```
#Step 1: Read the CSV file
data<- read.csv("C:/Users/tbkcpu/Desktop/CreditFraudLevel2.csv")

# Step 2: Explore the data structure
str(data)

# Step 3: Create a bar chart of fraud occurrence by device
# Assuming Device_Information is categorical and Fraud_Flag_or_Label is binary (0 or 1)
fraud_counts <- table(data$Device_Information, data$Fraud_Flag_or_Label)
fraud_rates <- fraud_counts[, 2] / rowSums(fraud_counts)

 # Define colors for each device type directly mapped to levels in Device_Information
 colors <- c(Mobile = "gray", Desktop = "orange", Tablet = "yellow")

 # Plotting the bar chart with specified colors
 barplot(fraud_rates,
        main = "Fraud Rate by Device",
        xlab = "Device Information",
        ylab = "Fraud Rate",
        col = colors[data$Device_Information],
        ylim = c(0, 1),
        names.arg = unique(data$Device_Information))

# Adding text labels for fraud rates on top of each bar
 text(x = barplot(fraud_rates, plot = FALSE), y = fraud_rates, label = round(fraud_rates, 2), pos = 3,
cex = 0.8)

# Step 4: Check Chi-Square Test of Independence assumptions and handle violations
# Assumptions:
```

```
#  a. Observations are independent: Each credit card transaction is independent from another credit card transaction.

#  b. Expected frequencies are not too small: Ensure all expected frequencies are greater than or equal to 5.

expected_freq <- chisq_result$expected

if (any(expected_freq < 5)) {

  stop("Chi-Square test cannot be performed because expected frequencies are too small.")

}

# c. Categorial Data: Device_Information is categorical with entries Desktop, Mobile, and Tablet and Fraud_Flag_or_Label is categorical with 0 for no fraud or 1 for fraud.


# Step 5: Run Chi-Square test chisq_result <- chisq.test(fraud_counts)


# Step 6: Print Chi-Square test results

print(chisq_result)


# Step 7: Print Chi-Square Test results at 95% confidence level

cat("Chi-Square Test of Independence Results:\n")

cat("-------------------------------------------------\n")

cat("Chi-Square Test Statistic:", chisq_result$statistic, "\n")

cat("Degrees of Freedom:", chisq_result$parameter, "\n")

cat("P-value:", chisq_result$p.value, "\n")

cat("\n")


# Step 8 Interpret the results at 95% confidence level

alpha <- 0.05

if (chisq_result$p.value < alpha) {

  cat("Conclusion: There is a significant difference in the occurrence of fraud between credit card transactions made on a desktop, mobile, or tablet.\n")

} else {
```

```
  cat("Conclusion: There is no significant difference in the occurrence of fraud between credit card transactions made on a desktop, mobile, or tablet.\n")

}
```