# GAMPALA VARUN TEJA

# 21BCE9207

# ASSIGNMENT-2

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:

```
print(sns.get_dataset_names())
```

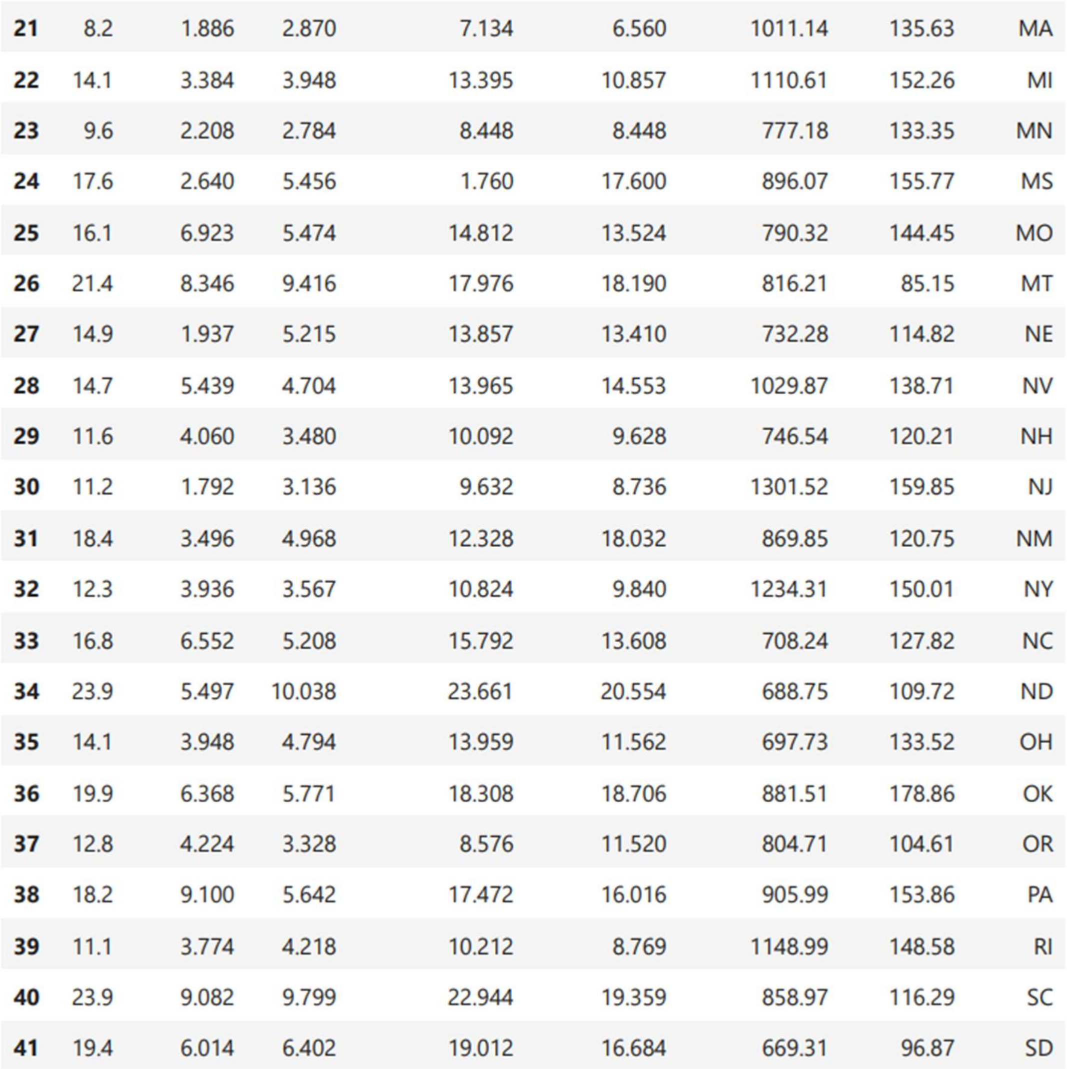
```
['anagrams', 'anscombe', 'attention', 'brain_networks', 'car_crashes', 'diamonds', 'dots', 'dowjones', 'exercise', 'fli
ghts', 'fmri', 'geyser', 'glue', 'healthexp', 'iris', 'mpg', 'penguins', 'planets', 'seaice', 'taxis', 'tips', 'titani
c']
```

In [3]:

```
df=sns.load_dataset('car_crashes')
df
```

Out[3]:

| | total | speeding | alcohol | not_distracted | no_previous | ins_premium | ins_losses | abbrev |
|---|---|---|---|---|---|---|---|---|
| **0** | 18.8 | 7.332 | 5.640 | 18.048 | 15.040 | 784.55 | 145.08 | AL |
| **1** | 18.1 | 7.421 | 4.525 | 16.290 | 17.014 | 1053.48 | 133.93 | AK |
| **2** | 18.6 | 6.510 | 5.208 | 15.624 | 17.856 | 899.47 | 110.35 | AZ |
| **3** | 22.4 | 4.032 | 5.824 | 21.056 | 21.280 | 827.34 | 142.39 | AR |
| **4** | 12.0 | 4.200 | 3.360 | 10.920 | 10.680 | 878.41 | 165.63 | CA |
| **5** | 13.6 | 5.032 | 3.808 | 10.744 | 12.920 | 835.50 | 139.91 | CO |
| **6** | 10.8 | 4.968 | 3.888 | 9.396 | 8.856 | 1068.73 | 167.02 | CT |
| **7** | 16.2 | 6.156 | 4.860 | 14.094 | 16.038 | 1137.87 | 151.48 | DE |
| **8** | 5.9 | 2.006 | 1.593 | 5.900 | 5.900 | 1273.89 | 136.05 | DC |
| **9** | 17.9 | 3.759 | 5.191 | 16.468 | 16.826 | 1160.13 | 144.18 | FL |
| **10** | 15.6 | 2.964 | 3.900 | 14.820 | 14.508 | 913.15 | 142.80 | GA |
| **11** | 17.5 | 9.450 | 7.175 | 14.350 | 15.225 | 861.18 | 120.92 | HI |
| **12** | 15.3 | 5.508 | 4.437 | 13.005 | 14.994 | 641.96 | 82.75 | ID |
| **13** | 12.8 | 4.608 | 4.352 | 12.032 | 12.288 | 803.11 | 139.15 | IL |
| **14** | 14.5 | 3.625 | 4.205 | 13.775 | 13.775 | 710.46 | 108.92 | IN |
| **15** | 15.7 | 2.669 | 3.925 | 15.229 | 13.659 | 649.06 | 114.47 | IA |
| **16** | 17.8 | 4.806 | 4.272 | 13.706 | 15.130 | 780.45 | 133.80 | KS |
| **17** | 21.4 | 4.066 | 4.922 | 16.692 | 16.264 | 872.51 | 137.13 | KY |
| **18** | 20.5 | 7.175 | 6.765 | 14.965 | 20.090 | 1281.55 | 194.78 | LA |
| **19** | 15.1 | 5.738 | 4.530 | 13.137 | 12.684 | 661.88 | 96.57 | ME |
| **20** | 12.5 | 4.250 | 4.000 | 8.875 | 12.375 | 1048.78 | 192.70 | MD |



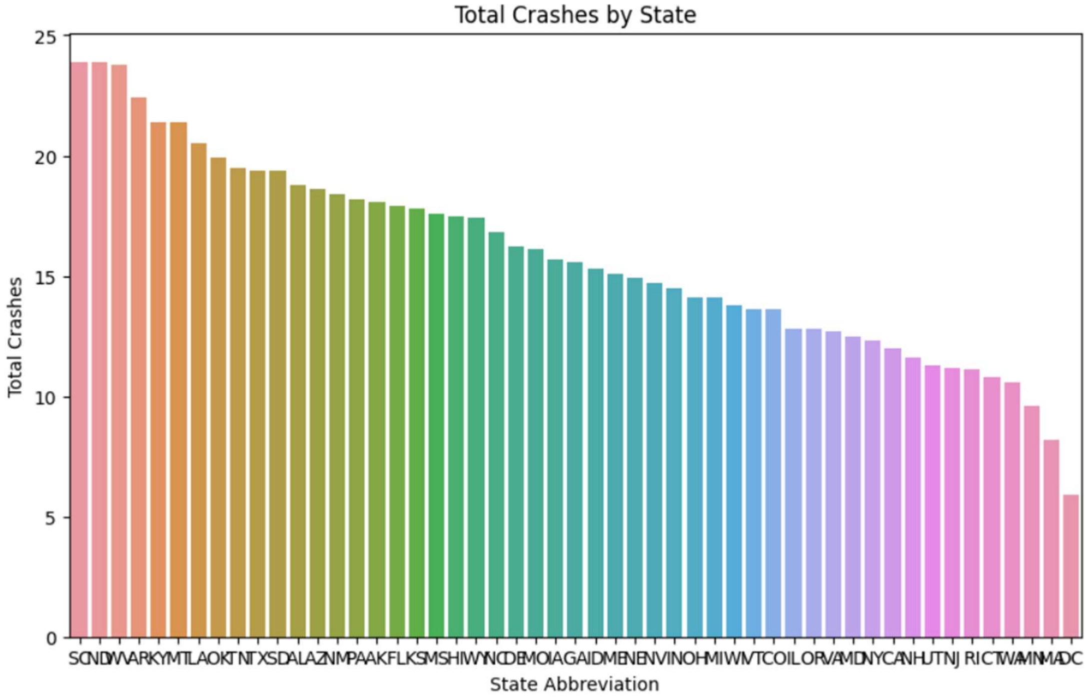
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **21** | 8.2 | 1.886 | 2.870 | 7.134 | 6.560 | 1011.14 | 135.63 | MA |
| **22** | 14.1 | 3.384 | 3.948 | 13.395 | 10.857 | 1110.61 | 152.26 | MI |
| **23** | 9.6 | 2.208 | 2.784 | 8.448 | 8.448 | 777.18 | 133.35 | MN |
| **24** | 17.6 | 2.640 | 5.456 | 1.760 | 17.600 | 896.07 | 155.77 | MS |
| **25** | 16.1 | 6.923 | 5.474 | 14.812 | 13.524 | 790.32 | 144.45 | MO |
| **26** | 21.4 | 8.346 | 9.416 | 17.976 | 18.190 | 816.21 | 85.15 | MT |
| **27** | 14.9 | 1.937 | 5.215 | 13.857 | 13.410 | 732.28 | 114.82 | NE |
| **28** | 14.7 | 5.439 | 4.704 | 13.965 | 14.553 | 1029.87 | 138.71 | NV |
| **29** | 11.6 | 4.060 | 3.480 | 10.092 | 9.628 | 746.54 | 120.21 | NH |
| **30** | 11.2 | 1.792 | 3.136 | 9.632 | 8.736 | 1301.52 | 159.85 | NJ |
| **31** | 18.4 | 3.496 | 4.968 | 12.328 | 18.032 | 869.85 | 120.75 | NM |
| **32** | 12.3 | 3.936 | 3.567 | 10.824 | 9.840 | 1234.31 | 150.01 | NY |
| **33** | 16.8 | 6.552 | 5.208 | 15.792 | 13.608 | 708.24 | 127.82 | NC |
| **34** | 23.9 | 5.497 | 10.038 | 23.661 | 20.554 | 688.75 | 109.72 | ND |
| **35** | 14.1 | 3.948 | 4.794 | 13.959 | 11.562 | 697.73 | 133.52 | OH |
| **36** | 19.9 | 6.368 | 5.771 | 18.308 | 18.706 | 881.51 | 178.86 | OK |
| **37** | 12.8 | 4.224 | 3.328 | 8.576 | 11.520 | 804.71 | 104.61 | OR |
| **38** | 18.2 | 9.100 | 5.642 | 17.472 | 16.016 | 905.99 | 153.86 | PA |
| **39** | 11.1 | 3.774 | 4.218 | 10.212 | 8.769 | 1148.99 | 148.58 | RI |
| **40** | 23.9 | 9.082 | 9.799 | 22.944 | 19.359 | 858.97 | 116.29 | SC |
| **41** | 19.4 | 6.014 | 6.402 | 19.012 | 16.684 | 669.31 | 96.87 | SD |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **42** | 19.5 | 4.095 | 5.655 | 15.990 | 15.795 | 767.91 | 155.57 | TN |
| **43** | 19.4 | 7.760 | 7.372 | 17.654 | 16.878 | 1004.75 | 156.83 | TX |
| **44** | 11.3 | 4.859 | 1.808 | 9.944 | 10.848 | 809.38 | 109.48 | UT |
| **45** | 13.6 | 4.080 | 4.080 | 13.056 | 12.920 | 716.20 | 109.61 | VT |
| **46** | 12.7 | 2.413 | 3.429 | 11.049 | 11.176 | 768.95 | 153.72 | VA |
| **47** | 10.6 | 4.452 | 3.498 | 8.692 | 9.116 | 890.03 | 111.62 | WA |
| **48** | 23.8 | 8.092 | 6.664 | 23.086 | 20.706 | 992.61 | 152.56 | WV |
| **49** | 13.8 | 4.968 | 4.554 | 5.382 | 11.592 | 670.31 | 106.62 | WI |
| **50** | 17.4 | 7.308 | 5.568 | 14.094 | 15.660 | 791.14 | 122.04 | WY |

In [5]:

```
plt.figure(figsize=(10, 6))
sns.barplot(x='abbrev', y='total', data=df.sort_values(by='total', ascending=False))
plt.xlabel('State Abbreviation')
plt.ylabel('Total Crashes')
plt.title('Total Crashes by State')
plt.show()
```

```
C:\Users\kumar\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_ca
tegorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
```

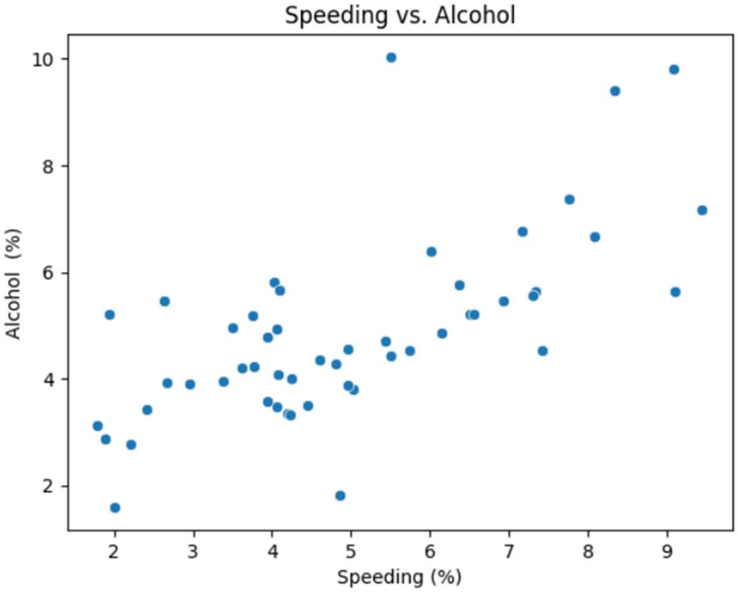


Here we can see that highest no.of crashes of 24 are in state SC ,ND And lowest no.of crashes of 6 in state DC

In [6]:

```
sns.scatterplot(x='speeding',y='alcohol',data=df)
plt.xlabel('Speeding (%)')
plt.ylabel('Alcohol  (%)')
plt.title('Speeding vs. Alcohol')
plt.show()
```

```
C:\Users\kumar\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_ca
tegorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
```

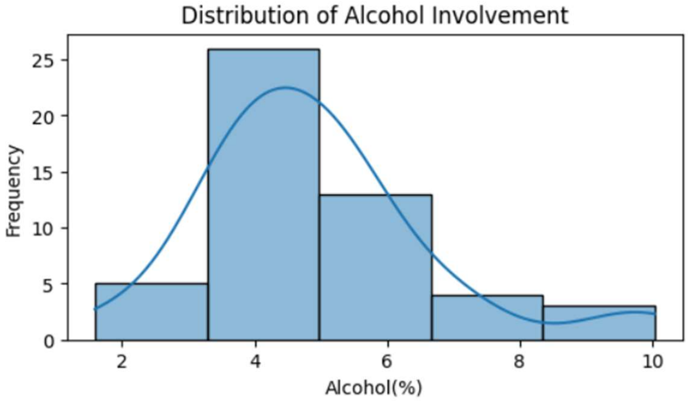


Here we can see there are more crashes at speeding and alcohol between 4-5 percent

In [7]:

```
plt.figure(figsize=(6, 3))
sns.histplot(df['alcohol'], bins=5, kde=True)
plt.xlabel('Alcohol(%)')
plt.ylabel('Frequency')
plt.title('Distribution of Alcohol Involvement')
plt.show()
```

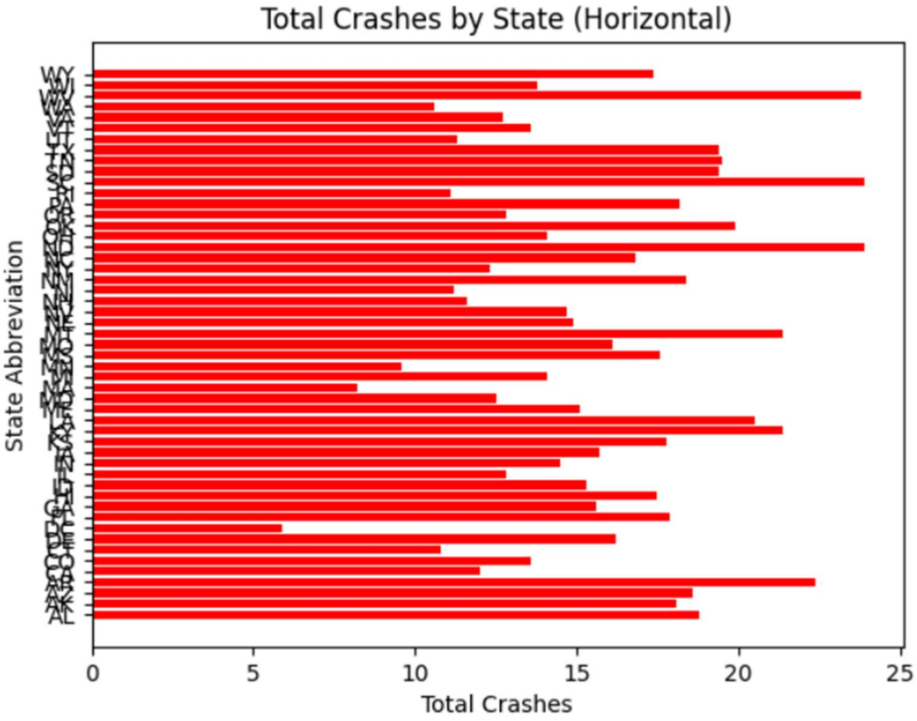
```
C:\Users\kumar\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_ca
tegorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
```



Here we can see in the histogram that alcohol percentage is mostly between 4-5 percent

In [8]:

```
plt.barh(df['abbrev'], df['total'],color="red")
plt.xlabel('Total Crashes')
plt.ylabel('State Abbreviation')
plt.title('Total Crashes by State (Horizontal)')
plt.show()
```

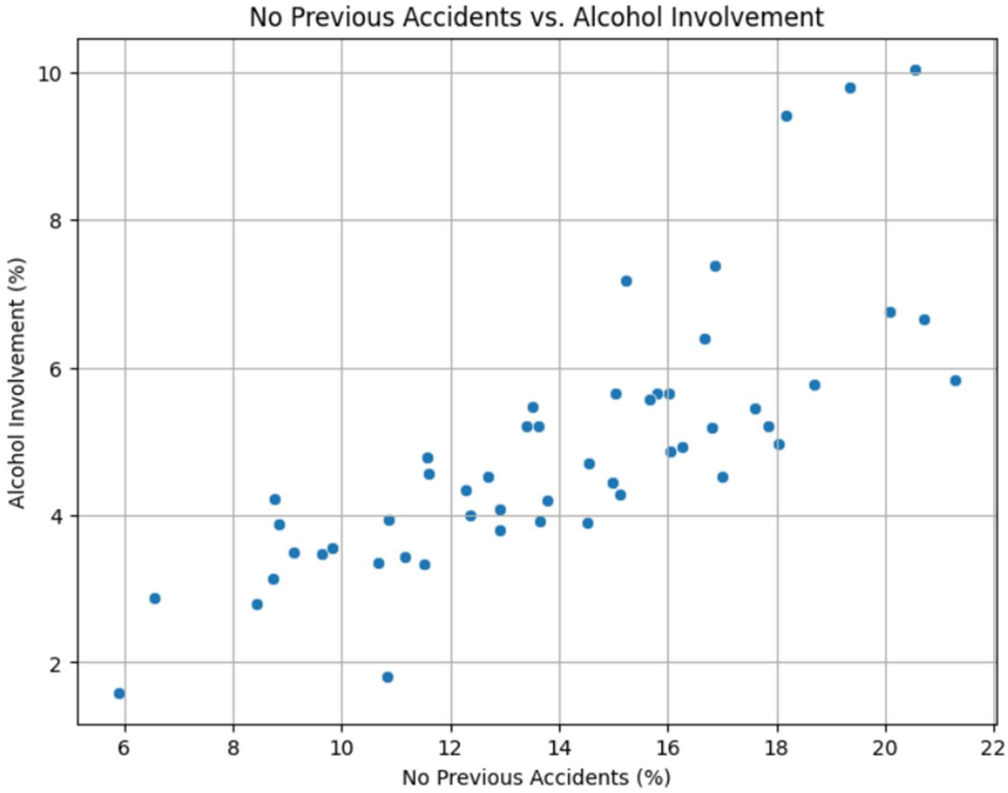


Here we can see that highest no.of crashes of 24 are in state SC And lowest no.of crashes of 6 in state DC

In [9]:

```
x = df['no_previous']
y = df['alcohol']

plt.figure(figsize=(8, 6))
sns.scatterplot(x=x, y=y)
plt.xlabel('No Previous Accidents (%)')
plt.ylabel('Alcohol Involvement (%)')
plt.title('No Previous Accidents vs. Alcohol Involvement')
plt.grid(True)
plt.show()
```

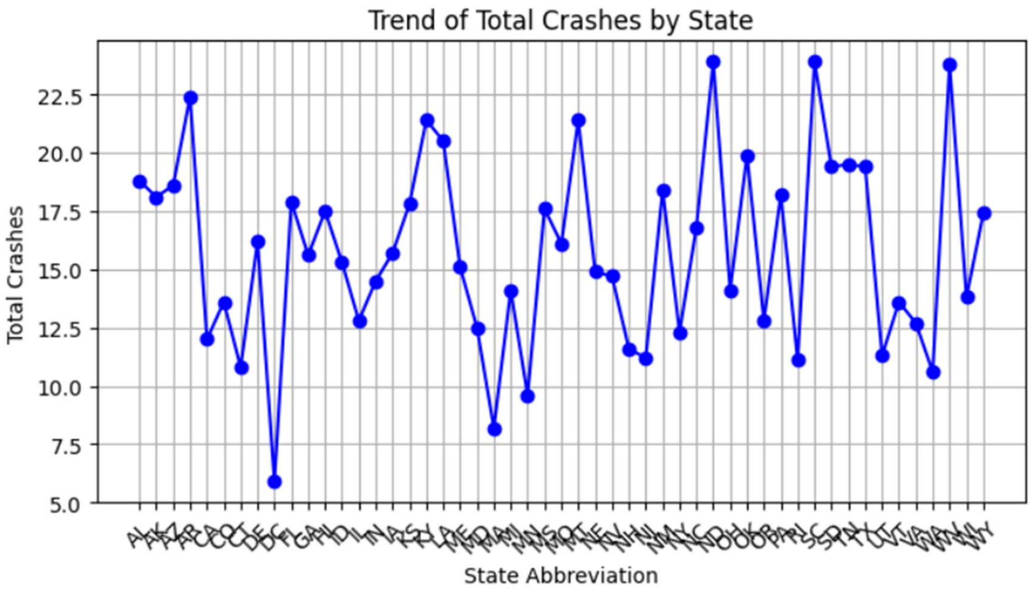
```
C:\Users\kumar\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_ca
tegorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
```



Here we can see that Accidents percentage is less when the alcohol consumption is less

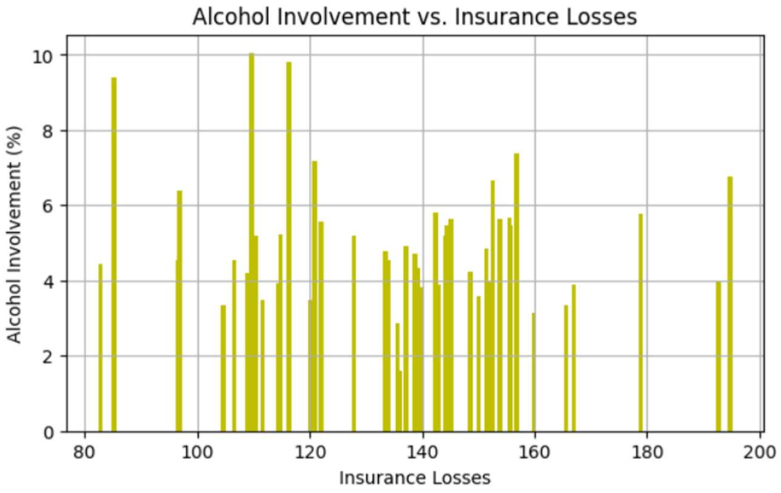
In [10]:

```
x = df['abbrev']
y = df['total']

# Create a line plot
plt.figure(figsize=(8, 4))
plt.plot(x, y, marker='o', linestyle='-', color='b')
plt.xlabel('State Abbreviation')
plt.ylabel('Total Crashes')
plt.title('Trend of Total Crashes by State')
plt.xticks(rotation=45)
plt.grid(True)
plt.show()
```



This is the lineplot between total crashes and States

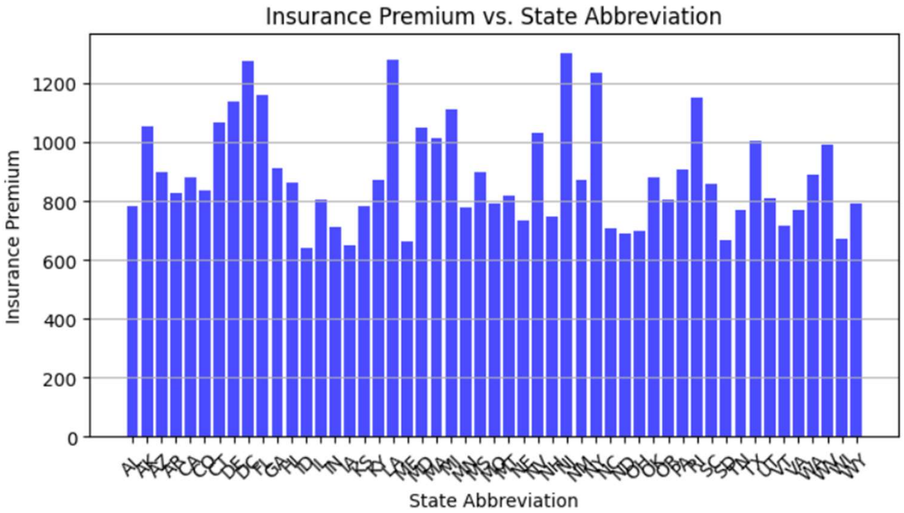
```
In [15]:
plt.figure(figsize=(7, 4))
plt.bar( df['ins_losses'],df['alcohol'], color='y')
plt.ylabel('Alcohol Involvement (%)')
plt.xlabel('Insurance Losses')
plt.title('Alcohol Involvement vs. Insurance Losses')
plt.grid(True)
plt.show()
```



Insurance loss is more for the Alcohol consumption

In [16]:

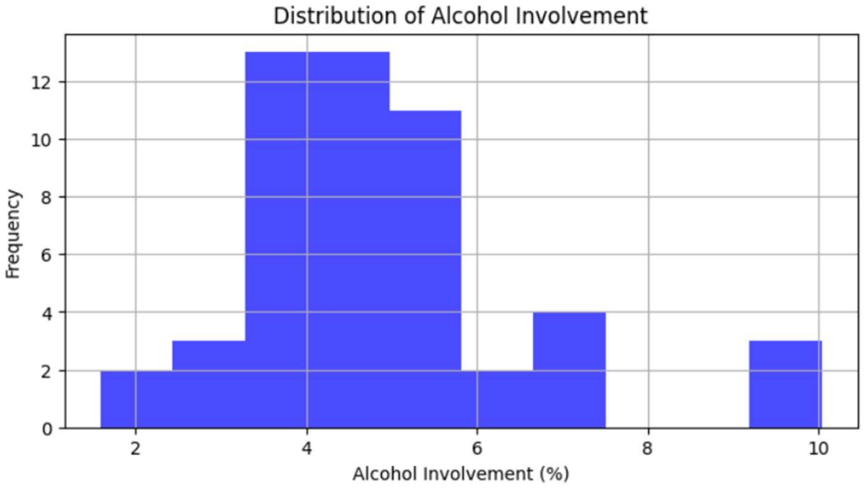
```
plt.figure(figsize=(8, 4))
plt.bar(df['abbrev'], df['ins_premium'], color='b', alpha=0.7)
plt.xlabel('State Abbreviation')
plt.ylabel('Insurance Premium')
plt.title('Insurance Premium vs. State Abbreviation')
plt.xticks(rotation=45)
plt.grid(axis='y')
plt.show()
```



From this we can say that almost many states have insurance premium for more than 600 people The highest percentage is for state NI And the lowest percentage is for the state TD

In [17]:

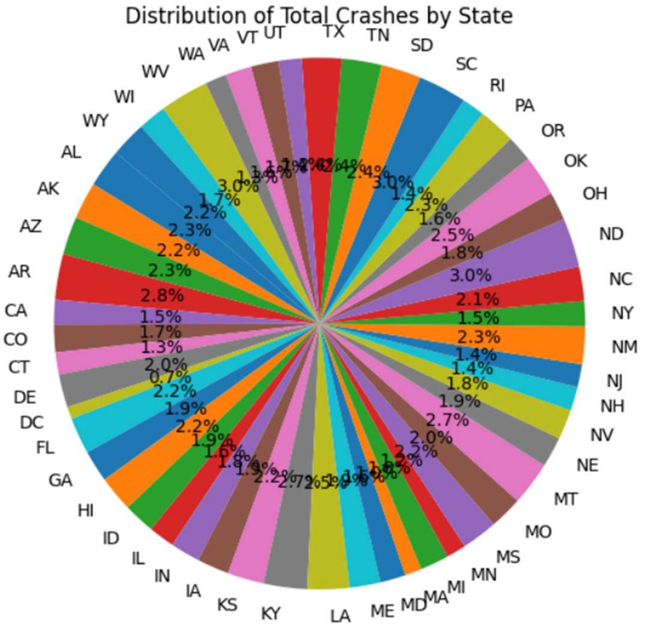
```
plt.figure(figsize=(8, 4))
plt.hist(df['alcohol'], bins=10, color='b', alpha=0.7)
plt.xlabel('Alcohol Involvement (%)')
plt.ylabel('Frequency')
plt.title('Distribution of Alcohol Involvement')
plt.grid(True)
plt.show()
```



The maximum alcohol consumption is between 4-5

In [18]:

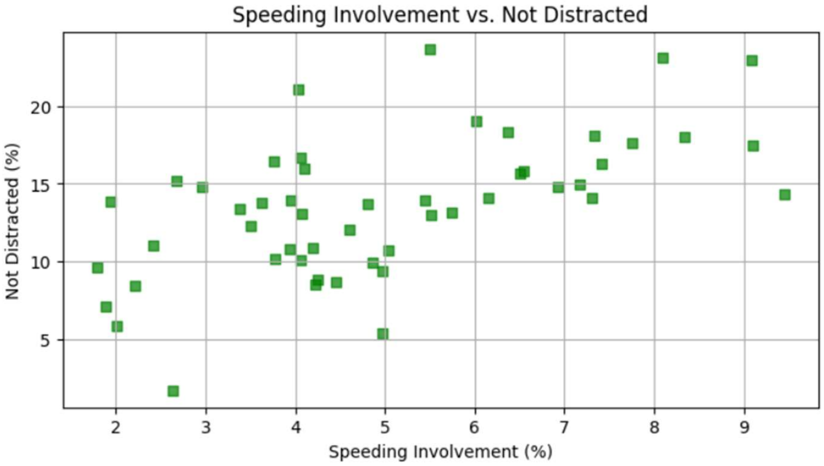
```
plt.figure(figsize=(6, 6))
plt.pie(df['total'], labels=df['abbrev'], autopct='%1.1f%%', startangle=140)
plt.axis('equal')
plt.title('Distribution of Total Crashes by State')
plt.show()
```



The states with maximum percentage of crashes are WV , SC with 3.0% The states with minimum percentage of crashes are DC with 0.7%

In [19]:

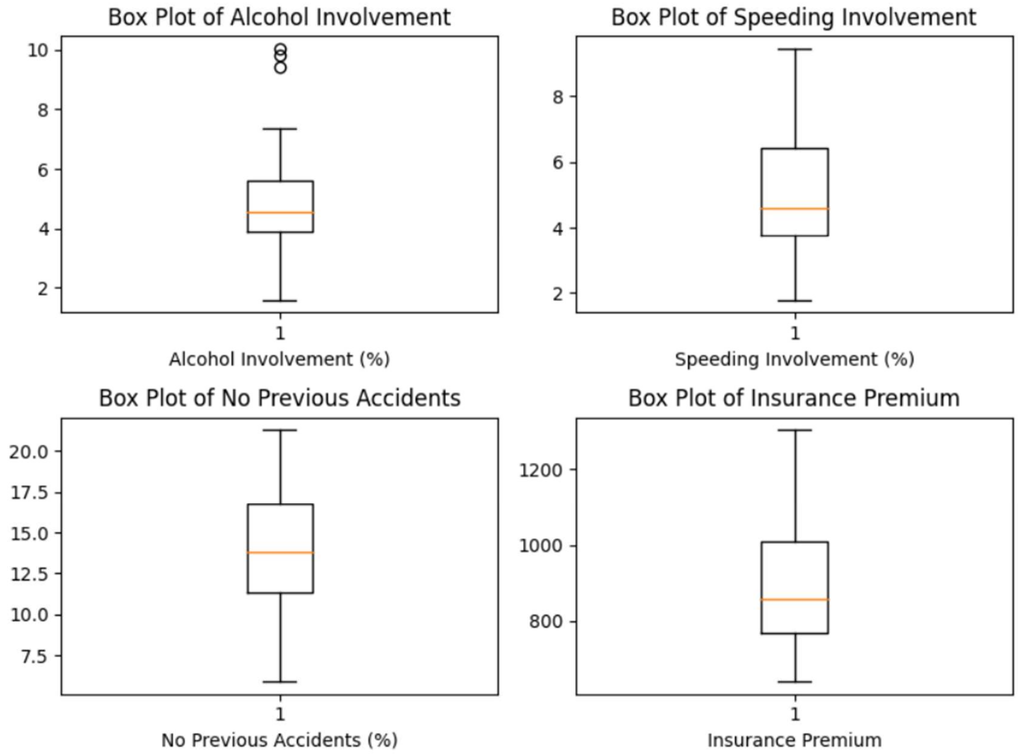
```
plt.figure(figsize=(8, 4))
plt.scatter(df['speeding'], df['not_distracted'], marker='s', color='g', alpha=0.7)
plt.xlabel('Speeding Involvement (%)')
plt.ylabel('Not Distracted (%)')
plt.title('Speeding Involvement vs. Not Distracted')
plt.grid(True)
plt.show()
```



We can see that people with maintaining less speed have high chances of not to distract

In [20]:

```
plt.figure(figsize=(8, 6))

# Box Plot 1: Alcohol Involvement
plt.subplot(2,2,1)
plt.boxplot(df['alcohol'])
plt.xlabel('Alcohol Involvement (%)')
plt.title('Box Plot of Alcohol Involvement')

# Box Plot 2: Speeding Involvement
plt.subplot(2,2,2)
plt.boxplot(df['speeding'])
plt.xlabel('Speeding Involvement (%)')
plt.title('Box Plot of Speeding Involvement')

# Box Plot 3: No Previous Accidents
plt.subplot(2,2,3)
plt.boxplot(df['no_previous'])
plt.xlabel('No Previous Accidents (%)')
plt.title('Box Plot of No Previous Accidents')

# Box Plot 4: Insurance Premium
plt.subplot(2,2,4)
plt.boxplot(df['ins_premium'])
plt.xlabel('Insurance Premium')
plt.title('Box Plot of Insurance Premium')

# Adjust spacing between subplots
plt.tight_layout()

# Show the subplots
plt.show()
```



Here we can see that for ALCOHOL minimum percentage is : 1.59 1st Quadratile : 3.89 Median : 4.56 3rd Quadratile : 5.60 Maximum : 10.03

for Speed minimum percentage is : 1.79 1st Quadratile : 3.76 Median : 4.60 3rd Quadratile : 6.43 Maximum : 9.45

for No previous Accidents minimum percentage is : 5.9 1st Quadratile : 11.34 Median : 13.77 3rd Quadratile : 16.75 Maximum :21.28

for Insurance premium Minimum: 641.96 1st Quartile : 768.43 Median : 858.97 3rd Quartile : 1007.94 Maximum: 1301.52

```
In [ ]:
```