**Assignment No. 13.1**

> COBRA.YTD2017 <- read.csv("E:/kamagyana/Computing/DARET/Assignments/COBRA-YTD2017.csv", stringsAsFactors=FALSE)

> View(COBRA.YTD2017)

> str(COBRA.YTD2017)

'data.frame': 26759 obs. of 23 variables:

$ MI\_PRINX : int 8924155 8924156 8924157 8924158 8924159 8924160 8924161 8924162 8924163 8924164 ...

$ offense\_id : num 1.74e+08 1.74e+08 1.74e+08 1.74e+08 1.74e+08 ...

$ rpt\_date : chr "12/31/2017" "12/31/2017" "12/31/2017" "12/31/2017" ...

$ occur\_date : chr "12/30/2017" "12/18/2017" "12/30/2017" "12/30/2017" ...

$ occur\_time : chr "23:15:00" "13:00:00" "22:01:00" "20:00:00" ...

$ poss\_date : chr "12/31/2017" "12/30/2017" "12/31/2017" "12/31/2017" ...

$ poss\_time : chr "00:30:00" "22:00:00" "01:00:00" "01:06:00" ...

$ beat : int 510 501 303 507 409 612 605 603 605 304 ...

$ apt\_office\_prefix: chr "" "" "" "" ...

$ apt\_office\_num : chr "" "" "" "" ...

$ location : chr "43 JESSE HILL JR DR NE" "1169 ATLANTIC DR NW" "633 PRYOR ST SW" "333 NELSON ST SW" ...

$ MinOfucr : int 640 640 640 640 640 650 311 640 640 531 ...

$ MinOfibr\_code : chr "2305" "2305" "2305" "2305" ...

$ dispo\_code : chr "" "" "" "" ...

$ MaxOfnum\_victims : int 2 1 1 1 2 1 1 1 1 1 ...

$ Shift : chr "Morn" "Unk" "Morn" "Eve" ...

$ Avg.Day : chr "Sat" "Unk" "Sat" "Sat" ...

$ loc\_type : int 13 13 18 18 18 18 26 18 13 26 ...

$ UC2.Literal : chr "LARCENY-FROM VEHICLE" "LARCENY-FROM VEHICLE" "LARCENY-FROM VEHICLE" "LARCENY-FROM VEHICLE" ...

$ neighborhood : chr "Downtown" "Home Park" "Mechanicsville" "Castleberry Hill" ...

$ npu : chr "M" "E" "V" "M" ...

$ x : num -84.4 -84.4 -84.4 -84.4 -84.5 ...

$ y : num 33.8 33.8 33.7 33.8 33.7 ...

View(COBRA.YTD2017)

str(COBRA.YTD2017)

sum(is.na(COBRA.YTD2017))

crimedata <- COBRA.YTD2017

colnames(crimedata)[22] <- "longitude"

colnames(crimedata)[23] <- "lattitude"

colnames(crimedata)[19] <- "CrimeType"

colnames(crimedata)[21] <- "NeiPlgUnit"

library(lubridate)

crimedata$rpt\_date <- mdy(crimedata$rpt\_date)

crimedata$occur\_date <- mdy(crimedata$occur\_date)

crimedata$poss\_date <- mdy(crimedata$poss\_date)

crimedata$occur\_time <- hms(crimedata$occur\_time)

crimedata$poss\_time <- hms(crimedata$poss\_time)

**QUESTION: 1**

Find out top 5 attributes having highest correlation (select only Numeric features).

numcrime <- cbind(crimedata[,c(2,22,23)])

str(numcrime)

cor(numcrime, method = "pearson", use = "complete.obs")

> str(numcrime)

'data.frame': 26759 obs. of 3 variables:

$ offense\_id: num 1.74e+08 1.74e+08 1.74e+08 1.74e+08 1.74e+08 ...

$ longitude : num -84.4 -84.4 -84.4 -84.4 -84.5 ...

$ lattitude : num 33.8 33.8 33.7 33.8 33.7 ...

> cor(numcrime, method = "pearson", use = "complete.obs")

offense\_id longitude lattitude

offense\_id 1.000000000 -0.004996624 0.004719228

longitude -0.004996624 1.000000000 -0.999835504

lattitude 0.004719228 -0.999835504 1.000000000

NOTE: If we consider whatever data is given as it is. The numeric data types are only three of them, which are the offence\_id, latitude, and longitude. Prima Facie the correlation of these three data does not make any sense, but for testing whether the offence id is related to the latitude and longitude. The above results show clearly that there is no correlation between the three, and logically the latitude and longitude are strongly correlated.

Further if we continue to extract all the integer variables also and then convert them as numeric and re-test with their correlations, even then there seems to be no major change in the correlation between the variables. So identifying the top 5 variables which are numerical type (as required by the question) is not possible. The following is the analysis of the same.

crimedata <- mutate(crimedata, occur\_day = day(occur\_date))

crimedata <- mutate(crimedata, occur\_month = month(occur\_date))

crimedata <- mutate(crimedata, Shift\_code = ifelse(Shift == "Day",1,ifelse(Shift == "Morn",2,ifelse(Shift == "Eve",3,"NA"))))

cor.test(crimedata$offense\_id,as.numeric(crimedata$Shift\_code), method = "spearman", use = "complete.obs")

cor(crimedata$offense\_id, crimedata$beat, method = "spearman", use = "complete.obs")

crimedata <- mutate(crimedata, Day\_code = ifelse(Avg.Day == "Sun",1,ifelse(Avg.Day == "Mon",2,ifelse(Avg.Day == "Tue",3, ifelse(Avg.Day == "Wed",4, ifelse(Avg.Day == "Thu",5,ifelse(Avg.Day == "Fri", 6, ifelse (Avg.Day == "Sat", 7, "NA"))))))))

numcrime <- cbind(crimedata[,c(1,2,8,12,15,18,22,23,24,25,26,27)])

numcrime$MI\_PRINX <- as.numeric(numcrime$MI\_PRINX)

numcrime$beat <- as.numeric(numcrime$beat)

numcrime$MinOfucr <- as.numeric(numcrime$MinOfucr)

numcrime$loc\_type <- as.numeric(numcrime$loc\_type)

numcrime$MaxOfnum\_victims <- as.numeric(numcrime$MaxOfnum\_victims)

numcrime$occur\_day <- as.numeric(numcrime$occur\_day)

numcrime$Shift\_code <- as.numeric(numcrime$Shift\_code)

numcrime$Day\_code <- as.numeric(numcrime$Day\_code)

cor(numcrime, method = "pearson", use= "complete.obs")

> cor(numcrime, method = "pearson", use= "complete.obs")

MI\_PRINX offense\_id beat MinOfucr

MI\_PRINX 1.000000000 0.995185992 0.009320465 0.027343476

offense\_id 0.995185992 1.000000000 0.009754083 0.026295379

beat 0.009320465 0.009754083 1.000000000 0.055179554

MinOfucr 0.027343476 0.026295379 0.055179554 1.000000000

MaxOfnum\_victims 0.012110438 0.011968656 0.011172904 -0.066890139

loc\_type -0.001511445 -0.001227131 -0.036640423 -0.032389302

longitude -0.012770751 -0.012754328 0.003842798 -0.258688150

lattitude 0.012979332 0.012944841 -0.007614065 0.261252199

occur\_day 0.083957360 0.082839180 0.001932860 0.001286179

occur\_month 0.985231323 0.979088161 0.009666581 0.027579005

Shift\_code 0.006546807 0.003912716 0.030411620 -0.010293055

Day\_code 0.019076862 0.019730488 0.007523491 0.018600084

MaxOfnum\_victims loc\_type longitude lattitude

MI\_PRINX 0.012110438 -0.0015114452 -0.012770751 0.012979332

offense\_id 0.011968656 -0.0012271310 -0.012754328 0.012944841

beat 0.011172904 -0.0366404232 0.003842798 -0.007614065

MinOfucr -0.066890139 -0.0323893017 -0.258688150 0.261252199

MaxOfnum\_victims 1.000000000 -0.0027733034 -0.015896371 0.015893261

loc\_type -0.002773303 1.0000000000 0.015218637 -0.016357892

longitude -0.015896371 0.0152186375 1.000000000 -0.999745561

lattitude 0.015893261 -0.0163578925 -0.999745561 1.000000000

occur\_day -0.000397998 -0.0001890544 -0.007996867 0.007849423

occur\_month 0.010849685 -0.0019754809 -0.013542802 0.013685875

Shift\_code 0.041520312 -0.0104292109 0.008610062 -0.008114567

Day\_code -0.013559773 0.0016441427 -0.003339004 0.003678394

occur\_day occur\_month Shift\_code Day\_code

MI\_PRINX 0.0839573602 0.985231323 0.006546807 0.019076862

offense\_id 0.0828391800 0.979088161 0.003912716 0.019730488

beat 0.0019328598 0.009666581 0.030411620 0.007523491

MinOfucr 0.0012861789 0.027579005 -0.010293055 0.018600084

MaxOfnum\_victims -0.0003979980 0.010849685 0.041520312 -0.013559773

loc\_type -0.0001890544 -0.001975481 -0.010429211 0.001644143

longitude -0.0079968674 -0.013542802 0.008610062 -0.003339004

lattitude 0.0078494231 0.013685875 -0.008114567 0.003678394

occur\_day 1.0000000000 0.006714302 0.003148464 0.008074932

occur\_month 0.0067143022 1.000000000 0.005218081 0.018928234

Shift\_code 0.0031484642 0.005218081 1.000000000 0.003473612

Day\_code 0.0080749315 0.018928234 0.003473612 1.000000000

**Question No. 2:**

Top 3 reasons for having crime in the city

> crime <-as.data.frame(table(crimedata$CrimeType))

> colnames(crime)[1] <- "Crime"

> crime

Crime Freq

1 AGG ASSAULT 2024

2 AUTO THEFT 3197

3 BURGLARY-NONRES 758

4 BURGLARY-RESIDENCE 2635

5 HOMICIDE 75

6 LARCENY-FROM VEHICLE 9840

7 LARCENY-NON VEHICLE 6589

8 RAPE 226

9 ROBBERY-COMMERCIAL 157

10 ROBBERY-PEDESTRIAN 1126

11 ROBBERY-RESIDENCE 132

> crime[order(-crime$Freq),]

Crime Freq

6 LARCENY-FROM VEHICLE 9840

7 LARCENY-NON VEHICLE 6589

2 AUTO THEFT 3197

4 BURGLARY-RESIDENCE 2635

1 AGG ASSAULT 2024

10 ROBBERY-PEDESTRIAN 1126

3 BURGLARY-NONRES 758

8 RAPE 226

9 ROBBERY-COMMERCIAL 157

11 ROBBERY-RESIDENCE 132

5 HOMICIDE 75

**Question No. 3:**

Which all attributes have correlation with crime rate?

In case we have to find out the correlation between attributes and the crime rate. Then we have to define crime rate. Since the data set contains more of non-numeric data, we can use the concept of frequency of occurrences, as the rate of crime, and then comment on the correlation between certain attributes and the crime rate.

> cor.test(crimedata$offense\_id, as.numeric(crimedata$occur\_time), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$occur\_time)

S = 3.1345e+12, p-value = 0.004822

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.01723414

> cor.test(crimedata$offense\_id, as.numeric(crimedata$beat), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$beat)

S = 3.2057e+12, p-value = 0.5288

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

-0.003850226

> cor.test(crimedata$offense\_id, as.numeric(crimedata$occur\_day), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$occur\_day)

S = 2.9622e+12, p-value < 2.2e-16

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.07241827

> cor.test(crimedata$offense\_id, as.numeric(crimedata$occur\_month), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$occur\_month)

S = 1.2699e+11, p-value < 2.2e-16

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.9602331

> cor.test(crimedata$offense\_id, as.numeric(crimedata$Day\_code), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$Day\_code)

S = 2.4784e+12, p-value = 0.003676

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.01846505

> cor.test(crimedata$offense\_id, as.numeric(crimedata$Shift\_code), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$Shift\_code)

S = 2.0146e+12, p-value = 0.05559

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.01260937

DayCrime <- as.matrix(table(crimedata$CrimeType,crimedata$occur\_day))

DayCrime <- DayCrime[-c(5,8,9,11),]

chisq.test(DayCrime)

MonthCrime <- as.matrix(table(crimedata$CrimeType,crimedata$occur\_month))

MonthCrime <- MonthCrime[-c(5,9),]

chisq.test(MonthCrime)

date

> crimedata <- mutate(crimedata, occur\_day = day(occur\_date))

> crimedata <- mutate(crimedata, occur\_month = month(occur\_date))

> crimedata <- mutate(crimedata, Shift\_code = ifelse(Shift == "Day",1,ifelse(Shift == "Morn",2,ifelse(Shift == "Eve",3,"NA"))))

> colnames(crimedata)

[1] "MI\_PRINX" "offense\_id" "rpt\_date" "occur\_date"

[5] "occur\_time" "poss\_date" "poss\_time" "beat"

[9] "apt\_office\_prefix" "apt\_office\_num" "location" "MinOfucr"

[13] "MinOfibr\_code" "dispo\_code" "MaxOfnum\_victims" "Shift"

[17] "Avg.Day" "loc\_type" "CrimeType" "neighborhood"

[21] "NeiPlgUnit" "longitude" "lattitude" "occur\_day"

[25] "occur\_month" "Shift\_code"

> head(crimedata$Avg.Day)

[1] "Sat" "Unk" "Sat" "Sat" "Sun" "Sun"

> crimedata <- mutate(crimedata, Day\_code = ifelse(Avg.Day == "Sun",1,ifelse(Avg.Day == "Mon",2,ifelse(Avg.Day == "Tue",3, ifelse(Avg.Day == "Wed",4, ifelse(Avg.Day == "Thu",5,ifelse(Avg.Day == "Fri", 6, ifelse (Avg.Day == "Sat", 7, "NA"))))))))

> head(crimedata$Day\_code)

[1] "7" "NA" "7" "7" "1" "1"

> table(crimedata$Avg.Day)

Fri Mon Sat Sun Thu Tue Unk Wed

3434 3492 3713 3569 3455 3542 2015 3539

> table(crimedata$Day\_code)

1 2 3 4 5 6 7 NA

3569 3492 3542 3539 3455 3434 3713 2015

> cor.test(crimedata$offense\_id,crimedata$Day\_code,method = "spearman", use = "complete.obs")

Error in cor.test.default(crimedata$offense\_id, crimedata$Day\_code, method = "spearman", :

'y' must be a numeric vector

> cor.test(crimedata$offense\_id,as.numeric(crimedata$Day\_code),method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$Day\_code)

S = 2.4784e+12, p-value = 0.003676

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.01846505

Warning messages:

1: In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$Day\_code), :

NAs introduced by coercion

2: In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$Day\_code), :

Cannot compute exact p-value with ties

> colnames(crimedata)

[1] "MI\_PRINX" "offense\_id" "rpt\_date" "occur\_date"

[5] "occur\_time" "poss\_date" "poss\_time" "beat"

[9] "apt\_office\_prefix" "apt\_office\_num" "location" "MinOfucr"

[13] "MinOfibr\_code" "dispo\_code" "MaxOfnum\_victims" "Shift"

[17] "Avg.Day" "loc\_type" "CrimeType" "neighborhood"

[21] "NeiPlgUnit" "longitude" "lattitude" "occur\_day"

[25] "occur\_month" "Shift\_code" "Day\_code"

> cor.test(crimedata$offense\_id,as.numeric(crimedata$MaxOfnum\_victims),method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$MaxOfnum\_victims)

S = 3.1047e+12, p-value = 0.001384

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.01957566

Warning message:

In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$MaxOfnum\_victims), :

Cannot compute exact p-value with ties

> table(crimedata$MaxOfnum\_victims)

0 1 2 3 4 5 6 7 8 9 10 11 13 14

208 23528 2169 470 171 58 27 21 11 2 4 4 2 2

15 17 19 21 23 24 27

1 1 1 1 1 1 1

> class(crimedata$MaxOfnum\_victims)

[1] "integer"

> colnames(crimedata)

[1] "MI\_PRINX" "offense\_id" "rpt\_date" "occur\_date"

[5] "occur\_time" "poss\_date" "poss\_time" "beat"

[9] "apt\_office\_prefix" "apt\_office\_num" "location" "MinOfucr"

[13] "MinOfibr\_code" "dispo\_code" "MaxOfnum\_victims" "Shift"

[17] "Avg.Day" "loc\_type" "CrimeType" "neighborhood"

[21] "NeiPlgUnit" "longitude" "lattitude" "occur\_day"

[25] "occur\_month" "Shift\_code" "Day\_code"

> numcrime <- cbind(crimedata[,c(1,2,8,12,15,18,22,23,24,25,26,27)])

> numcrime$MI\_PRINX <- as.numeric(numcrime$MI\_PRINX)

> numcrime$beat <- as.numeric(numcrime$beat)

> numcrime$MinOfucr <- as.numeric(numcrime$MinOfucr)

> numcrime$dispo\_code <- as.numeric(numcrime$dispo\_code)

Error in `$<-.data.frame`(`\*tmp\*`, dispo\_code, value = numeric(0)) :

replacement has 0 rows, data has 26759

> numcrime$loc\_type <- as.numeric(numcrime$loc\_type)

> colnames(numcrime)

[1] "MI\_PRINX" "offense\_id" "beat" "MinOfucr"

[5] "MaxOfnum\_victims" "loc\_type" "longitude" "lattitude"

[9] "occur\_day" "occur\_month" "Shift\_code" "Day\_code"

> str(numcrime)

'data.frame': 26759 obs. of 12 variables:

$ MI\_PRINX : num 8924155 8924156 8924157 8924158 8924159 ...

$ offense\_id : num 1.74e+08 1.74e+08 1.74e+08 1.74e+08 1.74e+08 ...

$ beat : num 510 501 303 507 409 612 605 603 605 304 ...

$ MinOfucr : num 640 640 640 640 640 650 311 640 640 531 ...

$ MaxOfnum\_victims: int 2 1 1 1 2 1 1 1 1 1 ...

$ loc\_type : num 13 13 18 18 18 18 26 18 13 26 ...

$ longitude : num -84.4 -84.4 -84.4 -84.4 -84.5 ...

$ lattitude : num 33.8 33.8 33.7 33.8 33.7 ...

$ occur\_day : int 30 18 30 30 31 30 31 31 30 31 ...

$ occur\_month : num 12 12 12 12 12 12 12 12 12 12 ...

$ Shift\_code : chr "2" "NA" "2" "3" ...

$ Day\_code : chr "7" "NA" "7" "7" ...

> numcrime$MaxOfnum\_victims <- as.numeric(numcrime$MaxOfnum\_victims)

> numcrime$occur\_day <- as.numeric(numcrime$occur\_day)

> numcrime$Shift\_code <- as.numeric(numcrime$Shift\_code)

Warning message:

NAs introduced by coercion

> numcrime$Day\_code <- as.numeric(numcrime$Day\_code)

Warning message:

NAs introduced by coercion

> str(numcrime)

'data.frame': 26759 obs. of 12 variables:

$ MI\_PRINX : num 8924155 8924156 8924157 8924158 8924159 ...

$ offense\_id : num 1.74e+08 1.74e+08 1.74e+08 1.74e+08 1.74e+08 ...

$ beat : num 510 501 303 507 409 612 605 603 605 304 ...

$ MinOfucr : num 640 640 640 640 640 650 311 640 640 531 ...

$ MaxOfnum\_victims: num 2 1 1 1 2 1 1 1 1 1 ...

$ loc\_type : num 13 13 18 18 18 18 26 18 13 26 ...

$ longitude : num -84.4 -84.4 -84.4 -84.4 -84.5 ...

$ lattitude : num 33.8 33.8 33.7 33.8 33.7 ...

$ occur\_day : num 30 18 30 30 31 30 31 31 30 31 ...

$ occur\_month : num 12 12 12 12 12 12 12 12 12 12 ...

$ Shift\_code : num 2 NA 2 3 2 2 2 2 NA 2 ...

$ Day\_code : num 7 NA 7 7 1 1 1 1 7 1 ...

> cor(numcrime, method = "pearson", use= "complete.obs")

MI\_PRINX offense\_id beat MinOfucr

MI\_PRINX 1.000000000 0.995185992 0.009320465 0.027343476

offense\_id 0.995185992 1.000000000 0.009754083 0.026295379

beat 0.009320465 0.009754083 1.000000000 0.055179554

MinOfucr 0.027343476 0.026295379 0.055179554 1.000000000

MaxOfnum\_victims 0.012110438 0.011968656 0.011172904 -0.066890139

loc\_type -0.001511445 -0.001227131 -0.036640423 -0.032389302

longitude -0.012770751 -0.012754328 0.003842798 -0.258688150

lattitude 0.012979332 0.012944841 -0.007614065 0.261252199

occur\_day 0.083957360 0.082839180 0.001932860 0.001286179

occur\_month 0.985231323 0.979088161 0.009666581 0.027579005

Shift\_code 0.006546807 0.003912716 0.030411620 -0.010293055

Day\_code 0.019076862 0.019730488 0.007523491 0.018600084

MaxOfnum\_victims loc\_type longitude lattitude

MI\_PRINX 0.012110438 -0.0015114452 -0.012770751 0.012979332

offense\_id 0.011968656 -0.0012271310 -0.012754328 0.012944841

beat 0.011172904 -0.0366404232 0.003842798 -0.007614065

MinOfucr -0.066890139 -0.0323893017 -0.258688150 0.261252199

MaxOfnum\_victims 1.000000000 -0.0027733034 -0.015896371 0.015893261

loc\_type -0.002773303 1.0000000000 0.015218637 -0.016357892

longitude -0.015896371 0.0152186375 1.000000000 -0.999745561

lattitude 0.015893261 -0.0163578925 -0.999745561 1.000000000

occur\_day -0.000397998 -0.0001890544 -0.007996867 0.007849423

occur\_month 0.010849685 -0.0019754809 -0.013542802 0.013685875

Shift\_code 0.041520312 -0.0104292109 0.008610062 -0.008114567

Day\_code -0.013559773 0.0016441427 -0.003339004 0.003678394

occur\_day occur\_month Shift\_code Day\_code

MI\_PRINX 0.0839573602 0.985231323 0.006546807 0.019076862

offense\_id 0.0828391800 0.979088161 0.003912716 0.019730488

beat 0.0019328598 0.009666581 0.030411620 0.007523491

MinOfucr 0.0012861789 0.027579005 -0.010293055 0.018600084

MaxOfnum\_victims -0.0003979980 0.010849685 0.041520312 -0.013559773

loc\_type -0.0001890544 -0.001975481 -0.010429211 0.001644143

longitude -0.0079968674 -0.013542802 0.008610062 -0.003339004

lattitude 0.0078494231 0.013685875 -0.008114567 0.003678394

occur\_day 1.0000000000 0.006714302 0.003148464 0.008074932

occur\_month 0.0067143022 1.000000000 0.005218081 0.018928234

Shift\_code 0.0031484642 0.005218081 1.000000000 0.003473612

Day\_code 0.0080749315 0.018928234 0.003473612 1.000000000

> cor.test(crimedata$offense\_id, as.numeric(crimedata$occur\_time), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$occur\_time)

S = 3.1345e+12, p-value = 0.004822

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.01723414

Warning message:

In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$occur\_time), :

Cannot compute exact p-value with ties

> table(as.numeric(crimedata$occur\_time))

0 60 120 180 240 300 360 420 480 540 600 660 720 780

550 160 7 3 4 46 5 3 3 2 24 2 1 4

840 900 960 1020 1080 1140 1200 1260 1320 1380 1440 1500 1560 1620

3 37 3 6 1 3 29 2 3 6 3 17 7 3

1680 1740 1800 1860 1920 1980 2040 2100 2160 2220 2280 2340 2400 2460

6 2 172 4 5 5 6 10 4 1 5 2 20 2

2520 2580 2640 2700 2760 2820 2880 2940 3000 3060 3120 3180 3240 3300

5 1 2 31 1 1 1 4 38 2 2 4 3 6

3360 3420 3480 3540 3600 3660 3720 3840 3900 3960 4020 4080 4140 4200

1 1 2 5 381 2 3 3 12 4 2 3 1 22

4260 4320 4380 4440 4500 4560 4620 4680 4740 4800 4860 4920 4980 5040

4 5 1 7 28 1 2 6 3 30 1 1 1 2

5100 5160 5220 5280 5340 5400 5460 5580 5640 5700 5760 5820 5940 6000

11 4 1 3 4 124 2 2 4 15 3 1 2 32

6120 6180 6240 6300 6360 6420 6480 6540 6600 6720 6780 6840 6900 6960

3 7 5 24 4 3 1 3 27 2 4 6 11 2

7020 7080 7140 7200 7260 7320 7380 7440 7500 7560 7620 7680 7740 7800

3 3 2 285 1 3 2 2 10 2 2 1 1 21

7920 8100 8160 8220 8280 8340 8400 8460 8520 8580 8640 8700 8760 8820

2 24 4 3 5 3 20 4 3 2 3 10 1 4

8880 8940 9000 9120 9180 9300 9360 9420 9480 9540 9600 9660 9720 9840

5 1 101 3 4 8 3 2 2 3 22 2 3 1

9900 9960 10020 10080 10140 10200 10260 10320 10380 10440 10500 10560 10620 10680

28 2 4 4 1 22 4 1 3 2 9 4 1 3

10740 10800 10920 10980 11040 11100 11160 11220 11280 11340 11400 11460 11520 11580

2 190 1 1 3 9 3 4 2 2 8 3 3 2

11640 11700 11760 11820 11880 11940 12000 12060 12120 12180 12240 12300 12360 12480

5 21 1 5 1 3 20 4 3 3 5 6 2 2

12540 12600 12660 12780 12840 12900 12960 13020 13080 13140 13200 13260 13320 13380

2 74 3 3 4 4 1 2 6 3 18 1 1 4

13440 13500 13560 13620 13680 13740 13800 13860 13920 13980 14040 14100 14160 14220

2 17 4 1 3 3 15 1 2 4 1 10 1 4

14340 14400 14520 14580 14640 14700 14760 14820 14880 14940 15000 15180 15300 15360

4 157 1 1 1 11 2 2 1 2 9 3 14 2

15420 15480 15540 15600 15660 15720 15780 15900 16020 16080 16140 16200 16320 16500

1 2 3 19 2 1 3 7 1 4 1 57 2 3

16560 16620 16680 16740 16800 16860 16920 16980 17040 17100 17340 17400 17460 17640

2 1 3 2 14 2 1 2 3 20 1 11 2 1

17700 17880 18000 18060 18120 18180 18240 18300 18360 18420 18540 18600 18720 18840

3 1 125 1 2 3 1 3 3 2 1 16 2 3

18900 18960 19020 19080 19200 19260 19320 19380 19440 19500 19560 19620 19680 19740

14 1 1 1 15 1 2 1 1 2 2 1 1 2

19800 19860 19980 20040 20100 20160 20280 20400 20460 20580 20640 20700 20820 20880

70 2 2 2 3 1 4 17 2 2 3 17 4 2

20940 21000 21060 21120 21240 21300 21360 21420 21480 21600 21720 21840 21900 22020

2 20 1 3 2 9 2 1 2 190 1 1 5 2

22140 22200 22260 22320 22380 22500 22560 22680 22800 22860 22920 22980 23040 23100

3 10 1 2 2 19 2 3 14 2 2 1 5 6

23160 23220 23400 23460 23520 23700 23760 23820 23880 24000 24060 24120 24240 24300

3 3 97 2 1 10 3 1 3 19 2 1 3 30

24420 24480 24600 24660 24840 24900 24960 25020 25200 25260 25320 25440 25500 25560

1 1 23 2 1 8 1 1 254 1 2 1 4 1

25620 25680 25740 25800 25860 25920 25980 26040 26100 26220 26280 26340 26400 26460

4 1 1 8 1 3 2 2 35 2 1 1 27 1

26520 26580 26640 26700 26880 27000 27060 27180 27240 27300 27360 27420 27480 27600

3 3 1 7 3 103 2 1 1 9 1 2 2 16

27660 27720 27780 27840 27900 27960 28020 28080 28140 28200 28260 28320 28380 28440

1 3 4 1 37 1 1 4 2 17 2 2 5 1

28500 28560 28620 28740 28800 28860 28920 28980 29040 29100 29160 29220 29280 29340

3 1 3 4 619 3 2 1 1 10 1 1 2 2

29400 29460 29520 29580 29640 29700 29760 29820 29880 29940 30000 30060 30120 30180

13 2 1 2 4 36 1 3 1 3 25 2 1 2

30240 30300 30360 30420 30480 30540 30600 30660 30720 30780 30840 30900 30960 31080

2 8 1 3 1 3 137 3 2 3 1 9 2 4

31140 31200 31320 31380 31440 31500 31560 31620 31680 31740 31800 31860 31920 31980

1 29 2 3 1 44 1 1 2 2 22 2 2 2

32040 32100 32160 32220 32280 32340 32400 32460 32520 32580 32640 32700 32760 32820

2 12 3 3 2 3 387 2 2 2 4 8 1 4

32880 33000 33060 33120 33180 33240 33300 33360 33480 33540 33600 33660 33720 33780

1 17 1 3 3 4 38 1 3 1 27 5 4 2

33840 33900 33960 34080 34140 34200 34260 34320 34380 34440 34500 34560 34620 34680

3 12 1 2 4 152 2 1 3 1 10 3 3 2

34740 34800 34860 34920 34980 35040 35100 35160 35220 35280 35340 35400 35460 35520

2 25 3 3 2 6 48 2 2 2 2 26 3 2

35580 35640 35700 35760 35820 35880 35940 36000 36060 36240 36300 36360 36420 36480

2 3 12 1 2 6 4 398 8 9 7 1 4 8

36540 36600 36660 36720 36780 36840 36900 37020 37080 37140 37200 37260 37320 37380

4 14 2 4 4 3 57 1 3 4 35 2 6 1

37440 37500 37560 37620 37680 37740 37800 37860 37920 37980 38040 38100 38160 38220

1 15 4 1 9 2 200 3 5 6 2 18 4 2

38280 38340 38400 38460 38520 38580 38640 38700 38760 38820 38880 38940 39000 39060

6 2 43 7 1 4 2 45 4 4 6 1 24 1

39120 39180 39240 39300 39360 39420 39480 39600 39720 39780 39840 39900 39960 40020

4 2 4 15 2 5 2 390 2 3 2 8 7 8

40080 40140 40200 40260 40320 40380 40440 40500 40560 40620 40680 40740 40800 40860

5 6 20 2 3 1 4 44 1 3 1 2 34 5

40920 40980 41040 41100 41160 41220 41280 41340 41400 41460 41520 41580 41640 41700

4 3 2 22 5 5 5 7 227 3 1 5 1 15

41760 41820 41880 41940 42000 42060 42120 42180 42240 42300 42360 42420 42480 42540

4 5 1 2 32 1 4 7 3 60 2 4 4 2

42600 42660 42720 42780 42840 42900 42960 43020 43080 43140 43200 43260 43320 43380

48 4 4 5 5 13 6 2 9 12 766 15 4 1

43440 43500 43560 43620 43680 43740 43800 43860 43920 43980 44040 44100 44160 44280

5 13 5 1 4 3 21 6 5 2 3 64 4 6

44340 44400 44460 44520 44580 44640 44700 44760 44820 44880 44940 45000 45060 45120

3 42 6 3 2 1 21 7 3 9 7 214 3 3

45180 45240 45300 45360 45420 45480 45540 45600 45660 45720 45780 45840 45900 45960

3 7 13 3 5 2 3 44 6 4 6 7 59 7

46020 46080 46140 46200 46260 46320 46380 46440 46500 46560 46620 46680 46800 46860

4 2 4 45 4 5 1 7 13 2 7 9 522 4

46920 46980 47040 47100 47160 47220 47280 47340 47400 47460 47520 47580 47640 47700

3 4 4 11 4 4 6 1 32 6 4 4 3 51

47760 47820 47880 47940 48000 48060 48120 48180 48240 48300 48360 48420 48480 48540

1 7 6 4 53 3 2 3 5 22 7 2 5 7

48600 48660 48720 48780 48840 48900 48960 49020 49080 49140 49200 49260 49320 49380

202 1 2 6 5 16 4 3 4 9 35 2 2 7

49440 49500 49560 49620 49680 49740 49800 49860 49920 49980 50040 50100 50160 50220

3 52 4 7 7 4 46 7 5 1 4 13 2 4

50280 50340 50400 50460 50520 50580 50640 50700 50760 50820 50880 50940 51000 51060

9 2 510 11 5 2 4 15 4 4 4 3 43 6

51120 51180 51240 51300 51420 51480 51540 51600 51660 51720 51780 51840 51900 51960

3 3 4 58 2 2 2 40 5 9 3 3 19 4

52020 52080 52140 52200 52260 52320 52380 52440 52500 52560 52620 52680 52740 52800

5 6 7 204 6 4 5 7 11 2 4 7 3 41

52860 52920 52980 53040 53100 53160 53220 53280 53340 53400 53460 53520 53580 53640

5 6 4 7 51 3 7 11 3 32 3 4 2 7

53700 53760 53820 53880 53940 54000 54060 54120 54180 54240 54300 54360 54420 54480

20 3 3 2 2 576 6 7 8 4 10 11 3 1

54540 54600 54660 54720 54780 54840 54900 54960 55020 55080 55140 55200 55260 55320

7 30 5 5 4 7 57 3 1 7 6 37 6 6

55380 55440 55500 55560 55620 55680 55740 55800 55860 55920 55980 56040 56100 56160

4 6 14 1 3 5 3 256 9 2 5 6 10 6

56220 56280 56340 56400 56460 56520 56580 56640 56700 56760 56820 56880 56940 57000

8 4 7 41 9 4 4 1 62 2 8 5 6 46

57060 57120 57180 57240 57300 57360 57420 57480 57540 57600 57660 57720 57780 57840

5 5 11 6 24 7 3 8 7 601 9 6 6 7

57900 57960 58020 58080 58140 58200 58260 58320 58380 58440 58500 58560 58620 58680

12 9 3 2 4 18 6 6 5 7 53 3 5 4

58740 58800 58860 58920 58980 59040 59100 59160 59220 59280 59340 59400 59460 59520

6 32 12 7 3 5 18 10 7 11 8 231 6 4

59580 59640 59700 59760 59820 59880 59940 60000 60060 60120 60180 60240 60300 60360

3 6 20 4 5 4 7 31 5 11 8 5 59 6

60420 60480 60540 60600 60660 60720 60780 60840 60900 60960 61020 61080 61140 61200

5 6 9 42 4 8 7 5 16 8 8 5 5 677

61260 61320 61380 61440 61500 61560 61620 61680 61740 61800 61860 61920 61980 62040

4 5 5 2 18 7 6 4 5 22 5 7 5 6

62100 62160 62220 62280 62340 62400 62460 62520 62580 62640 62700 62760 62820 62880

61 1 10 5 4 49 3 7 5 9 16 7 5 10

62940 63000 63060 63120 63180 63240 63300 63360 63420 63480 63540 63600 63660 63720

4 270 6 5 5 2 19 4 2 6 4 42 5 2

63780 63840 63900 63960 64020 64080 64140 64200 64260 64320 64380 64440 64500 64560

7 3 60 1 4 4 7 38 10 5 7 8 16 2

64620 64680 64740 64800 64860 64920

3 4 5 732 9 7

[ reached getOption("max.print") -- omitted 354 entries ]

> hour(as.character(crimedata$occur\_time))

Error in as.POSIXlt.character(x, tz = tz(x)) :

character string is not in a standard unambiguous format

> hour(as.POSIXct(crimedata$occur\_time))

Error in as.POSIXct.numeric(crimedata$occur\_time) :

'origin' must be supplied

> cor.test(crimedata$offense\_id, as.numeric(crimedata$beat), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$beat)

S = 3.2057e+12, p-value = 0.5288

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

-0.003850226

Warning message:

In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$beat), :

Cannot compute exact p-value with ties

> cor.test(crimedata$offense\_id, as.numeric(crimedata$occur\_day), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$occur\_day)

S = 2.9622e+12, p-value < 2.2e-16

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.07241827

Warning message:

In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$occur\_day), :

Cannot compute exact p-value with ties

> cor.test(crimedata$offense\_id, as.numeric(crimedata$occur\_month), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$occur\_month)

S = 1.2699e+11, p-value < 2.2e-16

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.9602331

Warning message:

In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$occur\_month), :

Cannot compute exact p-value with ties

> cor.test(crimedata$offense\_id, as.numeric(crimedata$Day\_code), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$Day\_code)

S = 2.4784e+12, p-value = 0.003676

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.01846505

Warning messages:

1: In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$Day\_code), :

NAs introduced by coercion

2: In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$Day\_code), :

Cannot compute exact p-value with ties

> colnames(crimedata)

[1] "MI\_PRINX" "offense\_id" "rpt\_date" "occur\_date"

[5] "occur\_time" "poss\_date" "poss\_time" "beat"

[9] "apt\_office\_prefix" "apt\_office\_num" "location" "MinOfucr"

[13] "MinOfibr\_code" "dispo\_code" "MaxOfnum\_victims" "Shift"

[17] "Avg.Day" "loc\_type" "CrimeType" "neighborhood"

[21] "NeiPlgUnit" "longitude" "lattitude" "occur\_day"

[25] "occur\_month" "Shift\_code" "Day\_code"

> cor.test(crimedata$offense\_id, as.numeric(crimedata$Shift\_code), method = "spearman", use = "complete.obs")

Spearman's rank correlation rho

data: crimedata$offense\_id and as.numeric(crimedata$Shift\_code)

S = 2.0146e+12, p-value = 0.05559

alternative hypothesis: true rho is not equal to 0

sample estimates:

rho

0.01260937

Warning messages:

1: In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$Shift\_code), :

NAs introduced by coercion

2: In cor.test.default(crimedata$offense\_id, as.numeric(crimedata$Shift\_code), :

Cannot compute exact p-value with ties

> table(crimedata$CrimeType,crimedata$occur\_day)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

AGG ASSAULT 68 72 68 63 65 59 68 51 60 70 70 75 69 65 76

AUTO THEFT 105 113 103 98 84 110 91 98 80 123 105 110 117 109 121

BURGLARY-NONRES 33 32 25 28 20 24 20 29 32 22 24 39 35 27 30

BURGLARY-RESIDENCE 90 78 79 78 93 82 101 77 72 89 77 79 86 95 94

HOMICIDE 2 4 3 2 2 3 2 3 2 8 0 2 3 4 2

LARCENY-FROM VEHICLE 301 305 322 333 314 311 337 317 300 313 350 301 338 310 305

LARCENY-NON VEHICLE 239 193 205 202 218 220 230 219 202 242 205 199 200 231 227

RAPE 18 8 6 10 11 8 7 6 1 5 5 5 7 4 13

ROBBERY-COMMERCIAL 7 4 6 4 5 6 4 9 2 3 4 3 6 6 6

ROBBERY-PEDESTRIAN 43 40 39 33 38 40 37 37 27 33 36 40 46 31 41

ROBBERY-RESIDENCE 2 7 2 3 3 2 6 5 5 2 2 3 3 3 2

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

AGG ASSAULT 75 68 60 64 75 69 67 59 71 66 60 79 66 62 55

AUTO THEFT 98 101 101 131 106 114 96 94 101 109 113 91 103 102 93

BURGLARY-NONRES 16 20 18 32 20 24 19 30 23 20 30 19 20 14 17

BURGLARY-RESIDENCE 84 98 89 91 92 95 85 80 97 99 69 79 95 68 81

HOMICIDE 1 3 2 3 1 7 3 2 0 4 3 1 1 1 1

LARCENY-FROM VEHICLE 343 371 342 333 354 302 369 293 302 315 319 342 342 294 274

LARCENY-NON VEHICLE 224 220 226 210 220 209 230 194 227 231 214 205 224 205 214

RAPE 10 9 10 7 6 7 10 6 10 4 3 5 5 8 7

ROBBERY-COMMERCIAL 4 1 3 9 8 5 3 3 4 7 3 7 6 4 10

ROBBERY-PEDESTRIAN 37 34 37 37 35 27 46 35 32 36 30 35 35 43 37

ROBBERY-RESIDENCE 7 7 5 4 6 3 8 5 4 1 7 6 5 8 3

31

AGG ASSAULT 29

AUTO THEFT 77

BURGLARY-NONRES 16

BURGLARY-RESIDENCE 63

HOMICIDE 0

LARCENY-FROM VEHICLE 188

LARCENY-NON VEHICLE 104

RAPE 5

ROBBERY-COMMERCIAL 5

ROBBERY-PEDESTRIAN 29

ROBBERY-RESIDENCE 3

> as.data.frame(table(crimedata$CrimeType, crimedata$occur\_day))

Var1 Var2 Freq

1 AGG ASSAULT 1 68

2 AUTO THEFT 1 105

3 BURGLARY-NONRES 1 33

4 BURGLARY-RESIDENCE 1 90

5 HOMICIDE 1 2

6 LARCENY-FROM VEHICLE 1 301

7 LARCENY-NON VEHICLE 1 239

8 RAPE 1 18

9 ROBBERY-COMMERCIAL 1 7

10 ROBBERY-PEDESTRIAN 1 43

11 ROBBERY-RESIDENCE 1 2

12 AGG ASSAULT 2 72

13 AUTO THEFT 2 113

14 BURGLARY-NONRES 2 32

15 BURGLARY-RESIDENCE 2 78

16 HOMICIDE 2 4

17 LARCENY-FROM VEHICLE 2 305

18 LARCENY-NON VEHICLE 2 193

19 RAPE 2 8

20 ROBBERY-COMMERCIAL 2 4

21 ROBBERY-PEDESTRIAN 2 40

22 ROBBERY-RESIDENCE 2 7

23 AGG ASSAULT 3 68

24 AUTO THEFT 3 103

25 BURGLARY-NONRES 3 25

26 BURGLARY-RESIDENCE 3 79

27 HOMICIDE 3 3

28 LARCENY-FROM VEHICLE 3 322

29 LARCENY-NON VEHICLE 3 205

30 RAPE 3 6

31 ROBBERY-COMMERCIAL 3 6

32 ROBBERY-PEDESTRIAN 3 39

33 ROBBERY-RESIDENCE 3 2

34 AGG ASSAULT 4 63

35 AUTO THEFT 4 98

36 BURGLARY-NONRES 4 28

37 BURGLARY-RESIDENCE 4 78

38 HOMICIDE 4 2

39 LARCENY-FROM VEHICLE 4 333

40 LARCENY-NON VEHICLE 4 202

41 RAPE 4 10

42 ROBBERY-COMMERCIAL 4 4

43 ROBBERY-PEDESTRIAN 4 33

44 ROBBERY-RESIDENCE 4 3

45 AGG ASSAULT 5 65

46 AUTO THEFT 5 84

47 BURGLARY-NONRES 5 20

48 BURGLARY-RESIDENCE 5 93

49 HOMICIDE 5 2

50 LARCENY-FROM VEHICLE 5 314

51 LARCENY-NON VEHICLE 5 218

52 RAPE 5 11

53 ROBBERY-COMMERCIAL 5 5

54 ROBBERY-PEDESTRIAN 5 38

55 ROBBERY-RESIDENCE 5 3

56 AGG ASSAULT 6 59

57 AUTO THEFT 6 110

58 BURGLARY-NONRES 6 24

59 BURGLARY-RESIDENCE 6 82

60 HOMICIDE 6 3

61 LARCENY-FROM VEHICLE 6 311

62 LARCENY-NON VEHICLE 6 220

63 RAPE 6 8

64 ROBBERY-COMMERCIAL 6 6

65 ROBBERY-PEDESTRIAN 6 40

66 ROBBERY-RESIDENCE 6 2

67 AGG ASSAULT 7 68

68 AUTO THEFT 7 91

69 BURGLARY-NONRES 7 20

70 BURGLARY-RESIDENCE 7 101

71 HOMICIDE 7 2

72 LARCENY-FROM VEHICLE 7 337

73 LARCENY-NON VEHICLE 7 230

74 RAPE 7 7

75 ROBBERY-COMMERCIAL 7 4

76 ROBBERY-PEDESTRIAN 7 37

77 ROBBERY-RESIDENCE 7 6

78 AGG ASSAULT 8 51

79 AUTO THEFT 8 98

80 BURGLARY-NONRES 8 29

81 BURGLARY-RESIDENCE 8 77

82 HOMICIDE 8 3

83 LARCENY-FROM VEHICLE 8 317

84 LARCENY-NON VEHICLE 8 219

85 RAPE 8 6

86 ROBBERY-COMMERCIAL 8 9

87 ROBBERY-PEDESTRIAN 8 37

88 ROBBERY-RESIDENCE 8 5

89 AGG ASSAULT 9 60

90 AUTO THEFT 9 80

91 BURGLARY-NONRES 9 32

92 BURGLARY-RESIDENCE 9 72

93 HOMICIDE 9 2

94 LARCENY-FROM VEHICLE 9 300

95 LARCENY-NON VEHICLE 9 202

96 RAPE 9 1

97 ROBBERY-COMMERCIAL 9 2

98 ROBBERY-PEDESTRIAN 9 27

99 ROBBERY-RESIDENCE 9 5

100 AGG ASSAULT 10 70

101 AUTO THEFT 10 123

102 BURGLARY-NONRES 10 22

103 BURGLARY-RESIDENCE 10 89

104 HOMICIDE 10 8

105 LARCENY-FROM VEHICLE 10 313

106 LARCENY-NON VEHICLE 10 242

107 RAPE 10 5

108 ROBBERY-COMMERCIAL 10 3

109 ROBBERY-PEDESTRIAN 10 33

110 ROBBERY-RESIDENCE 10 2

111 AGG ASSAULT 11 70

112 AUTO THEFT 11 105

113 BURGLARY-NONRES 11 24

114 BURGLARY-RESIDENCE 11 77

115 HOMICIDE 11 0

116 LARCENY-FROM VEHICLE 11 350

117 LARCENY-NON VEHICLE 11 205

118 RAPE 11 5

119 ROBBERY-COMMERCIAL 11 4

120 ROBBERY-PEDESTRIAN 11 36

121 ROBBERY-RESIDENCE 11 2

122 AGG ASSAULT 12 75

123 AUTO THEFT 12 110

124 BURGLARY-NONRES 12 39

125 BURGLARY-RESIDENCE 12 79

126 HOMICIDE 12 2

127 LARCENY-FROM VEHICLE 12 301

128 LARCENY-NON VEHICLE 12 199

129 RAPE 12 5

130 ROBBERY-COMMERCIAL 12 3

131 ROBBERY-PEDESTRIAN 12 40

132 ROBBERY-RESIDENCE 12 3

133 AGG ASSAULT 13 69

134 AUTO THEFT 13 117

135 BURGLARY-NONRES 13 35

136 BURGLARY-RESIDENCE 13 86

137 HOMICIDE 13 3

138 LARCENY-FROM VEHICLE 13 338

139 LARCENY-NON VEHICLE 13 200

140 RAPE 13 7

141 ROBBERY-COMMERCIAL 13 6

142 ROBBERY-PEDESTRIAN 13 46

143 ROBBERY-RESIDENCE 13 3

144 AGG ASSAULT 14 65

145 AUTO THEFT 14 109

146 BURGLARY-NONRES 14 27

147 BURGLARY-RESIDENCE 14 95

148 HOMICIDE 14 4

149 LARCENY-FROM VEHICLE 14 310

150 LARCENY-NON VEHICLE 14 231

151 RAPE 14 4

152 ROBBERY-COMMERCIAL 14 6

153 ROBBERY-PEDESTRIAN 14 31

154 ROBBERY-RESIDENCE 14 3

155 AGG ASSAULT 15 76

156 AUTO THEFT 15 121

157 BURGLARY-NONRES 15 30

158 BURGLARY-RESIDENCE 15 94

159 HOMICIDE 15 2

160 LARCENY-FROM VEHICLE 15 305

161 LARCENY-NON VEHICLE 15 227

162 RAPE 15 13

163 ROBBERY-COMMERCIAL 15 6

164 ROBBERY-PEDESTRIAN 15 41

165 ROBBERY-RESIDENCE 15 2

166 AGG ASSAULT 16 75

167 AUTO THEFT 16 98

168 BURGLARY-NONRES 16 16

169 BURGLARY-RESIDENCE 16 84

170 HOMICIDE 16 1

171 LARCENY-FROM VEHICLE 16 343

172 LARCENY-NON VEHICLE 16 224

173 RAPE 16 10

174 ROBBERY-COMMERCIAL 16 4

175 ROBBERY-PEDESTRIAN 16 37

176 ROBBERY-RESIDENCE 16 7

177 AGG ASSAULT 17 68

178 AUTO THEFT 17 101

179 BURGLARY-NONRES 17 20

180 BURGLARY-RESIDENCE 17 98

181 HOMICIDE 17 3

182 LARCENY-FROM VEHICLE 17 371

183 LARCENY-NON VEHICLE 17 220

184 RAPE 17 9

185 ROBBERY-COMMERCIAL 17 1

186 ROBBERY-PEDESTRIAN 17 34

187 ROBBERY-RESIDENCE 17 7

188 AGG ASSAULT 18 60

189 AUTO THEFT 18 101

190 BURGLARY-NONRES 18 18

191 BURGLARY-RESIDENCE 18 89

192 HOMICIDE 18 2

193 LARCENY-FROM VEHICLE 18 342

194 LARCENY-NON VEHICLE 18 226

195 RAPE 18 10

196 ROBBERY-COMMERCIAL 18 3

197 ROBBERY-PEDESTRIAN 18 37

198 ROBBERY-RESIDENCE 18 5

199 AGG ASSAULT 19 64

200 AUTO THEFT 19 131

201 BURGLARY-NONRES 19 32

202 BURGLARY-RESIDENCE 19 91

203 HOMICIDE 19 3

204 LARCENY-FROM VEHICLE 19 333

205 LARCENY-NON VEHICLE 19 210

206 RAPE 19 7

207 ROBBERY-COMMERCIAL 19 9

208 ROBBERY-PEDESTRIAN 19 37

209 ROBBERY-RESIDENCE 19 4

210 AGG ASSAULT 20 75

211 AUTO THEFT 20 106

212 BURGLARY-NONRES 20 20

213 BURGLARY-RESIDENCE 20 92

214 HOMICIDE 20 1

215 LARCENY-FROM VEHICLE 20 354

216 LARCENY-NON VEHICLE 20 220

217 RAPE 20 6

218 ROBBERY-COMMERCIAL 20 8

219 ROBBERY-PEDESTRIAN 20 35

220 ROBBERY-RESIDENCE 20 6

221 AGG ASSAULT 21 69

222 AUTO THEFT 21 114

223 BURGLARY-NONRES 21 24

224 BURGLARY-RESIDENCE 21 95

225 HOMICIDE 21 7

226 LARCENY-FROM VEHICLE 21 302

227 LARCENY-NON VEHICLE 21 209

228 RAPE 21 7

229 ROBBERY-COMMERCIAL 21 5

230 ROBBERY-PEDESTRIAN 21 27

231 ROBBERY-RESIDENCE 21 3

232 AGG ASSAULT 22 67

233 AUTO THEFT 22 96

234 BURGLARY-NONRES 22 19

235 BURGLARY-RESIDENCE 22 85

236 HOMICIDE 22 3

237 LARCENY-FROM VEHICLE 22 369

238 LARCENY-NON VEHICLE 22 230

239 RAPE 22 10

240 ROBBERY-COMMERCIAL 22 3

241 ROBBERY-PEDESTRIAN 22 46

242 ROBBERY-RESIDENCE 22 8

243 AGG ASSAULT 23 59

244 AUTO THEFT 23 94

245 BURGLARY-NONRES 23 30

246 BURGLARY-RESIDENCE 23 80

247 HOMICIDE 23 2

248 LARCENY-FROM VEHICLE 23 293

249 LARCENY-NON VEHICLE 23 194

250 RAPE 23 6

251 ROBBERY-COMMERCIAL 23 3

252 ROBBERY-PEDESTRIAN 23 35

253 ROBBERY-RESIDENCE 23 5

254 AGG ASSAULT 24 71

255 AUTO THEFT 24 101

256 BURGLARY-NONRES 24 23

257 BURGLARY-RESIDENCE 24 97

258 HOMICIDE 24 0

259 LARCENY-FROM VEHICLE 24 302

260 LARCENY-NON VEHICLE 24 227

261 RAPE 24 10

262 ROBBERY-COMMERCIAL 24 4

263 ROBBERY-PEDESTRIAN 24 32

264 ROBBERY-RESIDENCE 24 4

265 AGG ASSAULT 25 66

266 AUTO THEFT 25 109

267 BURGLARY-NONRES 25 20

268 BURGLARY-RESIDENCE 25 99

269 HOMICIDE 25 4

270 LARCENY-FROM VEHICLE 25 315

271 LARCENY-NON VEHICLE 25 231

272 RAPE 25 4

273 ROBBERY-COMMERCIAL 25 7

274 ROBBERY-PEDESTRIAN 25 36

275 ROBBERY-RESIDENCE 25 1

276 AGG ASSAULT 26 60

277 AUTO THEFT 26 113

278 BURGLARY-NONRES 26 30

279 BURGLARY-RESIDENCE 26 69

280 HOMICIDE 26 3

281 LARCENY-FROM VEHICLE 26 319

282 LARCENY-NON VEHICLE 26 214

283 RAPE 26 3

284 ROBBERY-COMMERCIAL 26 3

285 ROBBERY-PEDESTRIAN 26 30

286 ROBBERY-RESIDENCE 26 7

287 AGG ASSAULT 27 79

288 AUTO THEFT 27 91

289 BURGLARY-NONRES 27 19

290 BURGLARY-RESIDENCE 27 79

291 HOMICIDE 27 1

292 LARCENY-FROM VEHICLE 27 342

293 LARCENY-NON VEHICLE 27 205

294 RAPE 27 5

295 ROBBERY-COMMERCIAL 27 7

296 ROBBERY-PEDESTRIAN 27 35

297 ROBBERY-RESIDENCE 27 6

298 AGG ASSAULT 28 66

299 AUTO THEFT 28 103

300 BURGLARY-NONRES 28 20

301 BURGLARY-RESIDENCE 28 95

302 HOMICIDE 28 1

303 LARCENY-FROM VEHICLE 28 342

304 LARCENY-NON VEHICLE 28 224

305 RAPE 28 5

306 ROBBERY-COMMERCIAL 28 6

307 ROBBERY-PEDESTRIAN 28 35

308 ROBBERY-RESIDENCE 28 5

309 AGG ASSAULT 29 62

310 AUTO THEFT 29 102

311 BURGLARY-NONRES 29 14

312 BURGLARY-RESIDENCE 29 68

313 HOMICIDE 29 1

314 LARCENY-FROM VEHICLE 29 294

315 LARCENY-NON VEHICLE 29 205

316 RAPE 29 8

317 ROBBERY-COMMERCIAL 29 4

318 ROBBERY-PEDESTRIAN 29 43

319 ROBBERY-RESIDENCE 29 8

320 AGG ASSAULT 30 55

321 AUTO THEFT 30 93

322 BURGLARY-NONRES 30 17

323 BURGLARY-RESIDENCE 30 81

324 HOMICIDE 30 1

325 LARCENY-FROM VEHICLE 30 274

326 LARCENY-NON VEHICLE 30 214

327 RAPE 30 7

328 ROBBERY-COMMERCIAL 30 10

329 ROBBERY-PEDESTRIAN 30 37

330 ROBBERY-RESIDENCE 30 3

331 AGG ASSAULT 31 29

332 AUTO THEFT 31 77

333 BURGLARY-NONRES 31 16

[ reached getOption("max.print") -- omitted 8 rows ]

> as.matrix(table(crimedata$CrimeType, crimedata$occur\_day))

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

AGG ASSAULT 68 72 68 63 65 59 68 51 60 70 70 75 69 65 76

AUTO THEFT 105 113 103 98 84 110 91 98 80 123 105 110 117 109 121

BURGLARY-NONRES 33 32 25 28 20 24 20 29 32 22 24 39 35 27 30

BURGLARY-RESIDENCE 90 78 79 78 93 82 101 77 72 89 77 79 86 95 94

HOMICIDE 2 4 3 2 2 3 2 3 2 8 0 2 3 4 2

LARCENY-FROM VEHICLE 301 305 322 333 314 311 337 317 300 313 350 301 338 310 305

LARCENY-NON VEHICLE 239 193 205 202 218 220 230 219 202 242 205 199 200 231 227

RAPE 18 8 6 10 11 8 7 6 1 5 5 5 7 4 13

ROBBERY-COMMERCIAL 7 4 6 4 5 6 4 9 2 3 4 3 6 6 6

ROBBERY-PEDESTRIAN 43 40 39 33 38 40 37 37 27 33 36 40 46 31 41

ROBBERY-RESIDENCE 2 7 2 3 3 2 6 5 5 2 2 3 3 3 2

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

AGG ASSAULT 75 68 60 64 75 69 67 59 71 66 60 79 66 62 55

AUTO THEFT 98 101 101 131 106 114 96 94 101 109 113 91 103 102 93

BURGLARY-NONRES 16 20 18 32 20 24 19 30 23 20 30 19 20 14 17

BURGLARY-RESIDENCE 84 98 89 91 92 95 85 80 97 99 69 79 95 68 81

HOMICIDE 1 3 2 3 1 7 3 2 0 4 3 1 1 1 1

LARCENY-FROM VEHICLE 343 371 342 333 354 302 369 293 302 315 319 342 342 294 274

LARCENY-NON VEHICLE 224 220 226 210 220 209 230 194 227 231 214 205 224 205 214

RAPE 10 9 10 7 6 7 10 6 10 4 3 5 5 8 7

ROBBERY-COMMERCIAL 4 1 3 9 8 5 3 3 4 7 3 7 6 4 10

ROBBERY-PEDESTRIAN 37 34 37 37 35 27 46 35 32 36 30 35 35 43 37

ROBBERY-RESIDENCE 7 7 5 4 6 3 8 5 4 1 7 6 5 8 3

31

AGG ASSAULT 29

AUTO THEFT 77

BURGLARY-NONRES 16

BURGLARY-RESIDENCE 63

HOMICIDE 0

LARCENY-FROM VEHICLE 188

LARCENY-NON VEHICLE 104

RAPE 5

ROBBERY-COMMERCIAL 5

ROBBERY-PEDESTRIAN 29

ROBBERY-RESIDENCE 3

> DayCrime <- as.matrix(table(crimedata$CrimeType, crimedata$occur\_day))

> ncol(DayCrime)

[1] 31

> nrow(Daycrime)

Error in nrow(Daycrime) : object 'Daycrime' not found

> nrows(DayCrime)

Error in nrows(DayCrime) : could not find function "nrows"

> nrow(DayCrime)

[1] 11

> DayCrime <- as.data.frame(DayCrime)

> str(DayCrime)

'data.frame': 341 obs. of 3 variables:

$ Var1: Factor w/ 11 levels "AGG ASSAULT",..: 1 2 3 4 5 6 7 8 9 10 ...

$ Var2: Factor w/ 31 levels "1","2","3","4",..: 1 1 1 1 1 1 1 1 1 1 ...

$ Freq: int 68 105 33 90 2 301 239 18 7 43 ...

> colnames(DayCrime)(1) <- "CrimeType"

Error in colnames(DayCrime)(1) <- "CrimeType" :

target of assignment expands to non-language object

> colnames(DayCrime)[1] <- "CrimeType"

> head(DayCrime)

CrimeType Var2 Freq

1 AGG ASSAULT 1 68

2 AUTO THEFT 1 105

3 BURGLARY-NONRES 1 33

4 BURGLARY-RESIDENCE 1 90

5 HOMICIDE 1 2

6 LARCENY-FROM VEHICLE 1 301

> chisq.test(table(crimedata$CrimeType,crimedata$occur\_day))

Pearson's Chi-squared test

data: table(crimedata$CrimeType, crimedata$occur\_day)

X-squared = 317.45, df = 300, p-value = 0.2339

Warning message:

In chisq.test(table(crimedata$CrimeType, crimedata$occur\_day)) :

Chi-squared approximation may be incorrect

> table(crimedata$CrimeType,crimedata$occur\_day))

Error: unexpected ')' in "table(crimedata$CrimeType,crimedata$occur\_day))"

> table(crimedata$CrimeType,crimedata$occur\_day)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

AGG ASSAULT 68 72 68 63 65 59 68 51 60 70 70 75 69 65 76

AUTO THEFT 105 113 103 98 84 110 91 98 80 123 105 110 117 109 121

BURGLARY-NONRES 33 32 25 28 20 24 20 29 32 22 24 39 35 27 30

BURGLARY-RESIDENCE 90 78 79 78 93 82 101 77 72 89 77 79 86 95 94

HOMICIDE 2 4 3 2 2 3 2 3 2 8 0 2 3 4 2

LARCENY-FROM VEHICLE 301 305 322 333 314 311 337 317 300 313 350 301 338 310 305

LARCENY-NON VEHICLE 239 193 205 202 218 220 230 219 202 242 205 199 200 231 227

RAPE 18 8 6 10 11 8 7 6 1 5 5 5 7 4 13

ROBBERY-COMMERCIAL 7 4 6 4 5 6 4 9 2 3 4 3 6 6 6

ROBBERY-PEDESTRIAN 43 40 39 33 38 40 37 37 27 33 36 40 46 31 41

ROBBERY-RESIDENCE 2 7 2 3 3 2 6 5 5 2 2 3 3 3 2

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

AGG ASSAULT 75 68 60 64 75 69 67 59 71 66 60 79 66 62 55

AUTO THEFT 98 101 101 131 106 114 96 94 101 109 113 91 103 102 93

BURGLARY-NONRES 16 20 18 32 20 24 19 30 23 20 30 19 20 14 17

BURGLARY-RESIDENCE 84 98 89 91 92 95 85 80 97 99 69 79 95 68 81

HOMICIDE 1 3 2 3 1 7 3 2 0 4 3 1 1 1 1

LARCENY-FROM VEHICLE 343 371 342 333 354 302 369 293 302 315 319 342 342 294 274

LARCENY-NON VEHICLE 224 220 226 210 220 209 230 194 227 231 214 205 224 205 214

RAPE 10 9 10 7 6 7 10 6 10 4 3 5 5 8 7

ROBBERY-COMMERCIAL 4 1 3 9 8 5 3 3 4 7 3 7 6 4 10

ROBBERY-PEDESTRIAN 37 34 37 37 35 27 46 35 32 36 30 35 35 43 37

ROBBERY-RESIDENCE 7 7 5 4 6 3 8 5 4 1 7 6 5 8 3

31

AGG ASSAULT 29

AUTO THEFT 77

BURGLARY-NONRES 16

BURGLARY-RESIDENCE 63

HOMICIDE 0

LARCENY-FROM VEHICLE 188

LARCENY-NON VEHICLE 104

RAPE 5

ROBBERY-COMMERCIAL 5

ROBBERY-PEDESTRIAN 29

ROBBERY-RESIDENCE 3

> as.matrix(table(crimedata$CrimeType,crimedata$occur\_day))

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

AGG ASSAULT 68 72 68 63 65 59 68 51 60 70 70 75 69 65 76

AUTO THEFT 105 113 103 98 84 110 91 98 80 123 105 110 117 109 121

BURGLARY-NONRES 33 32 25 28 20 24 20 29 32 22 24 39 35 27 30

BURGLARY-RESIDENCE 90 78 79 78 93 82 101 77 72 89 77 79 86 95 94

HOMICIDE 2 4 3 2 2 3 2 3 2 8 0 2 3 4 2

LARCENY-FROM VEHICLE 301 305 322 333 314 311 337 317 300 313 350 301 338 310 305

LARCENY-NON VEHICLE 239 193 205 202 218 220 230 219 202 242 205 199 200 231 227

RAPE 18 8 6 10 11 8 7 6 1 5 5 5 7 4 13

ROBBERY-COMMERCIAL 7 4 6 4 5 6 4 9 2 3 4 3 6 6 6

ROBBERY-PEDESTRIAN 43 40 39 33 38 40 37 37 27 33 36 40 46 31 41

ROBBERY-RESIDENCE 2 7 2 3 3 2 6 5 5 2 2 3 3 3 2

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

AGG ASSAULT 75 68 60 64 75 69 67 59 71 66 60 79 66 62 55

AUTO THEFT 98 101 101 131 106 114 96 94 101 109 113 91 103 102 93

BURGLARY-NONRES 16 20 18 32 20 24 19 30 23 20 30 19 20 14 17

BURGLARY-RESIDENCE 84 98 89 91 92 95 85 80 97 99 69 79 95 68 81

HOMICIDE 1 3 2 3 1 7 3 2 0 4 3 1 1 1 1

LARCENY-FROM VEHICLE 343 371 342 333 354 302 369 293 302 315 319 342 342 294 274

LARCENY-NON VEHICLE 224 220 226 210 220 209 230 194 227 231 214 205 224 205 214

RAPE 10 9 10 7 6 7 10 6 10 4 3 5 5 8 7

ROBBERY-COMMERCIAL 4 1 3 9 8 5 3 3 4 7 3 7 6 4 10

ROBBERY-PEDESTRIAN 37 34 37 37 35 27 46 35 32 36 30 35 35 43 37

ROBBERY-RESIDENCE 7 7 5 4 6 3 8 5 4 1 7 6 5 8 3

31

AGG ASSAULT 29

AUTO THEFT 77

BURGLARY-NONRES 16

BURGLARY-RESIDENCE 63

HOMICIDE 0

LARCENY-FROM VEHICLE 188

LARCENY-NON VEHICLE 104

RAPE 5

ROBBERY-COMMERCIAL 5

ROBBERY-PEDESTRIAN 29

ROBBERY-RESIDENCE 3

> DayCrime <- as.matrix(table(crimedata$CrimeType,crimedata$occur\_day))

> DayCrime <- DayCrime[-c(5,8,9,11),]

> nrow(DayCrime)

[1] 7

> ncol(DayCrime)

[1] 31

> chisq.test(DayCrime)

Pearson's Chi-squared test

data: DayCrime

X-squared = 183.34, df = 180, p-value = 0.4168

> chisq.test(MonthCrime)

Pearson's Chi-squared test

data: MonthCrime

X-squared = 213.62, df = 88, p-value = 1.911e-12