Chit Hindocha

assignment-2

[1]:
```
import seaborn as sns
import matplotlib.pyplot as plt
```

[2]:
```
data = sns.load_dataset('car_crashes')
data.head()
```

[2]:
```
   total  speeding  alcohol  not_distracted  no_previous  ins_premium  \
0   18.8     7.332    5.640          18.048       15.040       784.55
1   18.1     7.421    4.525          16.290       17.014      1053.48
2   18.6     6.510    5.208          15.624       17.856       899.47
3   22.4     4.032    5.824          21.056       21.280       827.34
4   12.0     4.200    3.360          10.920       10.680       878.41

   ins_losses abbrev
0      145.08     AL
1      133.93     AK
2      110.35     AZ
3      142.39     AR
4      165.63     CA
```

[3]:
```
data.describe
```

[3]:
```
<bound method NDFrame.describe of     total  speeding  alcohol  not_distracted
no_previous  ins_premium  \
0    18.8     7.332    5.640          18.048       15.040       784.55
1    18.1     7.421    4.525          16.290       17.014      1053.48
2    18.6     6.510    5.208          15.624       17.856       899.47
3    22.4     4.032    5.824          21.056       21.280       827.34
4    12.0     4.200    3.360          10.920       10.680       878.41
5    13.6     5.032    3.808          10.744       12.920       835.50
6    10.8     4.968    3.888           9.396        8.856      1068.73
7    16.2     6.156    4.860          14.094       16.038      1137.87
8     5.9     2.006    1.593           5.900        5.900      1273.89
9    17.9     3.759    5.191          16.468       16.826      1160.13
10   15.6     2.964    3.900          14.820       14.508       913.15
11   17.5     9.450    7.175          14.350       15.225       861.18
12   15.3     5.508    4.437          13.005       14.994       641.96
```

13	12.8	4.608	4.352	12.032	12.288	803.11
14	14.5	3.625	4.205	13.775	13.775	710.46
15	15.7	2.669	3.925	15.229	13.659	649.06
16	17.8	4.806	4.272	13.706	15.130	780.45
17	21.4	4.066	4.922	16.692	16.264	872.51
18	20.5	7.175	6.765	14.965	20.090	1281.55
19	15.1	5.738	4.530	13.137	12.684	661.88
20	12.5	4.250	4.000	8.875	12.375	1048.78
21	8.2	1.886	2.870	7.134	6.560	1011.14
22	14.1	3.384	3.948	13.395	10.857	1110.61
23	9.6	2.208	2.784	8.448	8.448	777.18
24	17.6	2.640	5.456	1.760	17.600	896.07
25	16.1	6.923	5.474	14.812	13.524	790.32
26	21.4	8.346	9.416	17.976	18.190	816.21
27	14.9	1.937	5.215	13.857	13.410	732.28
28	14.7	5.439	4.704	13.965	14.553	1029.87
29	11.6	4.060	3.480	10.092	9.628	746.54
30	11.2	1.792	3.136	9.632	8.736	1301.52
31	18.4	3.496	4.968	12.328	18.032	869.85
32	12.3	3.936	3.567	10.824	9.840	1234.31
33	16.8	6.552	5.208	15.792	13.608	708.24
34	23.9	5.497	10.038	23.661	20.554	688.75
35	14.1	3.948	4.794	13.959	11.562	697.73
36	19.9	6.368	5.771	18.308	18.706	881.51
37	12.8	4.224	3.328	8.576	11.520	804.71
38	18.2	9.100	5.642	17.472	16.016	905.99
39	11.1	3.774	4.218	10.212	8.769	1148.99
40	23.9	9.082	9.799	22.944	19.359	858.97
41	19.4	6.014	6.402	19.012	16.684	669.31
42	19.5	4.095	5.655	15.990	15.795	767.91
43	19.4	7.760	7.372	17.654	16.878	1004.75
44	11.3	4.859	1.808	9.944	10.848	809.38
45	13.6	4.080	4.080	13.056	12.920	716.20
46	12.7	2.413	3.429	11.049	11.176	768.95
47	10.6	4.452	3.498	8.692	9.116	890.03
48	23.8	8.092	6.664	23.086	20.706	992.61
49	13.8	4.968	4.554	5.382	11.592	670.31
50	17.4	7.308	5.568	14.094	15.660	791.14

	ins_losses	abbrev
0	145.08	AL
1	133.93	AK
2	110.35	AZ
3	142.39	AR
4	165.63	CA
5	139.91	CO
6	167.02	CT

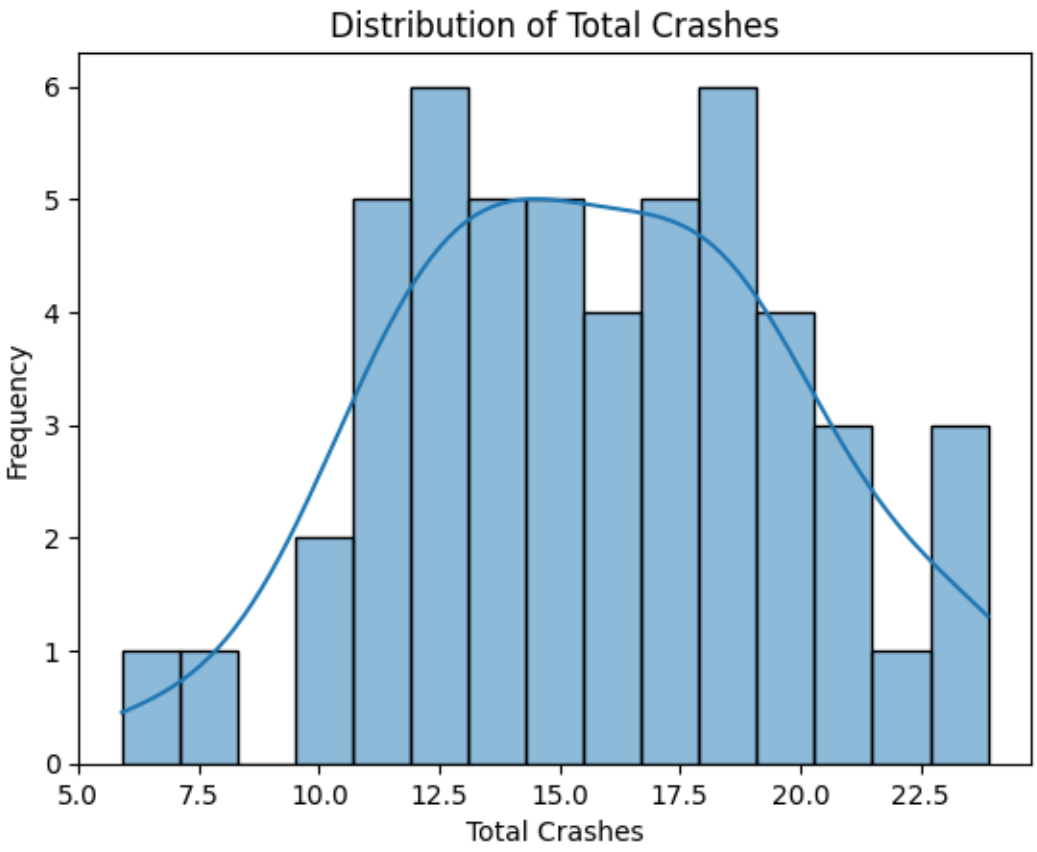
```
7       151.48     DE
8       136.05     DC
9       144.18     FL
10      142.80     GA
11      120.92     HI
12       82.75     ID
13      139.15     IL
14      108.92     IN
15      114.47     IA
16      133.80     KS
17      137.13     KY
18      194.78     LA
19       96.57     ME
20      192.70     MD
21      135.63     MA
22      152.26     MI
23      133.35     MN
24      155.77     MS
25      144.45     MO
26       85.15     MT
27      114.82     NE
28      138.71     NV
29      120.21     NH
30      159.85     NJ
31      120.75     NM
32      150.01     NY
33      127.82     NC
34      109.72     ND
35      133.52     OH
36      178.86     OK
37      104.61     OR
38      153.86     PA
39      148.58     RI
40      116.29     SC
41       96.87     SD
42      155.57     TN
43      156.83     TX
44      109.48     UT
45      109.61     VT
46      153.72     VA
47      111.62     WA
48      152.56     WV
49      106.62     WI
50      122.04     WY  >
```

[4]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 51 entries, 0 to 50
Data columns (total 8 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   total           51 non-null     float64
 1   speeding        51 non-null     float64
 2   alcohol         51 non-null     float64
 3   not_distracted  51 non-null     float64
 4   no_previous     51 non-null     float64
 5   ins_premium     51 non-null     float64
 6   ins_losses      51 non-null     float64
 7   abbrev          51 non-null     object
dtypes: float64(7), object(1)
memory usage: 3.3+ KB
```

0.1 Histogram of 'total' crashes

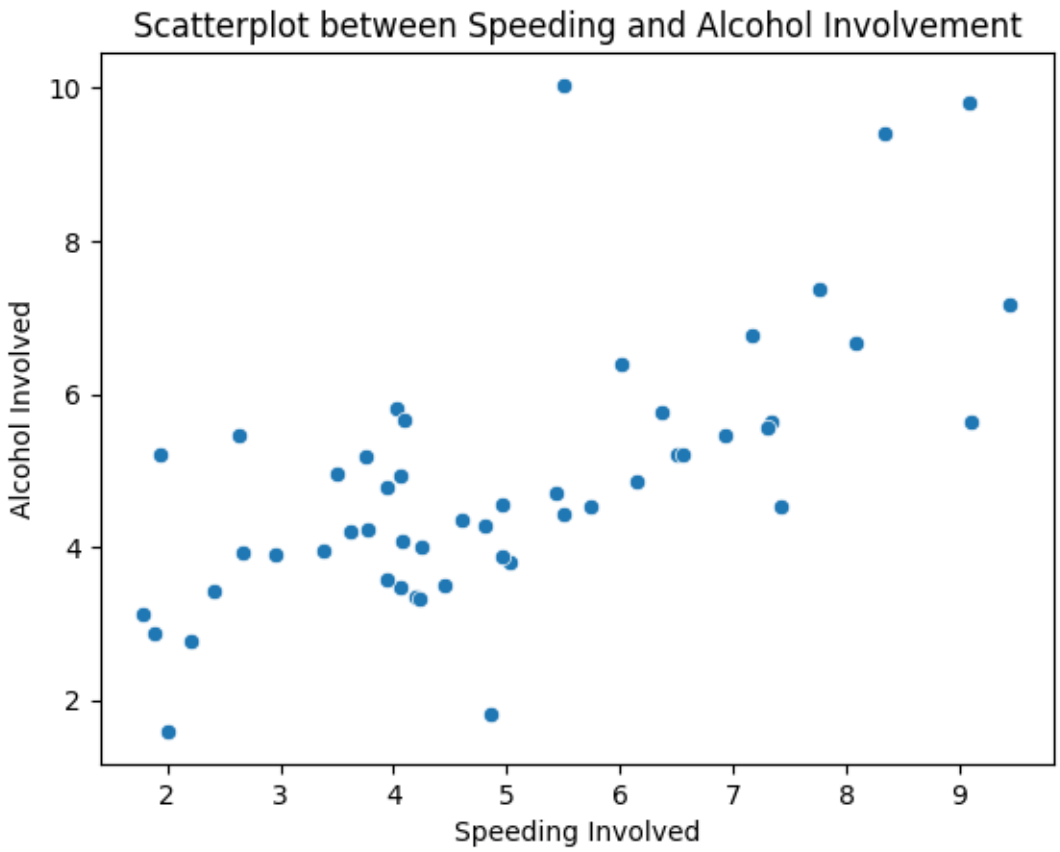
[5]:
```
sns.histplot(data['total'], bins=15, kde=True)
plt.xlabel('Total Crashes')
plt.ylabel('Frequency')
plt.title('Distribution of Total Crashes')
plt.show()
```



Inference: The histogram displays the distribution of total crashes. It appears to be right-skewed, Indicating that most cities have a relatively low number of total crashes.

0.2 Scatterplot between 'speeding' and 'alcohol' involvement

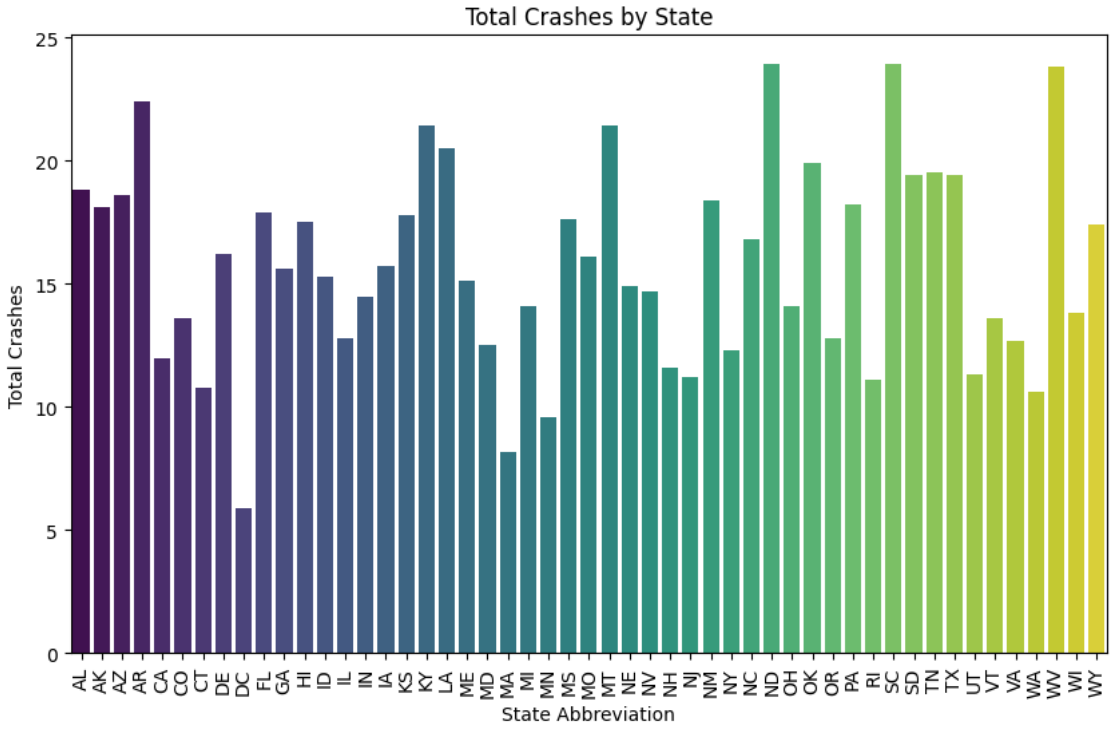
[6]:
```
sns.scatterplot(x='speeding', y='alcohol', data=data)
plt.xlabel('Speeding Involved')
plt.ylabel('Alcohol Involved')
plt.title('Scatterplot between Speeding and Alcohol Involvement')
plt.show()
```



Inference: The scatterplot illustrates the relationship between speeding and alcohol involvement. It seems that there is no strong linear relationship between these two variables.

0.3 Bar chart of 'abbrev' vs. 'total' crashes

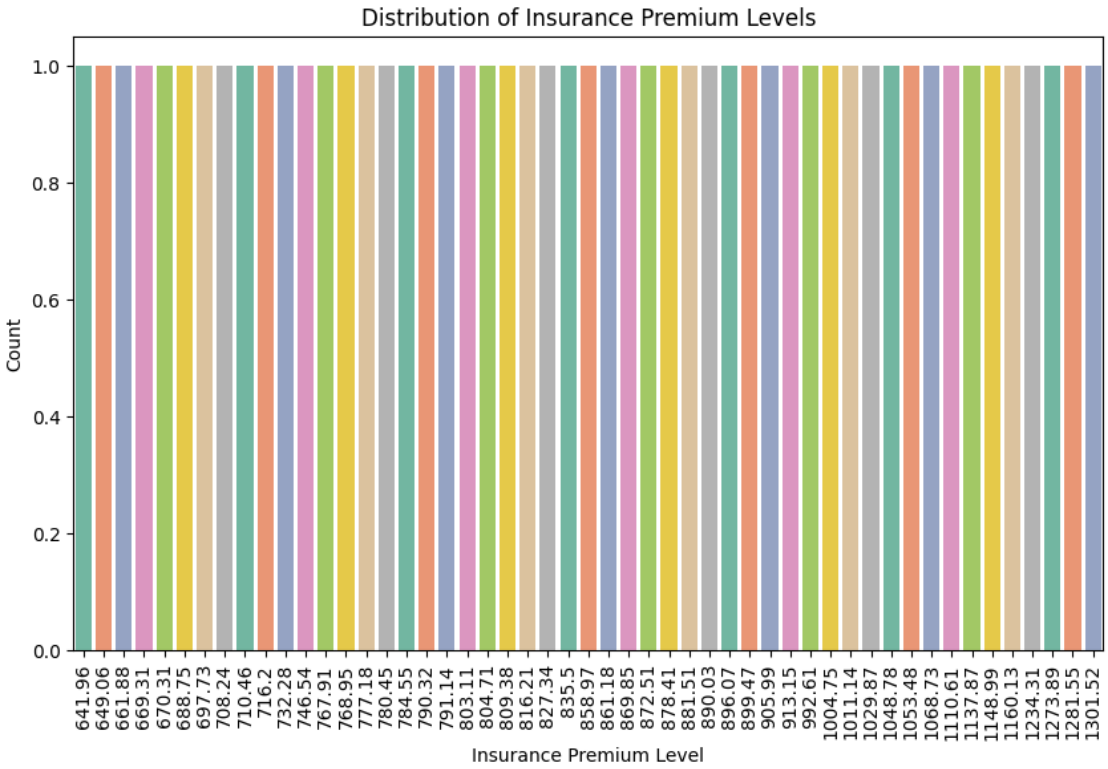
[7]:
```
plt.figure(figsize=(10, 6))
sns.barplot(x='abbrev', y='total', data=data, palette='viridis')
plt.xlabel('State Abbreviation')
plt.ylabel('Total Crashes')
plt.title('Total Crashes by State')
plt.xticks(rotation=90)
plt.show()
```



Inference: The bar chart displays the total crashes by state. For example, "SC" (South Carolina) Appears to have a relatively high number of total crashes compared to other states.

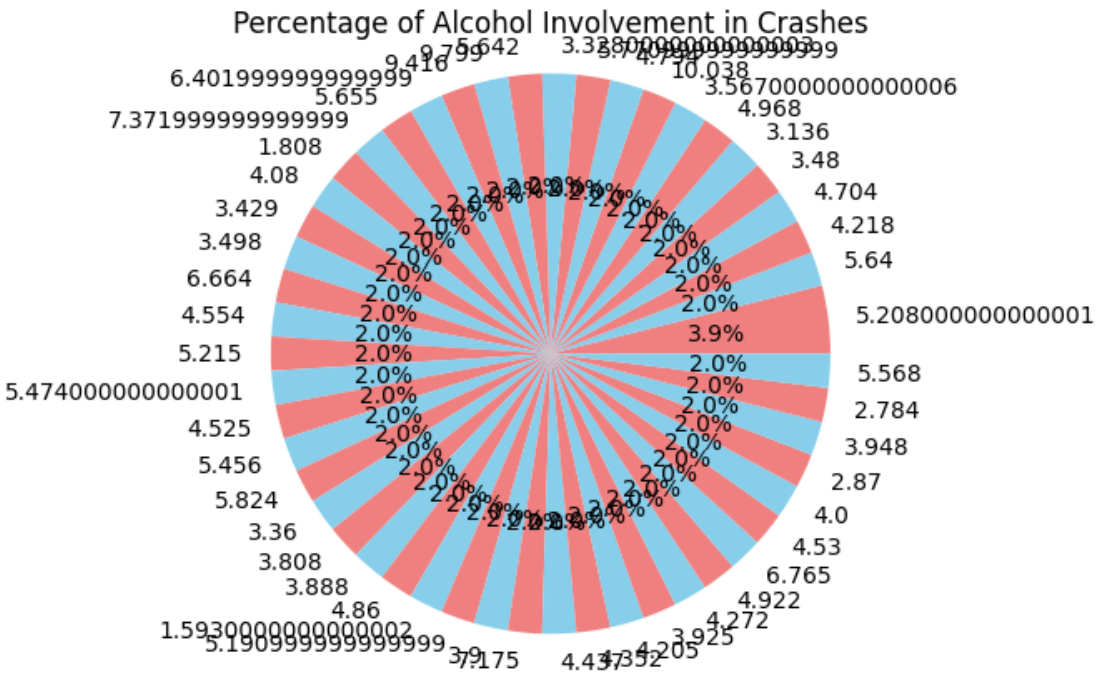
0.4 Countplot of 'ins_premium' bins

[8]:
```
plt.figure(figsize=(10, 6))
sns.countplot(x='ins_premium', data=data, palette='Set2')
plt.xlabel('Insurance Premium Level')
plt.ylabel('Count')
plt.title('Distribution of Insurance Premium Levels')
plt.xticks(rotation=90)
plt.show()
```



Inference: The countplot visualizes the distribution of insurance premium levels. It helps to see how many cities fall into each premium level category.

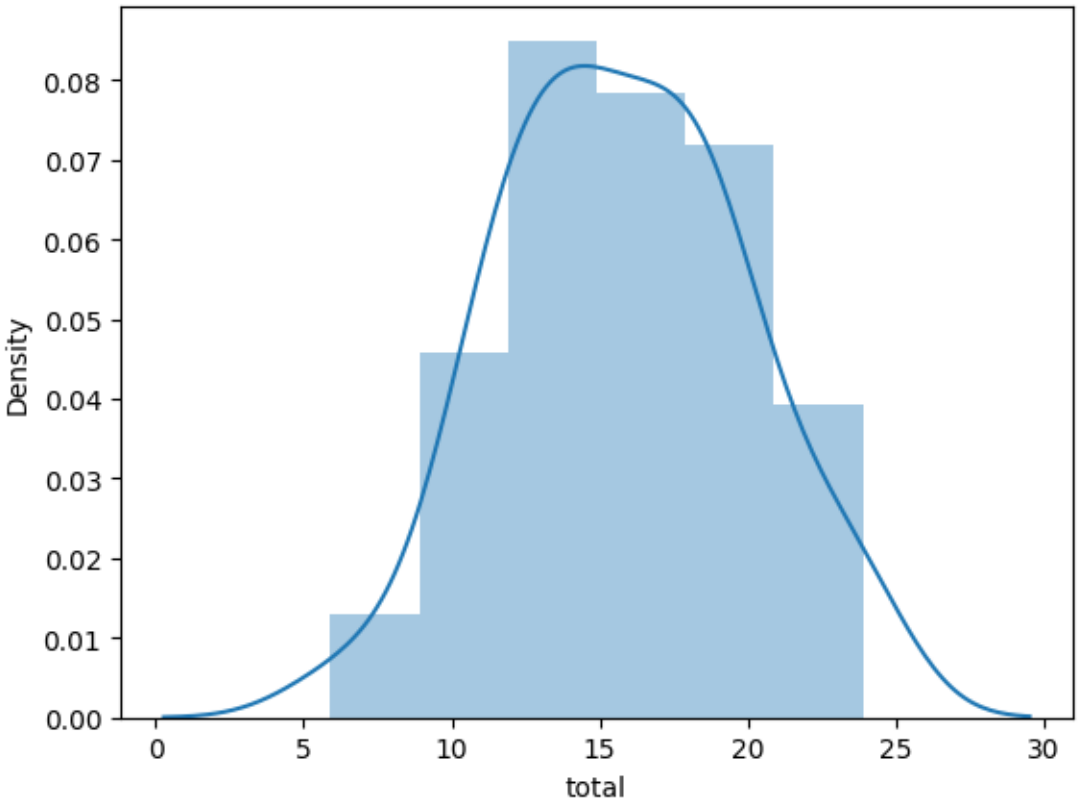
[9]:
```
alcohol_counts = data['alcohol'].value_counts()
plt.pie(alcohol_counts, labels=alcohol_counts.index, autopct='%1.1f%%',␣
 ↪colors=['lightcoral', 'skyblue'])
plt.title('Percentage of Alcohol Involvement in Crashes')
plt.axis('equal')
plt.show()
```



[10]:
```
sns.distplot(data['total'])
```

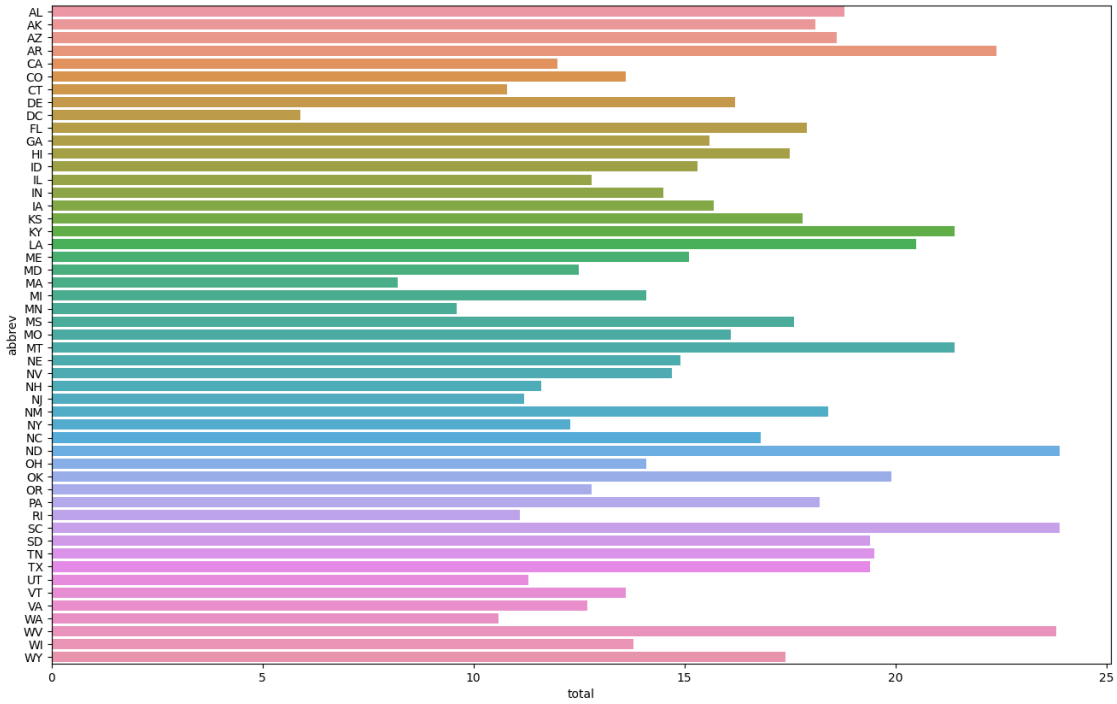
```
C:\Users\ASUS\AppData\Local\Temp\ipykernel_16716\3477427589.py:1: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  sns.distplot(data['total'])
```

[10]: <Axes: xlabel='total', ylabel='Density'>



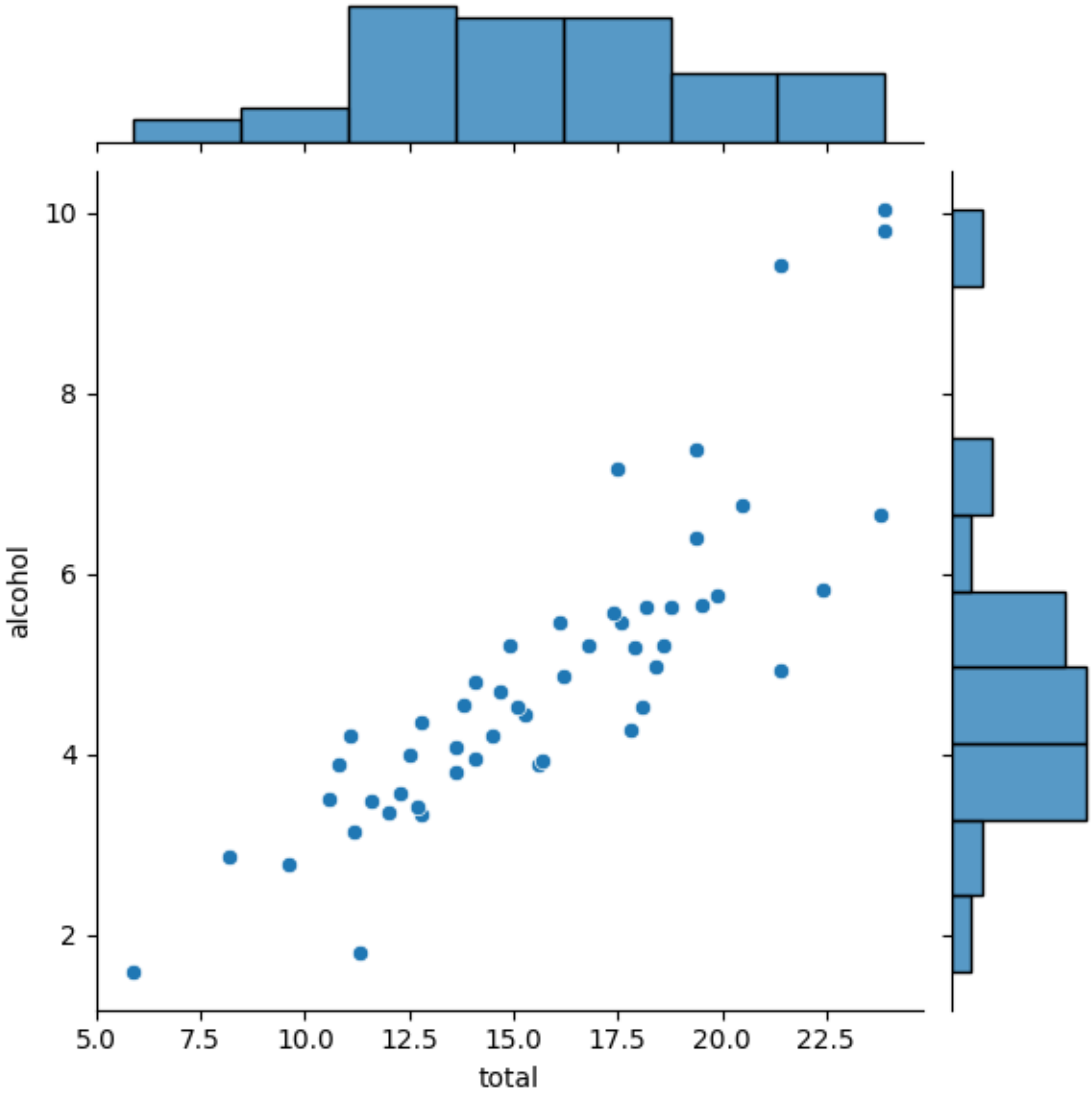
[11]:
```
plt.subplots(figsize=(16,10))
sns.barplot(x='total',y= 'abbrev',data=data,orient='h')
```

[11]: <Axes: xlabel='total', ylabel='abbrev'>



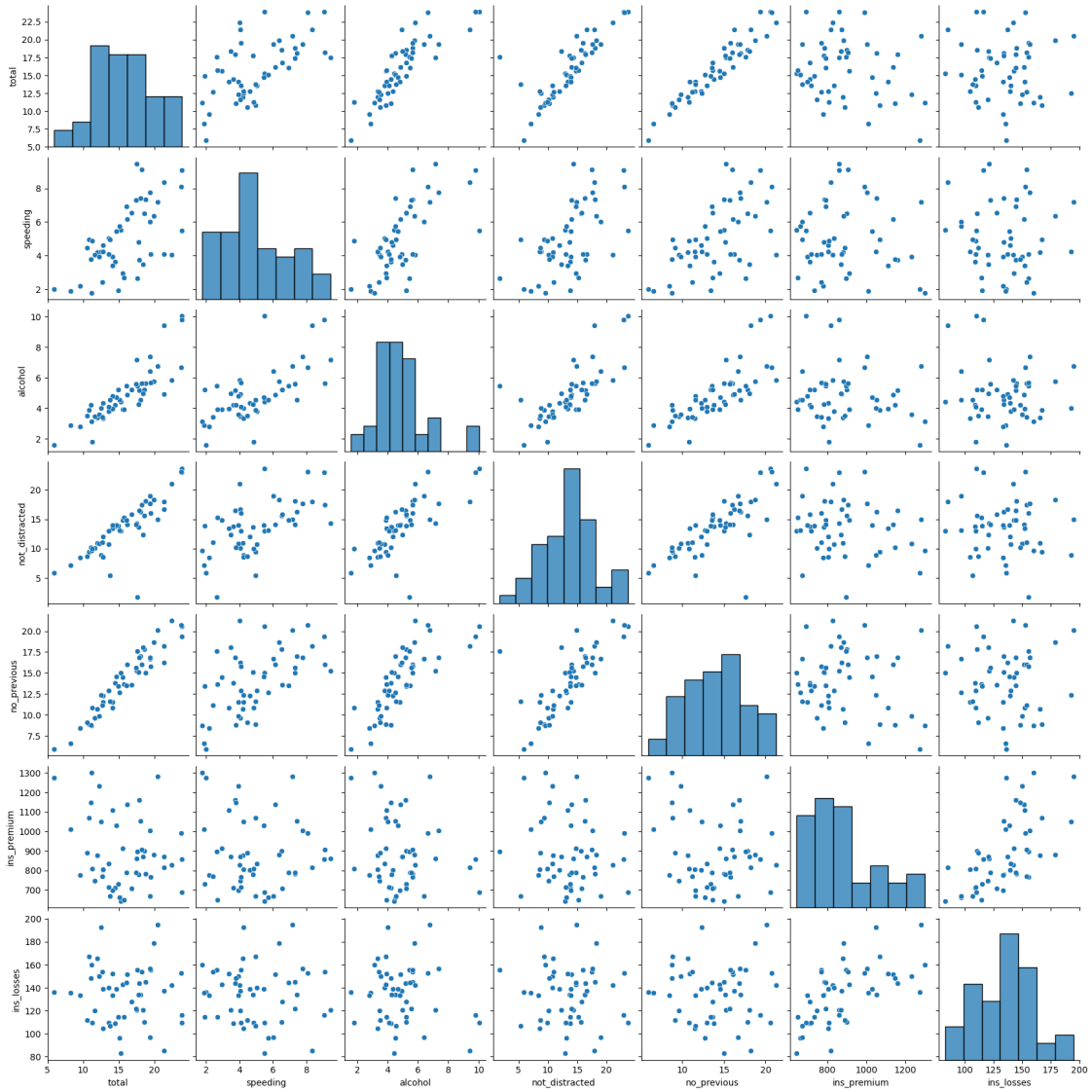
[12]:
```
sns.jointplot(x='total',y='alcohol',data=data)
```

[12]:
```
<seaborn.axisgrid.JointGrid at 0x1cf68d294e0>
```



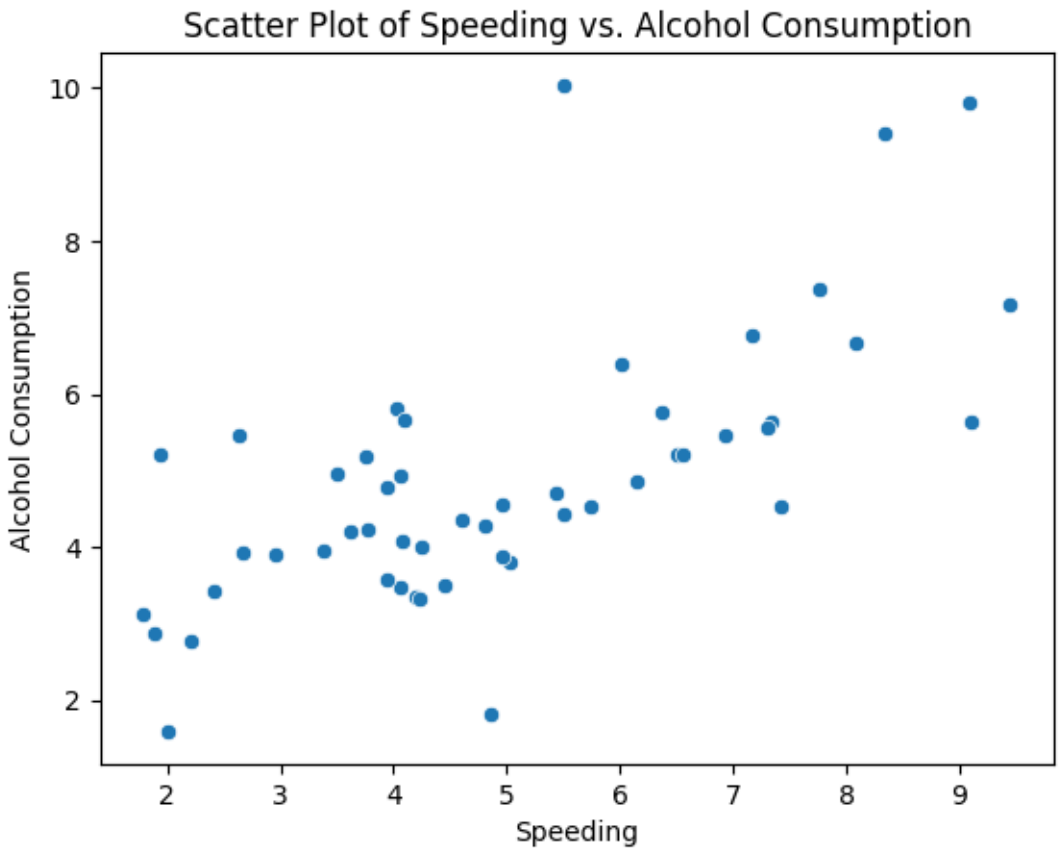
[13]:
```
sns.pairplot(data)
```

[13]: <seaborn.axisgrid.PairGrid at 0x1cf6a52ce50>



0.5 Scatter Plot

[14]:
```
sns.scatterplot(x="speeding", y="alcohol", data=data)
plt.xlabel("Speeding")
plt.ylabel("Alcohol Consumption")
plt.title("Scatter Plot of Speeding vs. Alcohol Consumption")
plt.show()
```

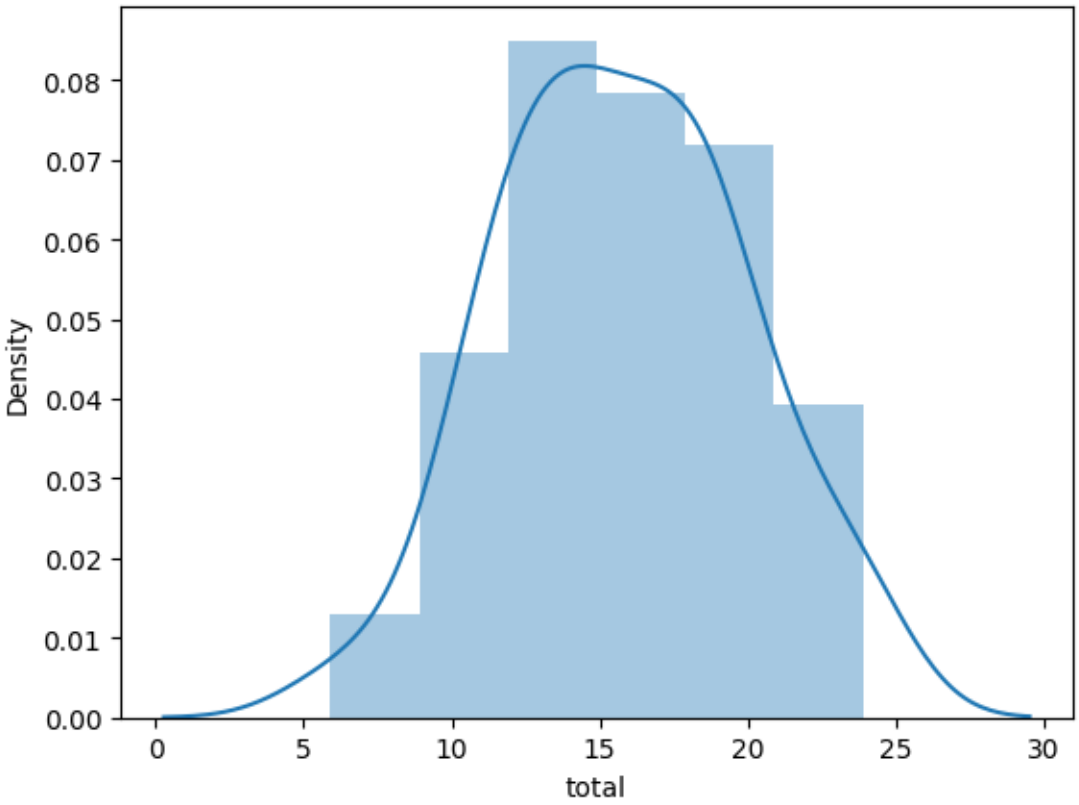


0.6 Histogram

[15]:
```
sns.distplot(data['total'])
```

```
C:\Users\ASUS\AppData\Local\Temp\ipykernel_16716\3477427589.py:1: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  sns.distplot(data['total'])
```

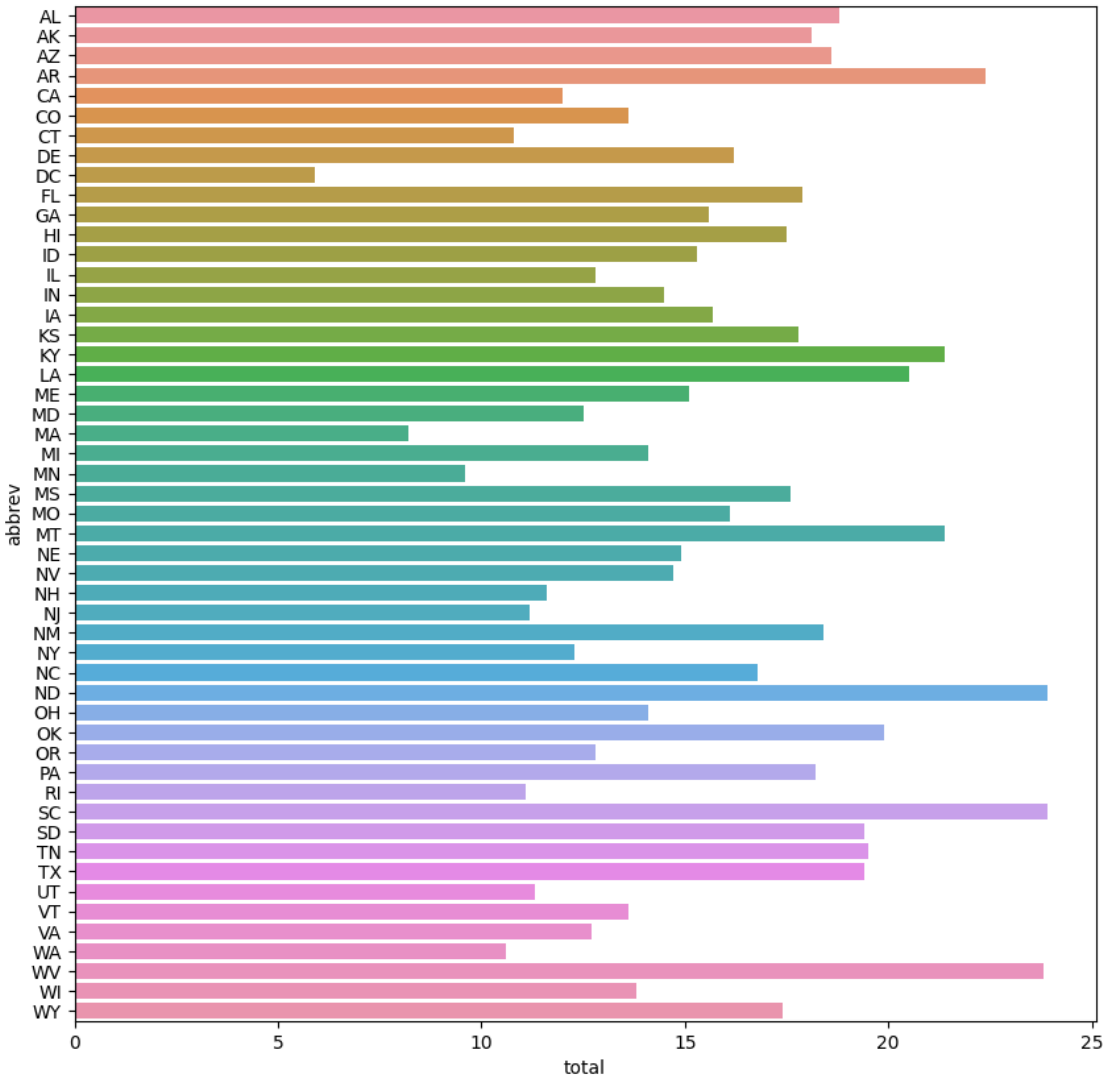
[15]: <Axes: xlabel='total', ylabel='Density'>



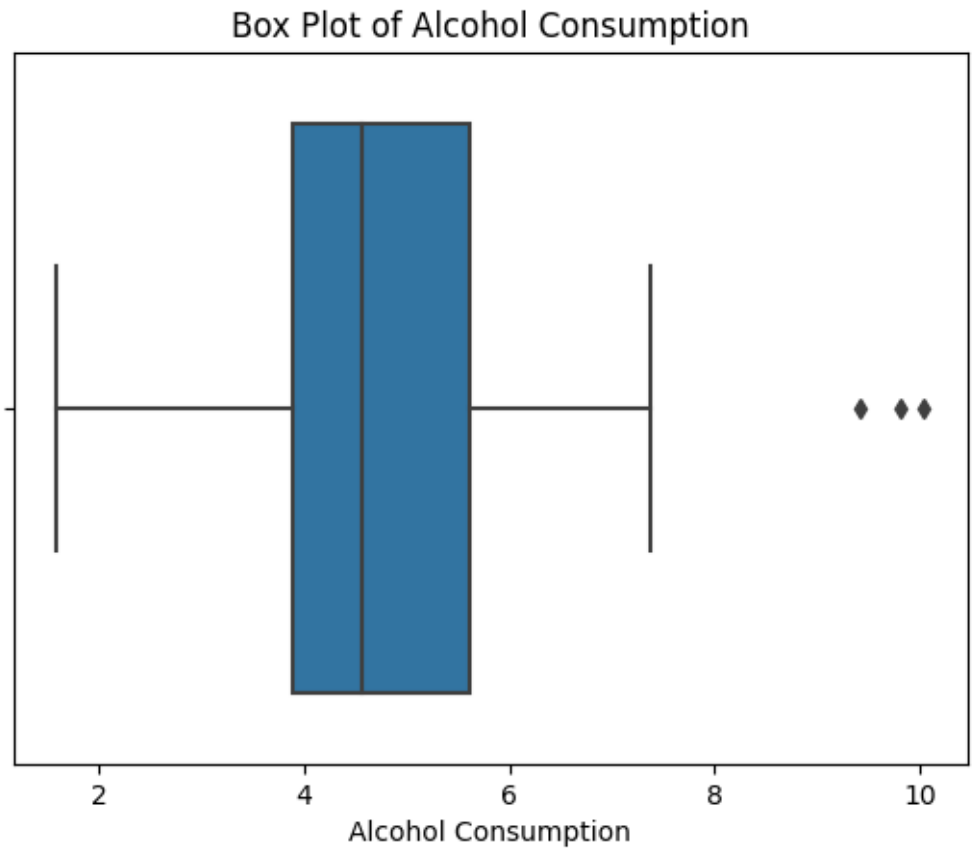
0.7 Bar Plots

[16]:
```
plt.subplots(figsize=(10,10))
sns.barplot(x='total',y= 'abbrev',data=data,orient='h')
```

[16]: <Axes: xlabel='total', ylabel='abbrev'>



[17]:
```
sns.boxplot(x="alcohol", data=data)
plt.xlabel("Alcohol Consumption")
plt.title("Box Plot of Alcohol Consumption")
plt.show()
```



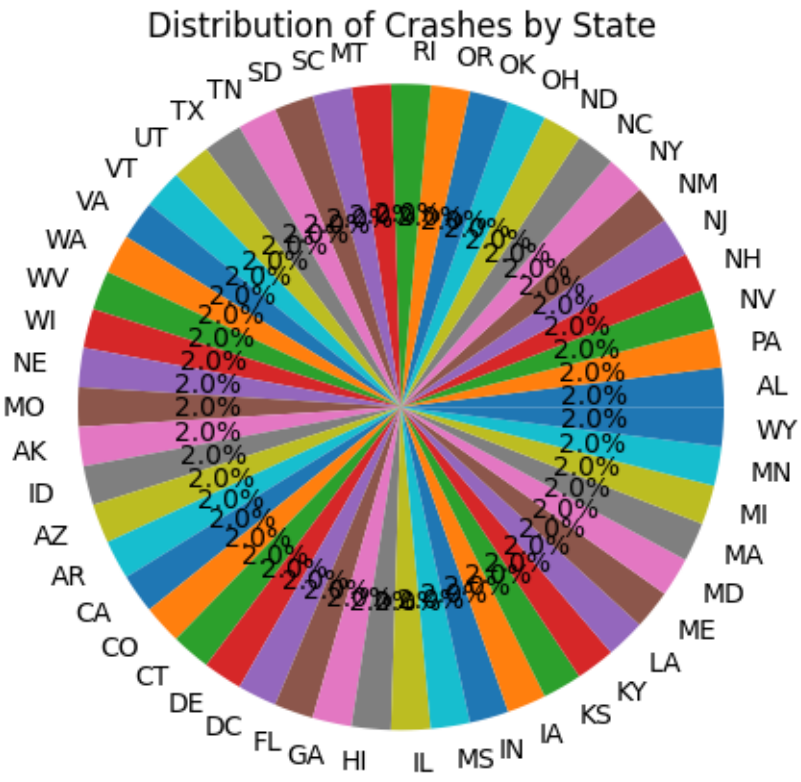
0.8 Heatmap

[18]:
```
correlation_matrix = data.corr()
sns.heatmap(correlation_matrix, annot=True, cmap="coolwarm")
plt.title("Correlation Heatmap")
plt.show()
```

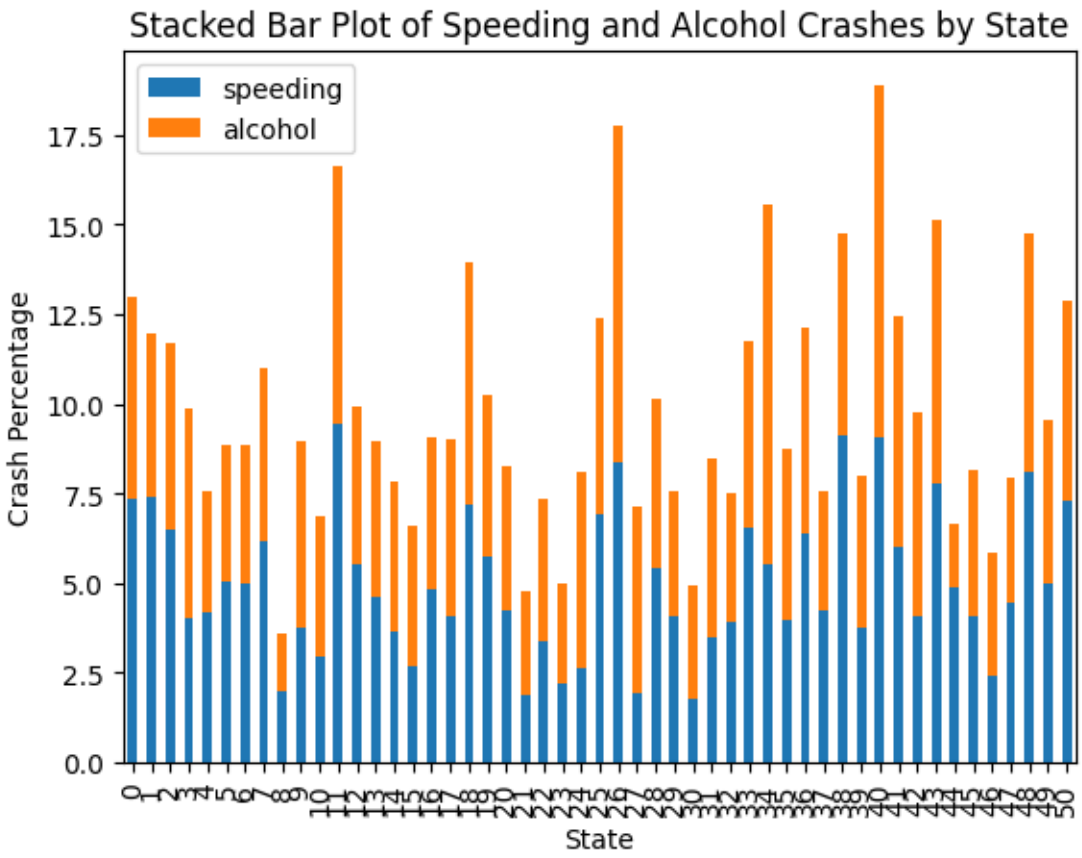
```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
d:\VIT\SmartInternz\Assignment-2\Assignment-2.ipynb Cell 22 line 1

----> <a href='vscode-notebook-cell:/d%3A/VIT/SmartInternz/Assignment-2/
 ↪Assignment-2.ipynb#X21sZmlsZQ%3D%3D?line=0'>1</a> correlation_matrix = data.
 ↪corr()
      <a href='vscode-notebook-cell:/d%3A/VIT/SmartInternz/Assignment-2/
 ↪Assignment-2.ipynb#X21sZmlsZQ%3D%3D?line=1'>2</a> sns.
 ↪heatmap(correlation_matrix, annot=True, cmap="coolwarm")
      <a href='vscode-notebook-cell:/d%3A/VIT/SmartInternz/Assignment-2/
 ↪Assignment-2.ipynb#X21sZmlsZQ%3D%3D?line=2'>3</a> plt.title("Correlation␣
 ↪Heatmap")
```

```
File c:\Users\ASUS\anaconda3\envs\tf2\lib\site-packages\pandas\core\frame.py:
 ↪10054, in DataFrame.corr(self, method, min_periods, numeric_only)
  10052 cols = data.columns
  10053 idx = cols.copy()
> 10054 mat = data.to_numpy(dtype=float, na_value=np.nan, copy=False)
  10056 if method == "pearson":
  10057     correl = libalgos.nancorr(mat, minp=min_periods)

File c:\Users\ASUS\anaconda3\envs\tf2\lib\site-packages\pandas\core\frame.py:
 ↪1838, in DataFrame.to_numpy(self, dtype, copy, na_value)
   1836 if dtype is not None:
   1837     dtype = np.dtype(dtype)
-> 1838 result = self._mgr.as_array(dtype=dtype, copy=copy, na_value=na_value)
   1839 if result.dtype is not dtype:
   1840     result = np.array(result, dtype=dtype, copy=False)

File c:
 ↪\Users\ASUS\anaconda3\envs\tf2\lib\site-packages\pandas\core\internals\manage
 ↪py:1732, in BlockManager.as_array(self, dtype, copy, na_value)
   1730         arr.flags.writeable = False
   1731 else:
-> 1732     arr = self._interleave(dtype=dtype, na_value=na_value)
   1733     # The underlying data was copied within _interleave, so no need
   1734     # to further copy if copy=True or setting na_value
   1736 if na_value is not lib.no_default:

File c:
 ↪\Users\ASUS\anaconda3\envs\tf2\lib\site-packages\pandas\core\internals\manage
 ↪py:1794, in BlockManager._interleave(self, dtype, na_value)
   1792     else:
   1793         arr = blk.get_values(dtype)
-> 1794     result[rl.indexer] = arr
   1795     itemmask[rl.indexer] = 1
   1797 if not itemmask.all():

ValueError: could not convert string to float: 'AL'
```

[ ]:
```
state_counts = data["abbrev"].value_counts()
plt.pie(state_counts, labels=state_counts.index, autopct='%1.1f%%')
plt.axis('equal')  # Equal aspect ratio ensures that pie is drawn as a circle.
plt.title("Distribution of Crashes by State")
plt.show()
```



[ ]:
```
data[["speeding", "alcohol"]].plot(kind="bar", stacked=True)
plt.xlabel("State")
plt.ylabel("Crash Percentage")
plt.title("Stacked Bar Plot of Speeding and Alcohol Crashes by State")
plt.show()
```


Stacked Bar Plot of Speeding and Alcohol Crashes by State
speeding
alcohol
Crash Percentage
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
State