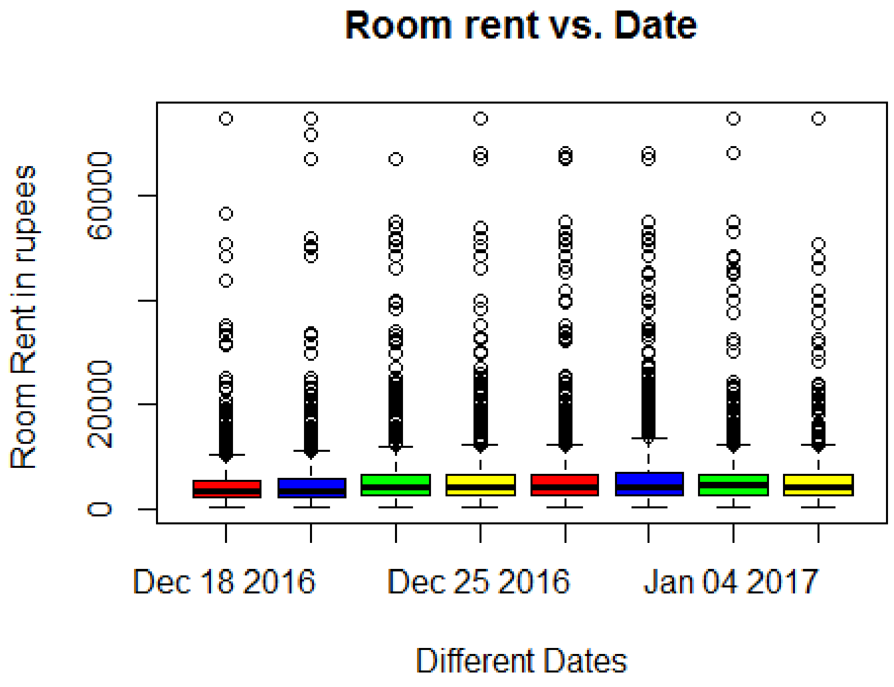


Result : The above Visualization of room rents according to the sold out dates tell us that the room rent on 31st December 2016 was the highest among all sold out dates. The average room rent on 31st December was around 6.1k.

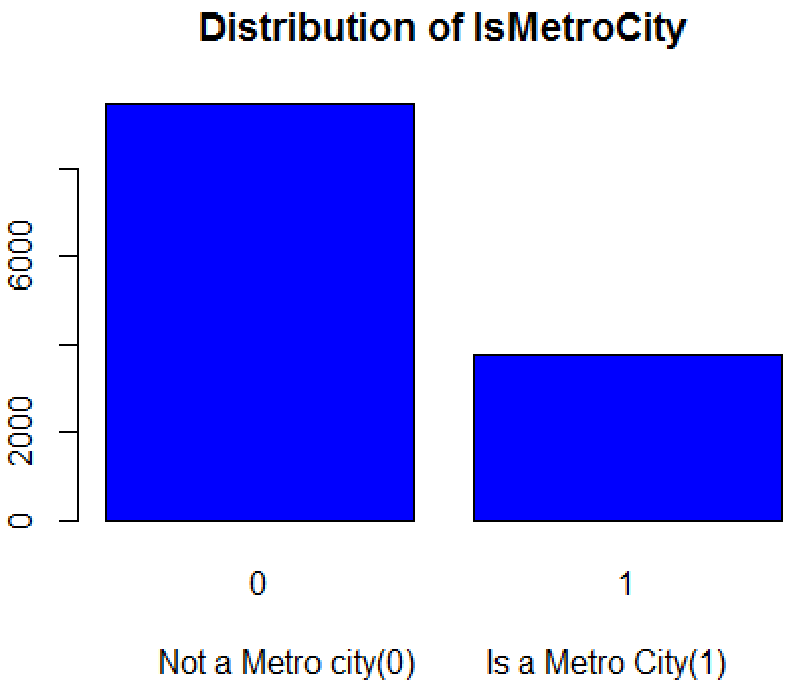
```
   boxplot(RoomRent~Date,data=hotel.df, main="Room rent vs. Date",
xlab="Different Dates", ylab="Room Rent in rupees ",
col=c("red","blue","green","yellow"))
```



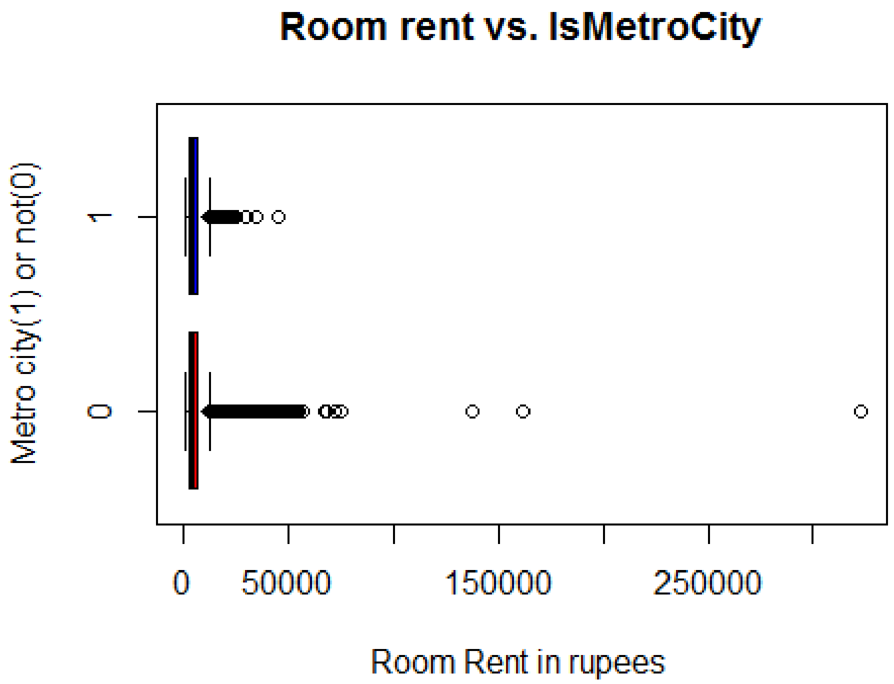
```
    ##Without extreme outliers
    boxplot(RoomRent~Date,data=RoomRent1.df, main="Room rent vs. Date",
xlab="Different Dates", ylab="Room Rent in rupees ",
col=c("red","blue","green","yellow"))
```



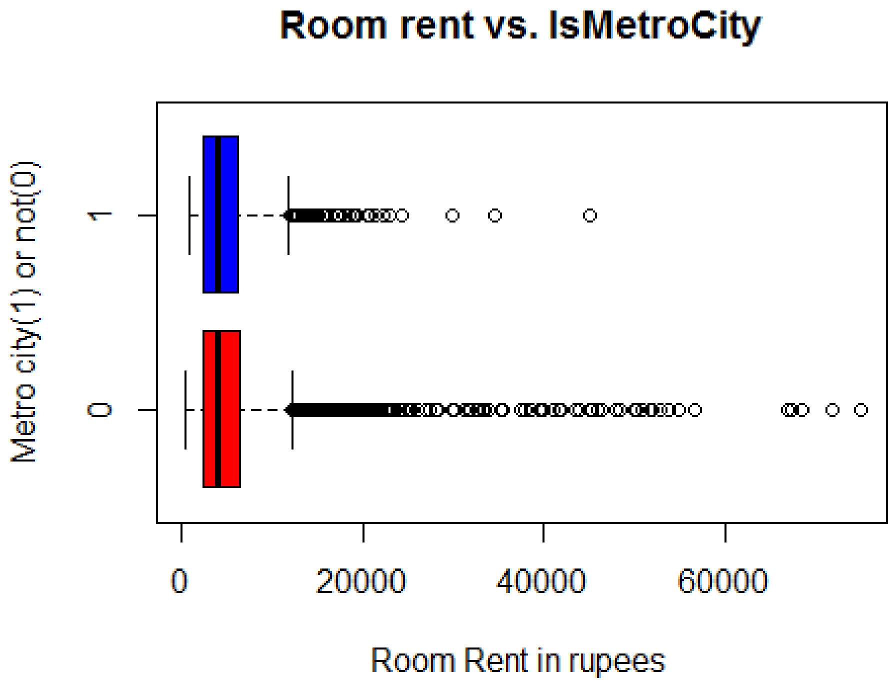
```
   #Analyzing IsMetroCity effect on RoomRent
   table(hotel.df$IsMetroCity)
##
##    0    1
## 9472 3760
   table1<-table(hotel.df$IsMetroCity)
   barplot(table1, main="Distribution of IsMetroCity", xlab="Not a
Metro city(0)         Is a Metro City(1)", col="blue")
```



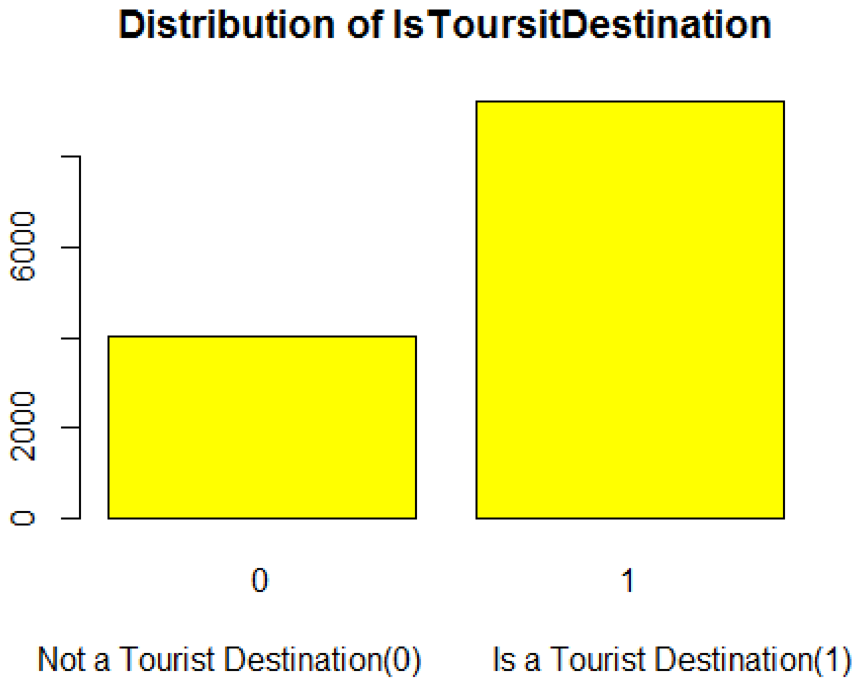
```
   #Effect of IsMetroCity on RoomRent
   imc = aggregate(RoomRent ~ IsMetroCity, data = hotel.df, mean)
   imc
##   IsMetroCity RoomRent
## 1           0 5782.794
## 2           1 4696.073
   boxplot(RoomRent~IsMetroCity,data=hotel.df, main="Room rent vs.
IsMetroCity", ylab="Metro city(1) or not(0)", xlab="Room Rent in
rupees ", col=c("red","blue","green","yellow"),horizontal=TRUE)
```



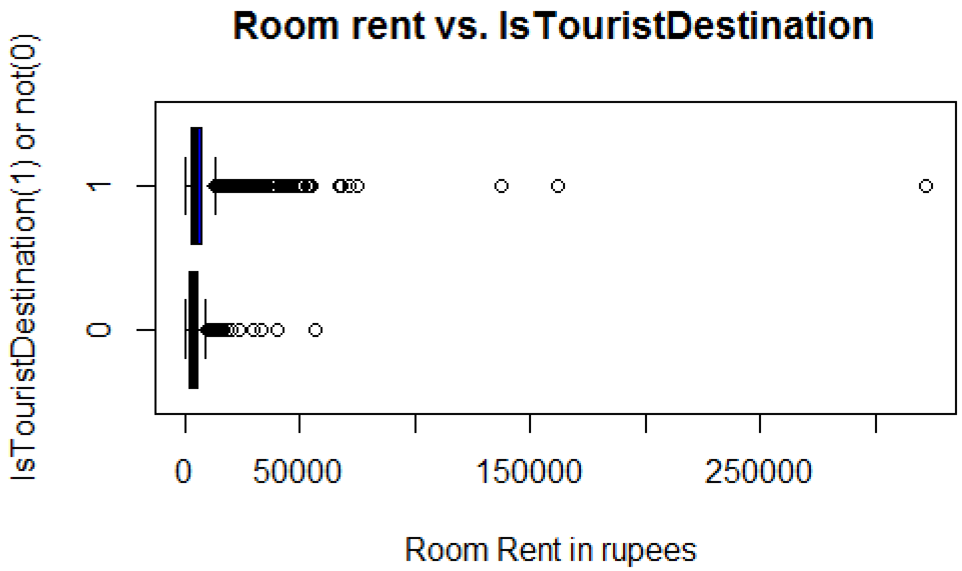
```
   ##Without extreme outliers
   boxplot(RoomRent~IsMetroCity,data=RoomRent1.df, main="Room rent vs.
IsMetroCity", ylab="Metro city(1) or not(0)", xlab="Room Rent in
rupees ", col=c("red","blue","green","yellow"),horizontal=TRUE)
```



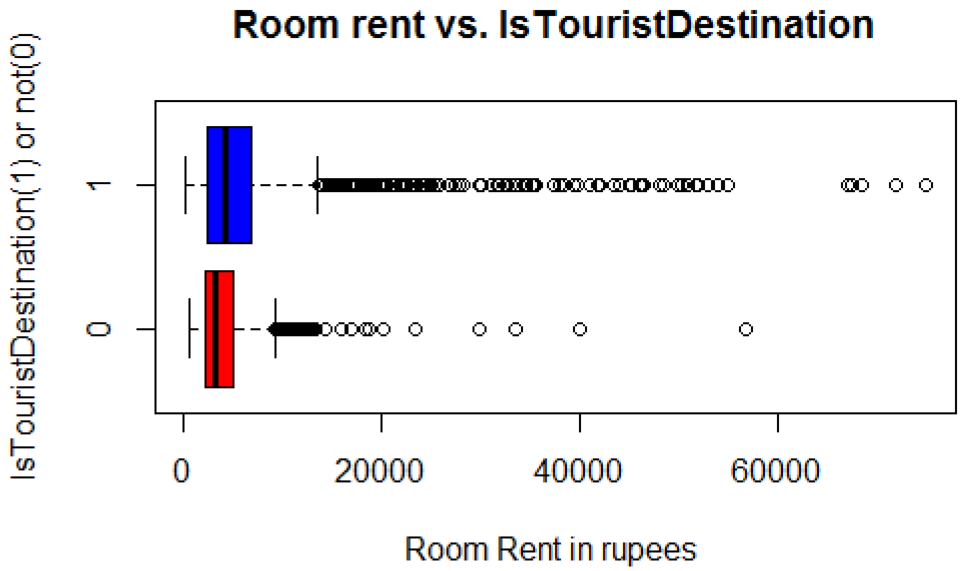
```
   #Analyzing IsTouristDestination effect on RoomRent
   table(hotel.df$IsTouristDestination)
##
##    0    1
## 4007 9225
   table1<-table(hotel.df$IsTouristDestination)
   barplot(table1, main="Distribution of IsToursitDestination",
xlab="Not a Tourist Destination(0)         Is a Tourist
Destination(1)", col="yellow")
```



```
   #Effect of IsTouristDestination on RoomRent
   itd = aggregate(RoomRent ~ IsTouristDestination, data = hotel.df,
mean)
   itd
##   IsTouristDestination RoomRent
## 1                    0 4111.003
## 2                    1 6066.024
   boxplot(RoomRent~IsTouristDestination,data=hotel.df, main="Room
rent vs. IsTouristDestination ", ylab=" IsTouristDestination (1) or
not(0)", xlab="Room Rent in rupees ",
col=c("red","blue","green","yellow"),horizontal=TRUE)
```

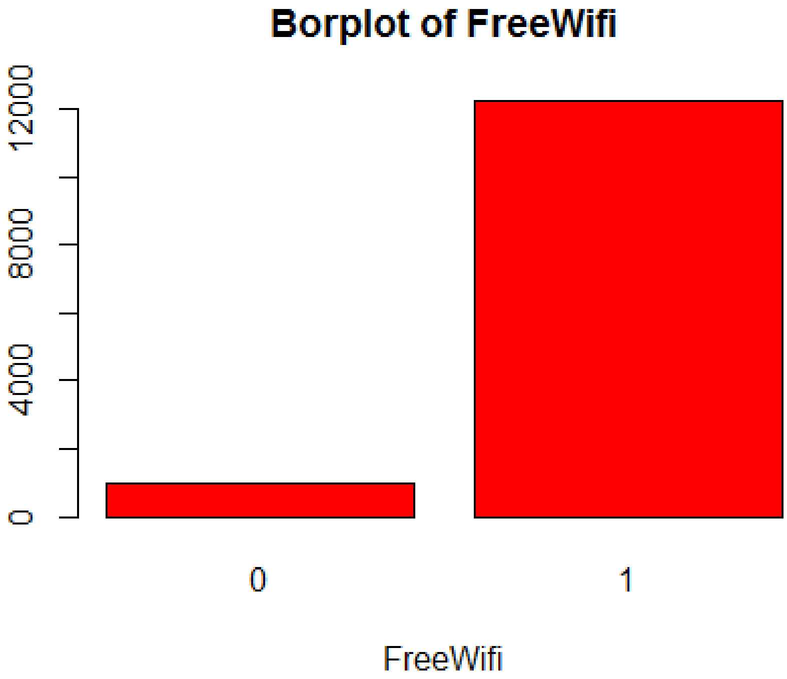


```
   ##Without extreme outliers
   boxplot(RoomRent~ IsTouristDestination,data=RoomRent1.df,
main="Room rent vs. IsTouristDestination ", ylab="
IsTouristDestination (1) or not(0)", xlab="Room Rent in rupees ",
col=c("red","blue","green","yellow"),horizontal=TRUE)
```

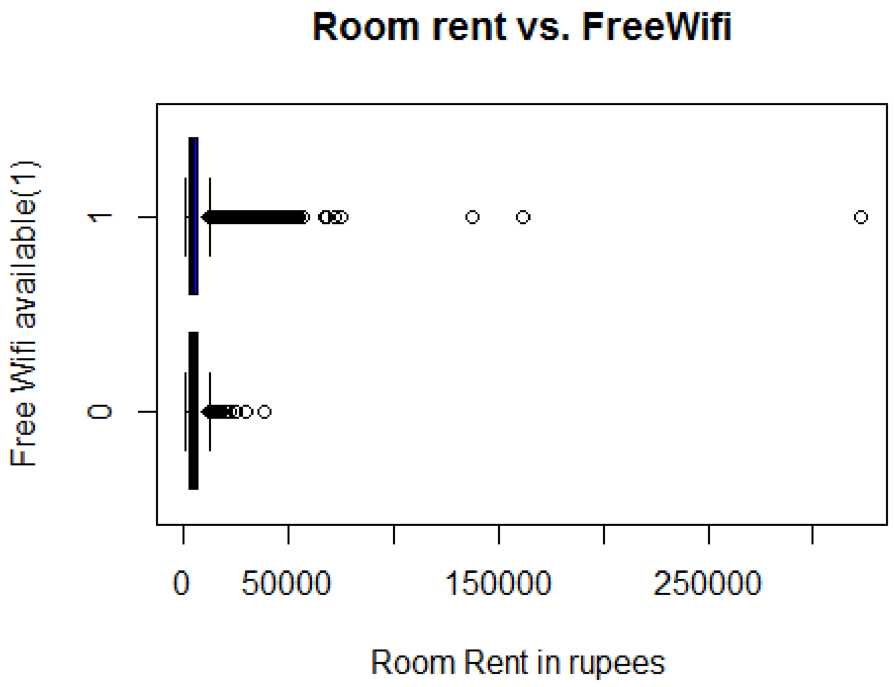


Result: The prices of Room of Hotels in Tourist Places is far more and have more outliers as that of normal city.

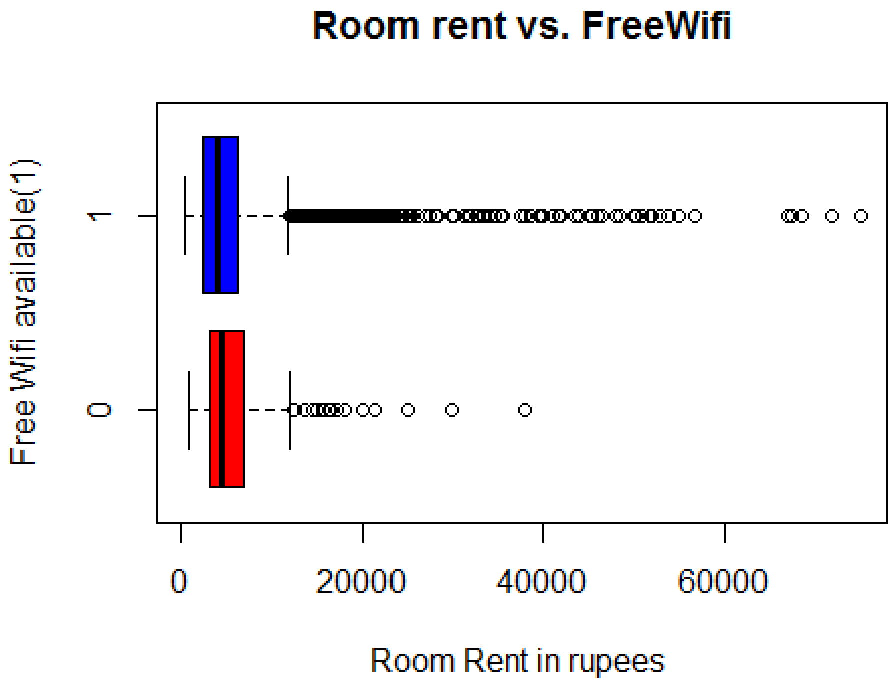
```
   #Analyzing FreeWifi Vs RoomRent
   table(hotel.df$FreeWifi)
##
##     0     1
##   981 12251
   fw<-table(hotel.df$FreeWifi)
   barplot(fw, main="Borplot of FreeWifi",xlab= "FreeWifi" ,col="red")
```



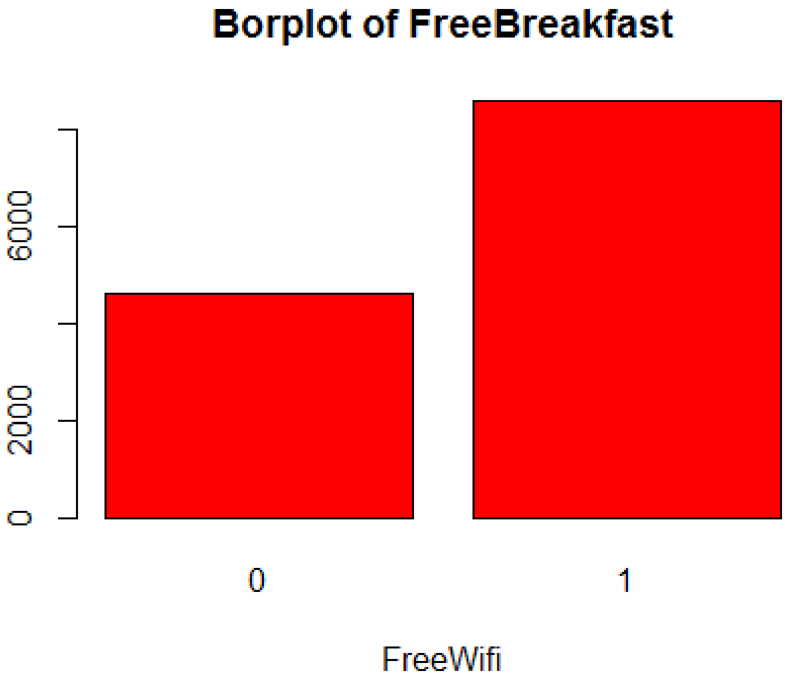
```
   #Effect of FreeWifi on RoomRent
   fw = aggregate(RoomRent ~ FreeWifi, data = hotel.df, mean)
   fw
##   FreeWifi RoomRent
## 1        0 5380.004
## 2        1 5481.518
   ##With extreme outliers of roomrent
   boxplot(RoomRent~FreeWifi,data=hotel.df, main="Room rent vs.
FreeWifi", ylab="Free Wifi available(1)", xlab="Room Rent in rupees ",
col=c("red","blue","green","yellow"),horizontal=TRUE)
```



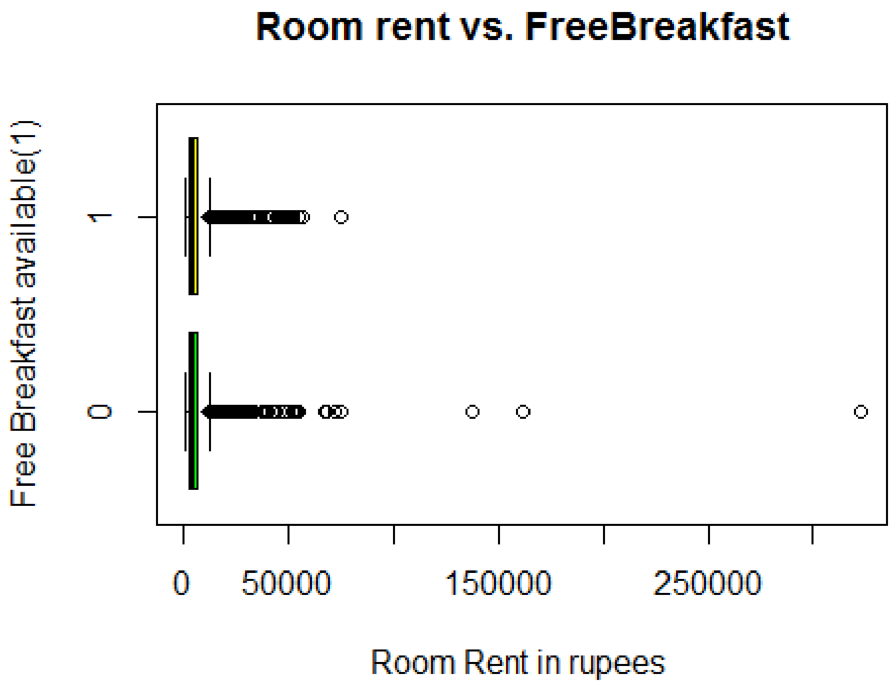
```
    ##Without extreme outliers of roomrent
    boxplot(RoomRent~FreeWifi,data=RoomRent1.df, main="Room rent vs.
FreeWifi", ylab="Free Wifi available(1)", xlab="Room Rent in rupees ",
col=c("red","blue","green","yellow"),horizontal=TRUE)
```



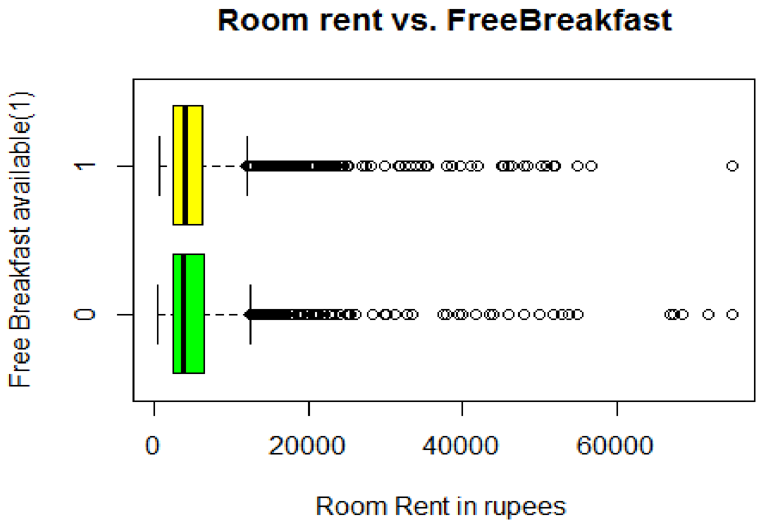
```
   #Analyzing FreeBreakfast Vs RoomRent
   table(hotel.df$FreeWifi)
##
##     0     1
##   981 12251
   fw<-table(hotel.df$FreeBreakfast)
   barplot(fw, main="Borplot of FreeBreakfast",xlab=
"FreeWifi" ,col="red")
```



```
   #Effect of FreeBreakfast on RoomRent
   fb = aggregate(RoomRent ~ FreeBreakfast, data =hotel.df, mean)
   fb1  = aggregate(RoomRent ~ FreeBreakfast, data =RoomRent1.df,
mean)
   ##Aggregate are affected by outliers a lot in the case of
FreeBreakfast on RoomRent
   fb
##   FreeBreakfast RoomRent
## 1             0 5573.790
## 2             1 5420.044
   fb1
##   FreeBreakfast RoomRent
## 1             0 5341.260
## 2             1 5420.044
   ##With extreme outliers of roomrent
   boxplot(RoomRent~FreeBreakfast,data=hotel.df, main="Room rent vs.
FreeBreakfast", ylab="Free Breakfast available(1)", xlab="Room Rent in
rupees ", col=c("green","yellow"),horizontal=TRUE)
```

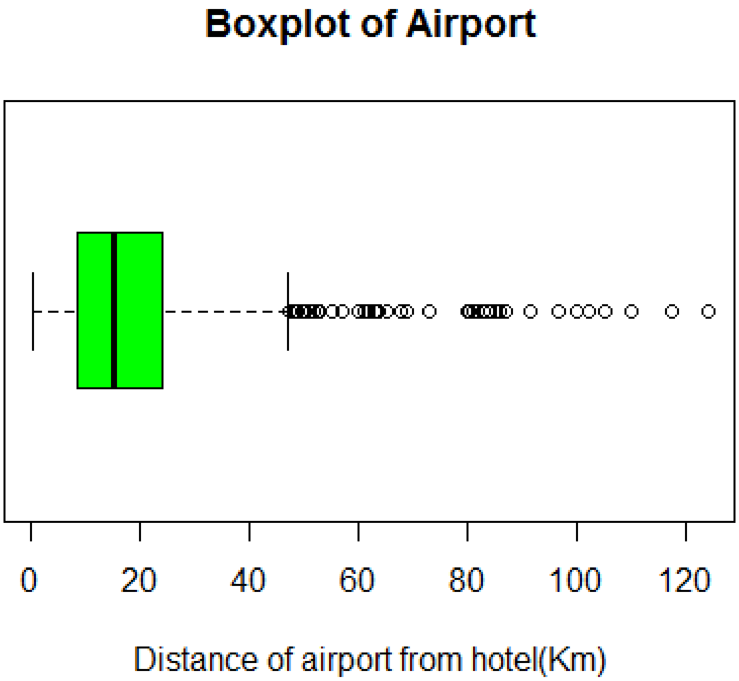


```
##Without extreme outliers of roomrent
boxplot(RoomRent~FreeBreakfast,data=RoomRent1.df, main="Room rent vs. FreeBreakfast", ylab="Free Breakfast available(1)", xlab="Room Rent in rupees ", col=c("green","yellow"),horizontal=TRUE)
```

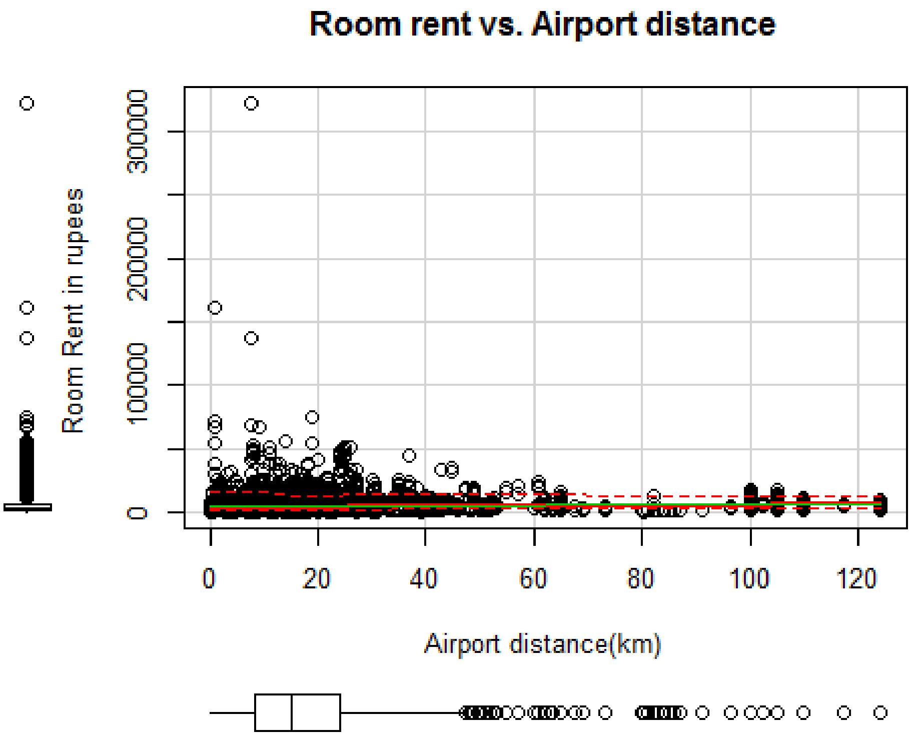


Result : The RoomRent for Hotel changes according with the outlier when it comes to FreeBreakfast

```
   #Analyzing Airport distance from hotel effects in what way on
RoomRent
   summary(hotel.df$Airport)
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
##    0.20    8.40   15.00   21.16   24.00  124.00
   boxplot(hotel.df$Airport, main="Boxplot of Airport",xlab= "Distance
of airport from hotel(Km)" ,col="green",horizontal = TRUE)
```



```
   #Effect of Airport distance on RoomRent

   scatterplot(hotel.df$Airport,hotel.df$RoomRent, main="Room rent vs.
Airport distance", xlab="Airport distance(km)", ylab="Room Rent in
rupees ",cex=1.1)
```



Hypothesis

8. Articulating hypothesis and conducting t-test to determine their p value

```
##Hypothesis

   #1.Average RoomRent in hotels having swimming pool is more than
that which don't have.
   t.test(RoomRent~HasSwimmingPool,data = hotel.df,
alternative="less")
##
##  Welch Two Sample t-test
##
## data:  RoomRent by HasSwimmingPool
## t = -29.013, df = 5011.3, p-value < 2.2e-16
## alternative hypothesis: true difference in means is less than 0
## 95 percent confidence interval:
##       -Inf -4502.814
## sample estimates:
## mean in group 0 mean in group 1
##        3775.566        8549.052
```

- Since the p-value is less than 0.05, we can reject the null hypothesis that the mean are equal

```
   #2.Average RoomRent in hotels with high star rating is high as
compared to one which has less star rating.
   t.test(hotel.df$RoomRent,hotel.df$StarRating)
##
##  Welch Two Sample t-test
##
## data:  hotel.df$RoomRent and hotel.df$StarRating
## t = 85.813, df = 13231, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  5345.575 5595.491
## sample estimates:
##   mean of x   mean of y
## 5473.991838    3.458933
```

- Since the p-value is less than 0.05, we can reject the null hypothesis that they are equal

```
   #3.Average RoomRent in hotels providing Free Breakfast is more than
that which don't provide.
   t.test(RoomRent~FreeBreakfast, data = hotel.df, alternative="less")
##
##  Welch Two Sample t-test
##
## data:  RoomRent by FreeBreakfast
## t = 0.98095, df = 6212.3, p-value = 0.8367
## alternative hypothesis: true difference in means is less than 0
## 95 percent confidence interval:
##      -Inf 411.5844
## sample estimates:
## mean in group 0 mean in group 1
##        5573.790        5420.044
```

- Since the p-value is more than 0.05, we fail to reject the null hypothesis that they are equal

```
   #4.Average RoomRent in metro city hotels is more than that of non
metro city hotel.
   t.test(RoomRent~IsMetroCity, data = hotel.df, alternative="less")
##
##  Welch Two Sample t-test
##
## data:  RoomRent by IsMetroCity
## t = 10.721, df = 13224, p-value = 1
## alternative hypothesis: true difference in means is less than 0
## 95 percent confidence interval:
##      -Inf 1253.463
## sample estimates:
```

```
## mean in group 0 mean in group 1
##        5782.794        4696.073
```

- Since the p-value is more than 0.05, we fail to reject the null hypothesis that they are equal

```

   #5.Average RoomRent in hotels in metro cities is more than hotels
in non metro cities.
   t.test(hotel.df$RoomRent,hotel.df$HotelCapacity)
##
##  Welch Two Sample t-test
##
## data:  hotel.df$RoomRent and hotel.df$HotelCapacity
## t = 84.882, df = 13234, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  5286.515 5536.445
## sample estimates:
##  mean of x  mean of y
## 5473.99184   62.51164
```

- Since the p-value is less than 0.05, we can reject the null hypothesis that the mean are equal

Regression Model

9. Generating Regression models using lm() model and testing hypothesis

```

#Generating a multiple linear regression model for RoomRent
   #1.
   fit1<-lm(RoomRent~StarRating+HasSwimmingPool+HotelCapacity-1, data
= hotel.df)
   summary(fit1)
##
## Call:
## lm(formula = RoomRent ~ StarRating + HasSwimmingPool + 
HotelCapacity - 
##     1, data = hotel.df)
##
## Residuals:
##    Min     1Q Median      3Q    Max
##  -8039  -2448  -1249    461 312401
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## StarRating      1396.8746    26.1320  53.455  < 2e-16 ***
## HasSwimmingPool 3719.6943   148.7835  25.001  < 2e-16 ***
## HotelCapacity     -7.6598     0.9415  -8.136 4.44e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6813 on 13229 degrees of freedom
## Multiple R-squared:  0.4457, Adjusted R-squared:  0.4456
## F-statistic:  3546 on 3 and 13229 DF,  p-value: < 2.2e-16
   #Coefficents of the model
   fit1$coefficients
##      StarRating HasSwimmingPool   HotelCapacity
##     1396.874562     3719.694300       -7.659814
   #Fitted residuals and values  are checked and the deviation was
around 1000 , because of
   #large data points it's not suitable to show those in the output
file.

###.  Model1:    salary = b0 + b1*StarRating + b2*HasSwimmingPool+
b3*HotelCapacity
#   b0 = -1(assumption),  b1 =  1396.874562, b2=3719.6943, b3= -
7.659814
#  Model:    salary = -1 + 1396.874562*StarRating +
3719.6943*HasSwimmingPool -7.659814*HotelCapacity



   #2.
   fit2<-
lm(RoomRent~StarRating+HasSwimmingPool+HotelCapacity+IsWeekend+IsTouri
stDestination-1, data = hotel.df)
   summary(fit2)
##
## Call:
## lm(formula = RoomRent ~ StarRating + HasSwimmingPool +
HotelCapacity +
##     IsWeekend + IsTouristDestination - 1, data = hotel.df)
##
## Residuals:
##    Min     1Q Median     3Q    Max
##  -8326  -2517  -1212    463 312480
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## StarRating           1258.9558    44.4985  28.292  < 2e-16 ***
## HasSwimmingPool      3670.2511   148.8411  24.659  < 2e-16 ***
## HotelCapacity          -6.1769     0.9658  -6.396 1.65e-10 ***
## IsWeekend            -509.6479   119.1618  -4.277 1.91e-05 ***
## IsTouristDestination 1053.0394   124.7325   8.442  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6792 on 13227 degrees of freedom
## Multiple R-squared:  0.4493, Adjusted R-squared:  0.4491
## F-statistic:  2159 on 5 and 13227 DF,  p-value: < 2.2e-16
```

```
   #Coefficents of the model
   fit2$coefficients
##           StarRating      HasSwimmingPool        HotelCapacity
##          1258.955786          3670.251057            -6.176913
##            IsWeekend IsTouristDestination
##          -509.647863          1053.039364
    #Fitted residuals and values  are checked and the deviation was
around 1000 , because of
   #large data points it's not suitable to show those in the output
file.


   ###.  Model1:    salary = b0 + b1*StarRating + b2*HasSwimmingPool+
b3*HotelCapacity + b4*IsWeekend + b6*IsTouristDestination
   #   b0 = -1(assumption),  b1 =  1258.955786, b2=3670.251057, b3= -
6.176913, b4=-509.647863, b5=1053.039364
   #  Model:    salary = -1 + 1258.955786*StarRating +
3670.251057*HasSwimmingPool -6.176913*HotelCapacity
   # -509.647863*IsWeekend + 1053.039364*IsTouristDestination



   #3.
   fit3<-lm(RoomRent~StarRating+HasSwimmingPool+HotelCapacity+Airport-
1, data = hotel.df)
   summary(fit3)
##
## Call:
## lm(formula = RoomRent ~ StarRating + HasSwimmingPool +
HotelCapacity +
##     Airport - 1, data = hotel.df)
##
## Residuals:
##    Min     1Q Median     3Q    Max
##  -8240  -2380  -1224    384 312742
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## StarRating      1248.4270    33.2220  37.578  < 2e-16 ***
## HasSwimmingPool 3903.7369   150.6728  25.909  < 2e-16 ***
## HotelCapacity     -6.7434     0.9482  -7.112 1.20e-12 ***
## Airport           18.8697     2.6157   7.214 5.73e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6800 on 13228 degrees of freedom
## Multiple R-squared:  0.4479, Adjusted R-squared:  0.4477
## F-statistic:  2683 on 4 and 13228 DF,  p-value: < 2.2e-16
   #Coefficents of the model
   fit3$coefficients
##      StarRating HasSwimmingPool   HotelCapacity         Airport
##     1248.426988     3903.736921       -6.743354       18.869726
```

```
   #Fitted residuals and values  are checked and the deviation was
around 1000 , because of
   #large data points it's not suitable to show those in the output
file.

   ###.  Model1:    salary = b0 + b1*StarRating + b2*HasSwimmingPool+
b3*HotelCapacity +b4*Airport + b5*Date
   #   b0 = -1(assumption),  b1 =  1248.426988 , b2=3903.736921, b3= -
6.743354, b4= 18.869726
   #  Model:    salary = -1 + 1248.426988*StarRating +
3903.736921*HasSwimmingPool -6.743354*HotelCapacity  +
18.869726*Aiport
```