R ASSIGNMENT
NAME – Deepesh Srivastava
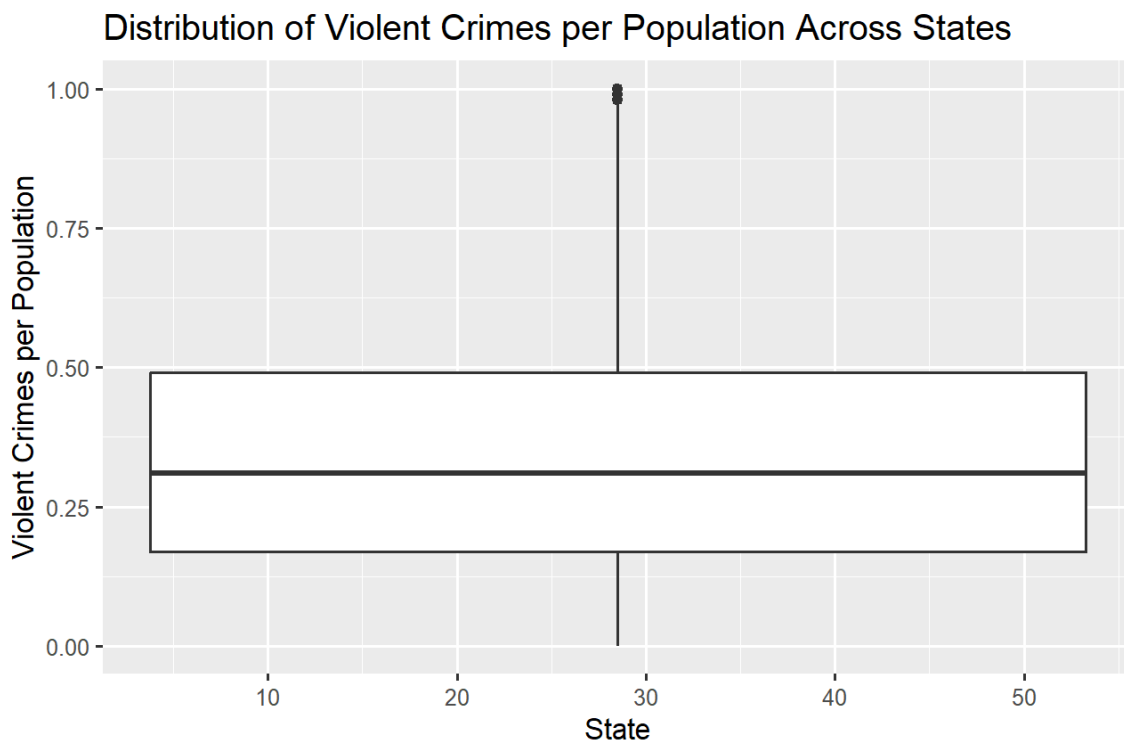# PRN – 23070126028
# Class – AIML A
Year – 2023-2027
Subject - STAIML

a) What is the distribution of violent crimes per population across different states?

```
ggplot(data, aes(x = state, y = ViolentCrimesPerPop))
+geom_boxplot() + labs(title = "Distribution of Violent Crimes
per Population Across States", x = "State", y = "Violent Crimes
per Population")
```
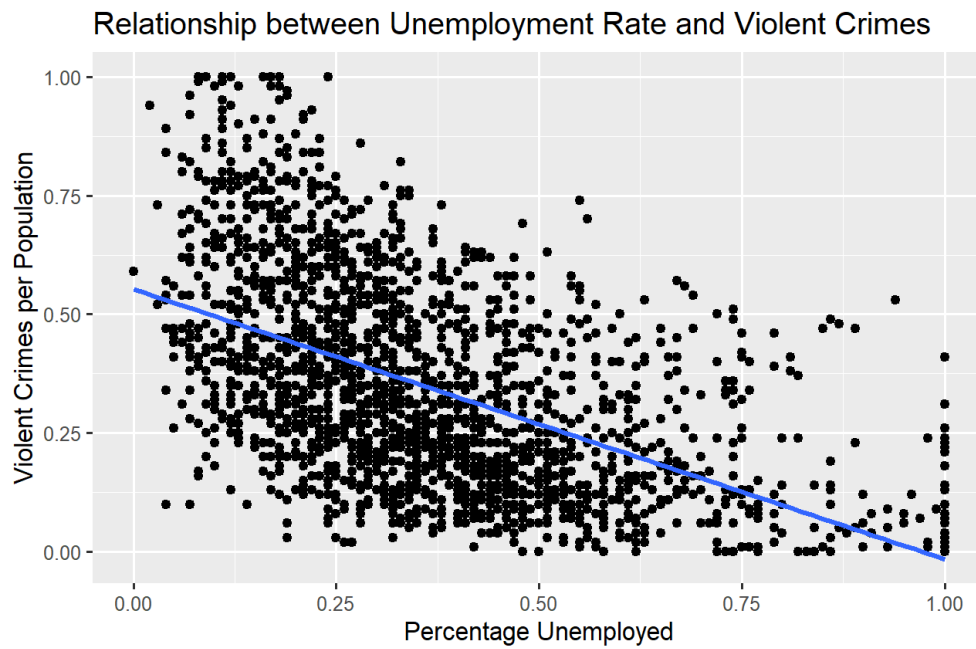

Distribution of Violent Crimes per Population Across States

```
ggplot(data, aes(x = medIncome, y = ViolentCrimesPerPop)) +
geom_point() +

geom_smooth(method = "lm", se = FALSE) + labs(title =
"Correlation between Household Income and Violent Crimes", x
= "Median Income", y = "Violent Crimes per Population")
```
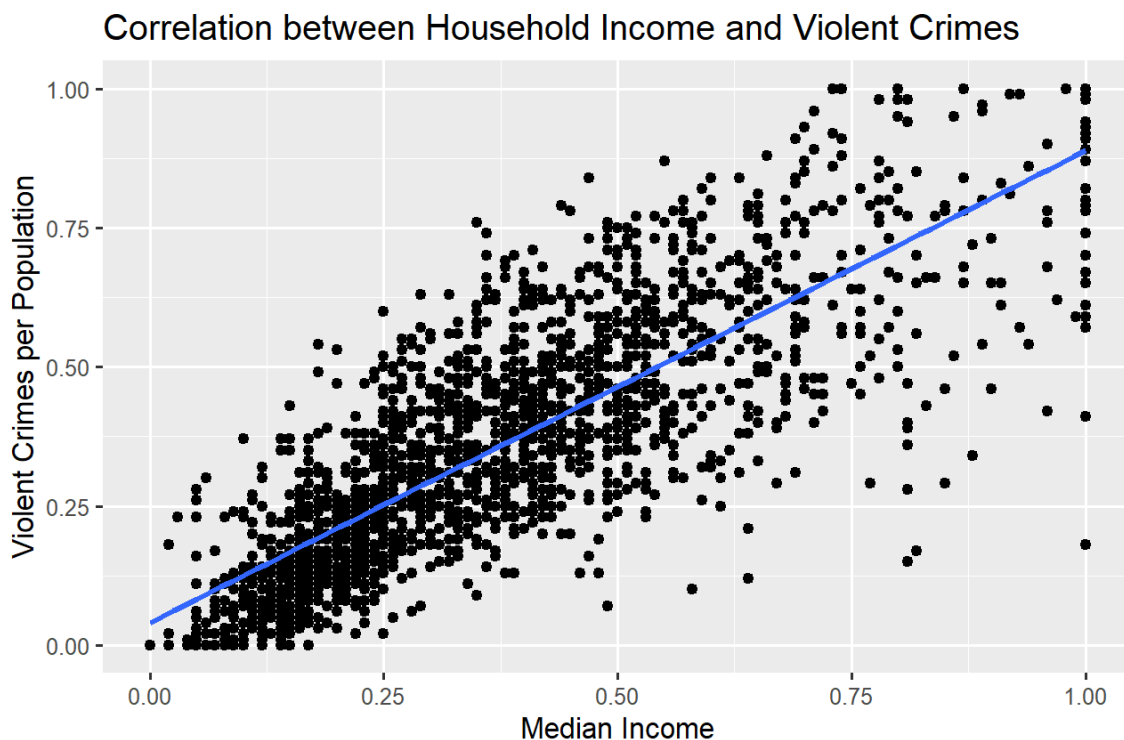

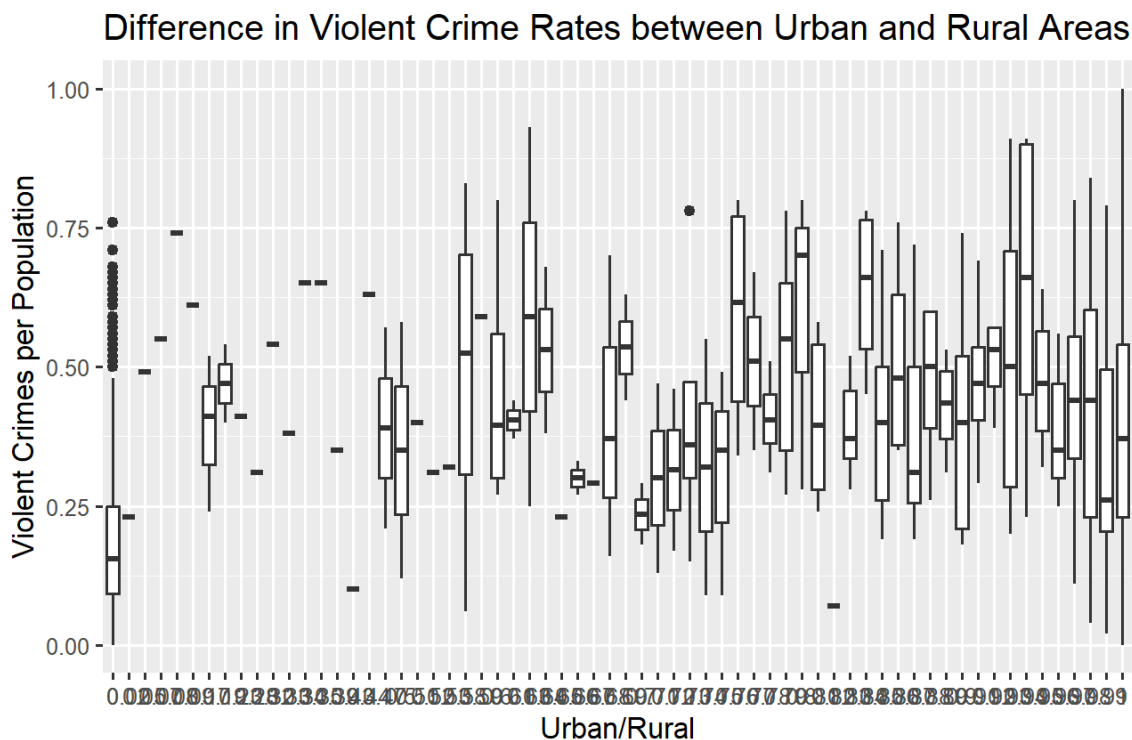Correlation between Household Income and Violent Crimes

```
ggplot(data, aes(x = PctUnemployed, y = ViolentCrimesPerPop))
+

 geom_point() + geom_smooth(method = "lm", se = FALSE) +

 labs(title = "Relationship between Unemployment Rate and
Violent Crimes",

 x = "Percentage Unemployed", y = "Violent Crimes per
Population")
```

Relationship between Unemployment Rate and Violent Crimes

**d) Is there a difference in violent crime rates between urban and rural areas?**

```
ggplot(data, aes(x = as.factor(pctUrban), y = ViolentCrimesPerPop)) +

 geom_boxplot() + labs(title = "Difference in Violent Crime Rates between Urban and Rural Areas", x = "Urban/Rural", y = "Violent Crimes per Population")
```
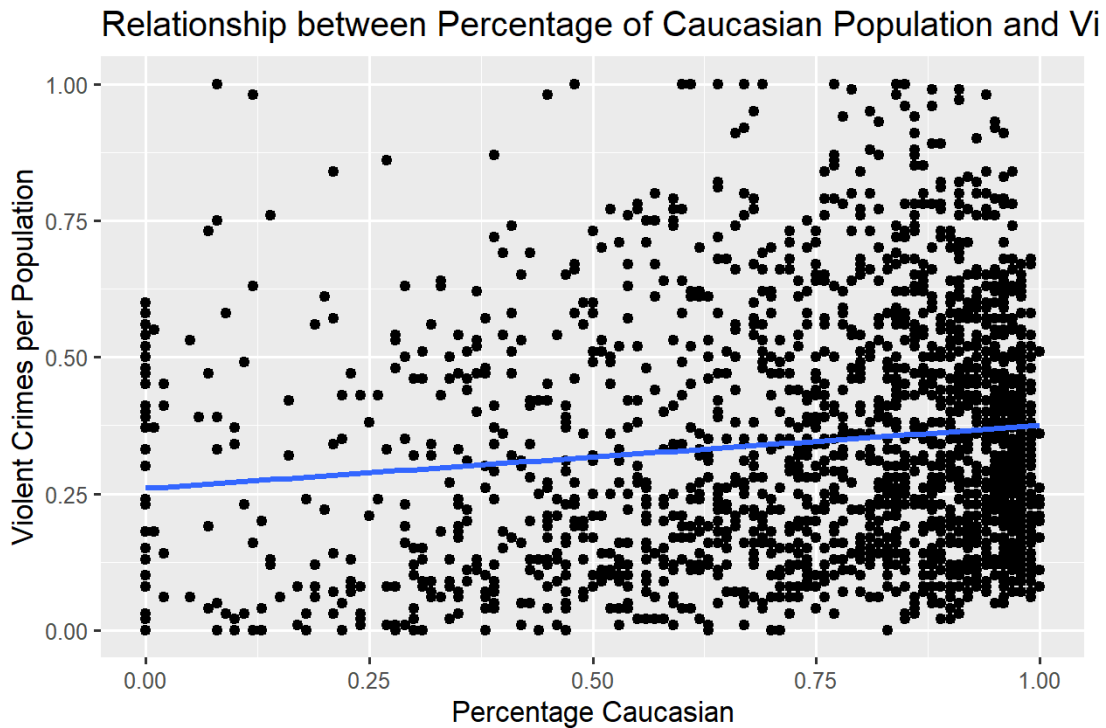

Difference in Violent Crime Rates between Urban and Rural Areas

```
ggplot(data, aes(x = racepctblack, y = ViolentCrimesPerPop)) + geom_point() + geom_smooth(method = "lm", se = FALSE) + labs(title = "Relationship between Percentage of African American Population and Violent Crimes", x = "Percentage African American", y = "Violent Crimes per Population")
```

Relationship between Percentage of African American Population
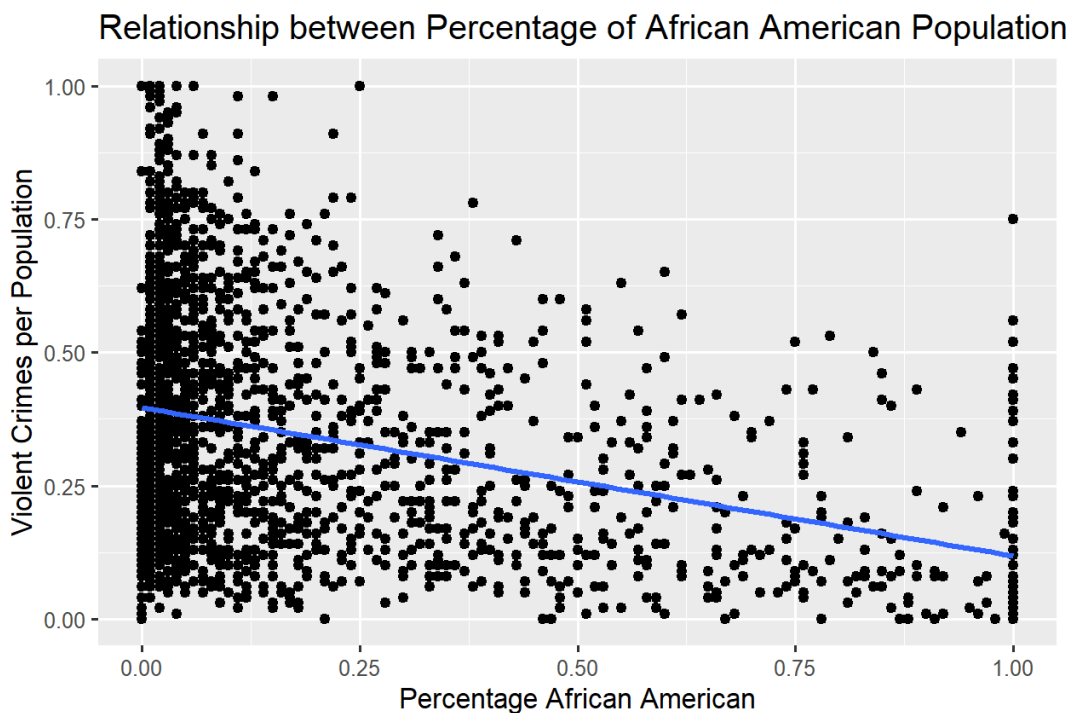

```
ggplot(data, aes(x = racePctWhite, y = ViolentCrimesPerPop)) + geom_point() + geom_smooth(method = "lm", se = FALSE) + labs(title = "Relationship between Percentage of Caucasian Population and Violent Crimes", x = "Percentage Caucasian", y = "Violent Crimes per Population")
```

Relationship between Percentage of Caucasian Population and Vi
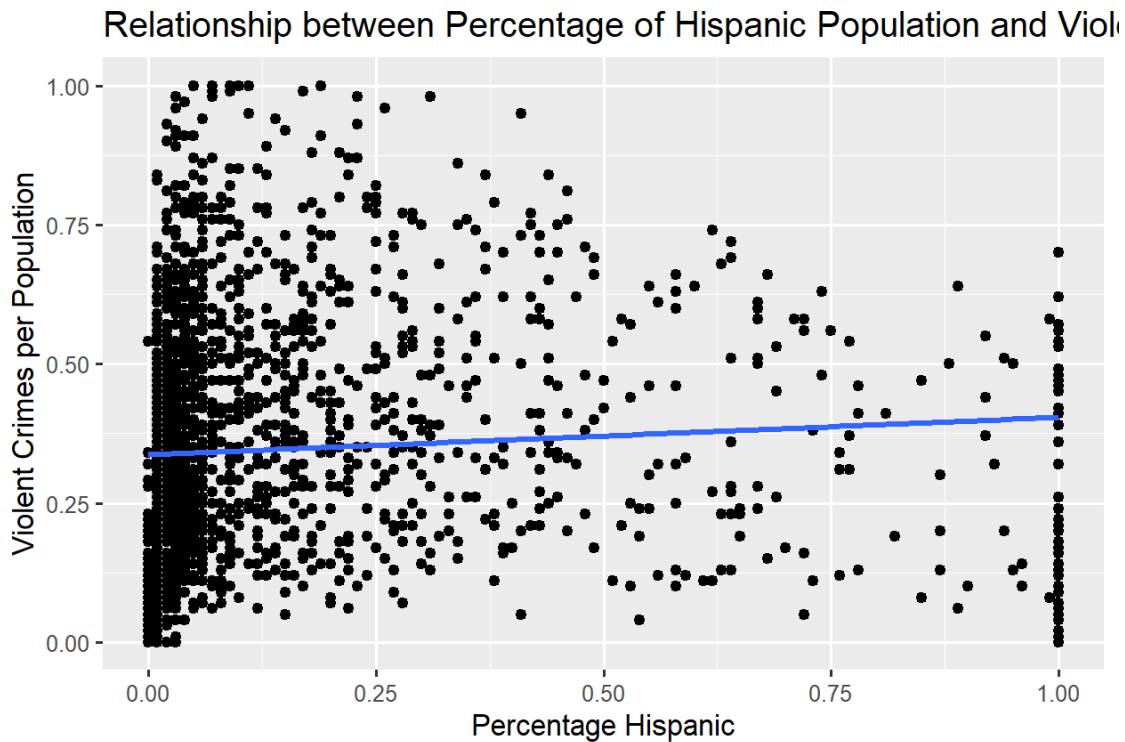
```
ggplot(data,      aes(x      =      racePctHisp,      y      =
ViolentCrimesPerPop))      +      geom_point()      +
geom_smooth(method = "lm", se = FALSE) +
labs(title = "Relationship between Percentage of Hispanic
Population and Violent Crimes", x = "Percentage Hispanic",
y = "Violent Crimes per Population")
```

Relationship between Percentage of Hispanic Population and Viol

x-axis: Percentage Hispanic
y-axis: Violent Crimes per Population

f) Does the presence of sworn full-time police officers have an impact on reducing violent crime rates?
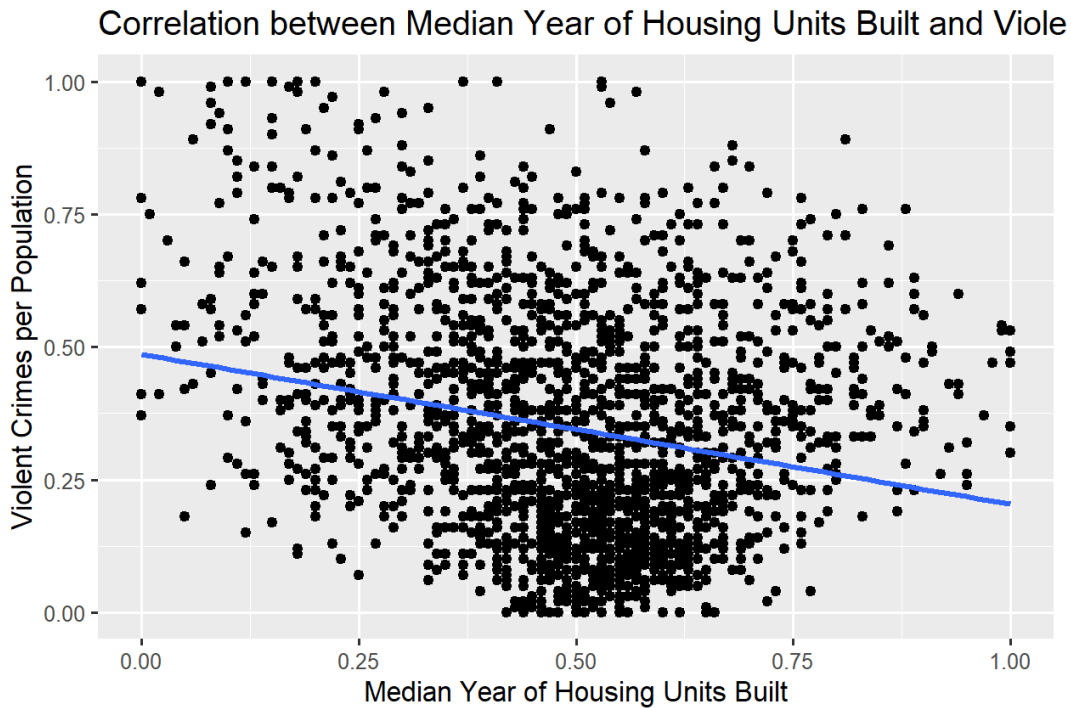
cor.test(data$PolicRate, data$ViolentCrimesPerPop)

ggplot(data, aes(x = PolicRate, y = ViolentCrimesPerPop)) + geom_point() + geom_smooth(method = "lm") + labs(title = "Relationship between Police Presence and Violent Crime Rate", x = "Police Rate", y = "Violent Crimes per Population")

```
data:  data$PolicRate and data$ViolentCrimesPerPop
t = 68.488, df = 1992, p-value < 2.2e-16
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.8242181 0.8504237
sample estimates:
      cor
0.8378028
```
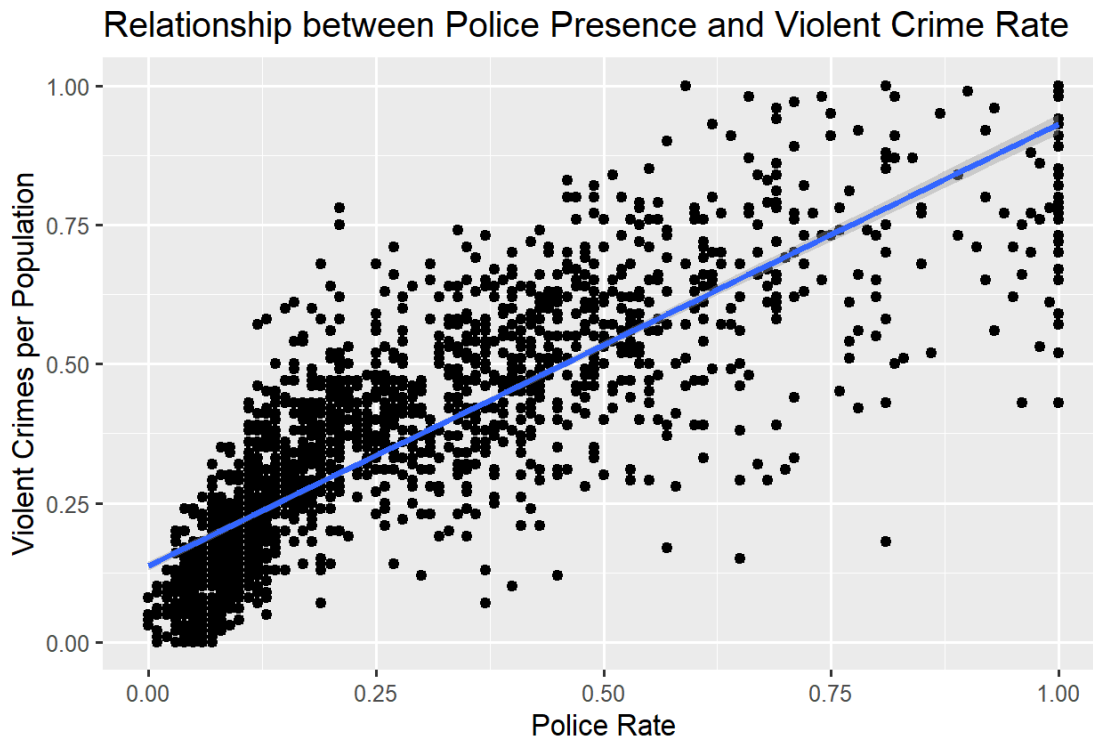
Relationship between Police Presence and Violent Crime Rate

```
ggplot(data, aes(x = MedYrHousBuilt, y =
ViolentCrimesPerPop)) + geom_point() + geom_smooth(method
= "lm", se = FALSE) + labs(title = "Correlation between Median
Year of Housing Units Built and Violent Crimes", x = "Median
Year of Housing Units Built", y = "Violent Crimes per
Population")
```

Correlation between Median Year of Housing Units Built and Viole

i) Is there a relationship between the percentage of households with public assistance income and violent crime rates?

```
ggplot(data, aes(x = pctWPubAsst, y = ViolentCrimesPerPop)) +
geom_point() + geom_smooth(method = "lm", se = FALSE) +
labs(title = "Relationship between Percentage of Households
with Public Assistance Income and Violent Crimes", x =
"Percentage of Households with Public Assistance Income", y =
"Violent Crimes per Population")
```

Relationship between Percentage of Households with Public Assis

(x-axis: Percentage of Households with Public Assistance Income, y-axis: Violent Crimes per Population)
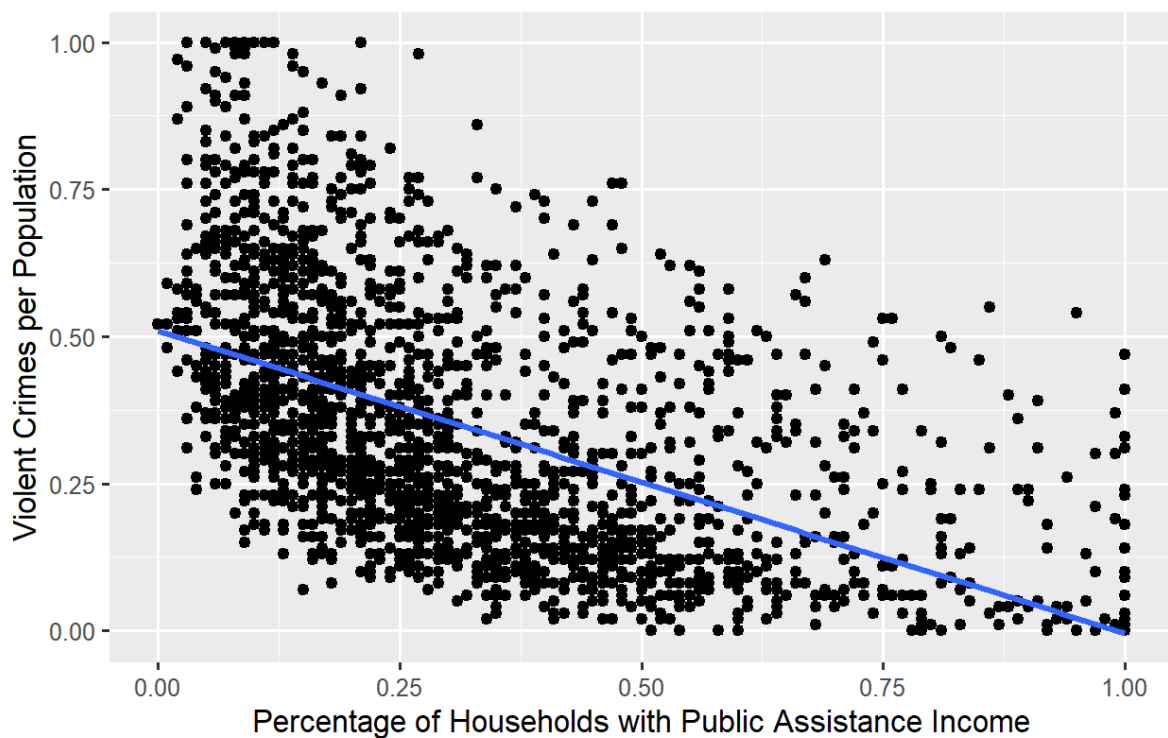
```
ggplot(data, aes(x = pctUrban, y = ViolentCrimesPerPop)) +
geom_point() + geom_smooth(method = "lm") +  labs(title =
"Relationship between Population   Density and Violent Crime
Rate", x = "Percentage of Urban Population", y = "Violent
Crimes per Population")
```

Relationship between Population Density and Violent Crime Rate
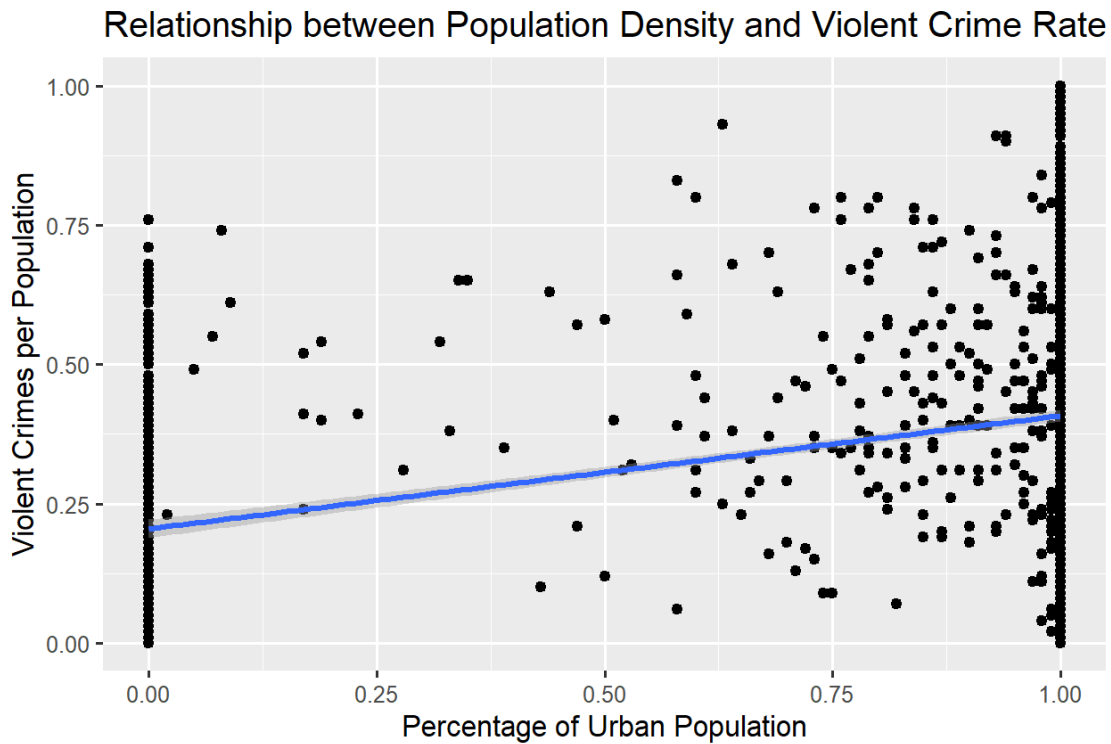
h) What is the impact of the presence of gang units deployed on violent crime rates?

ggplot(data, aes(x = PctLargHouseFam, y = ViolentCrimesPerPop)) + geom_point() + labs(x = "Presence of gang units", y = "Violent Crimes per Population")
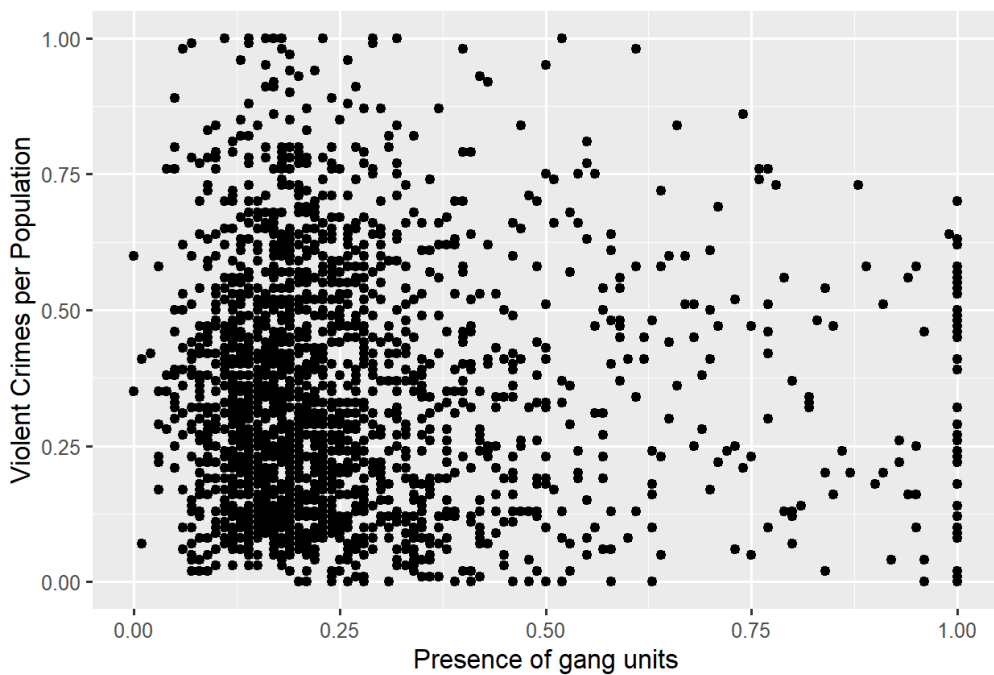
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AIML A2
STAIML.

→   Analysis.

→   To provide a comprehensive analysis, let's breakdown each question and discuss the appropriate plots and the implications:

a) Distribution of violet crimes per population across different states:

A bar chart map which is showing the violent crime rate per capita for each state. This will help visualize which states have higher or lower rates of violent crime

b) Correlation b/w household income and the rate of violent crimes:
Scatter plot with household income on the x axis and violent crime rate on the y-axis. This plot whether there is a correlation b/w in both of two subjects.

c) Relationship b/w the percentage
of unemployed individuals and
rate of violent crimes:
Scatter plots with the percentage
of unemployed individuals on x-axis
and violent crime rates on y-axis.
This plot indicates a relationship
b/w both subjects:
A positive correlation would
suggest that higher unemployment
rates are associated with higher
crime rates.

d) Different in violent crime rates
b/w urban and rural areas?
Two separate histograms or
box plots comparing violent
crime rates in urban and rural
areas. This visualization will
help determine a significant diff.

e) Relationship b/w racial demographics
and violent crime rates:
Multiple bar charts or a stacked
bar chart showing the breakdown
of violent crime rates by racial
demographics.

f) Impact of sworn full-time police officers on reducing crime rates
Scatter plots with number of sworn full time officers on x-axis and violent crime rate on y-axis.

g) Correlation b/w the median year of housing units built and violent crime rates:
Scatter plot with median year of housing units built on x-axis and violent crime rate on y-axis

h) Impact of the presence of units deployed on violent crime rates:
in comparison plot showing violent crime rates in areas w/o deployed gang unit
This will help in assessing.

i) Relationship b/w the percentage of households with public assistance income and violent crime rates:
→ Scatter plot with percentage of households with public assistance income on x-axis and violent crime rate on y-axis.

i) Impact of population density on the rate of violent crimes: Scatter plot with population density on x-axis and violent crime rate on y-axis.
This will help in determine if there is a correlation.