NAME : D GUNASEKHAR

REG NO: 21BCI0243

EMAIL: Devineniguna.Sekhar2021@vitstudent.ac.in

SLOT: Morning(10-12 AM)

import the necessary libraries

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
```

Loading the dataset

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

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

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

```
    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
```

```
data_car.shape
```

```
(51, 8)
```

```
data_car.head()
```

```
   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

data_car.tail()

    total  speeding  alcohol  not_distracted  no_previous  ins_premium
\
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
46      153.72     VA
47      111.62     WA
48      152.56     WV
49      106.62     WI
50      122.04     WY

data_car.describe()

           total   speeding    alcohol  not_distracted  no_previous  \
count  51.000000  51.000000  51.000000       51.000000    51.000000
mean   15.790196   4.998196   4.886784       13.573176    14.004882
std     4.122002   2.017747   1.729133        4.508977     3.764672
min     5.900000   1.792000   1.593000        1.760000     5.900000
25%    12.750000   3.766500   3.894000       10.478000    11.348000
50%    15.600000   4.608000   4.554000       13.857000    13.775000
75%    18.500000   6.439000   5.604000       16.140000    16.755000
max    23.900000   9.450000  10.038000       23.661000    21.280000

       ins_premium  ins_losses
count    51.000000   51.000000
mean    886.957647  134.493137
std     178.296285   24.835922
min     641.960000   82.750000
```

```
25%     768.430000  114.645000
50%     858.970000  136.050000
75%    1007.945000  151.870000
max    1301.520000  194.780000
```

```
data_car.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
```

#Handling the null values

```
data_car.isnull().any()
# There are no null values in the dataset.
```

```
total             False
speeding          False
alcohol           False
not_distracted    False
no_previous       False
ins_premium       False
ins_losses        False
abbrev            False
dtype: bool
```

```
data_car.isnull().sum()
# There are no null values in the dataset.
```

```
total             0
speeding          0
alcohol           0
not_distracted    0
no_previous       0
ins_premium       0
ins_losses        0
abbrev            0
dtype: int64
```

Seperating the dependent and independent variables

```
x=data_car.iloc[:,0:7]
y=data_car.iloc[:,7:8]

x
```

	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
0       145.08
1       133.93
2       110.35
3       142.39
4       165.63
5       139.91
6       167.02
7       151.48
8       136.05
9       144.18
10      142.80
11      120.92
12       82.75
13      139.15
14      108.92
15      114.47
16      133.80
17      137.13
18      194.78
19       96.57
20      192.70
21      135.63
22      152.26
23      133.35
24      155.77
25      144.45
26       85.15
27      114.82
28      138.71
29      120.21
30      159.85
31      120.75
32      150.01
33      127.82
34      109.72
35      133.52
36      178.86
37      104.61
```

```
38      153.86
39      148.58
40      116.29
41       96.87
42      155.57
43      156.83
44      109.48
45      109.61
46      153.72
47      111.62
48      152.56
49      106.62
50      122.04
```

y

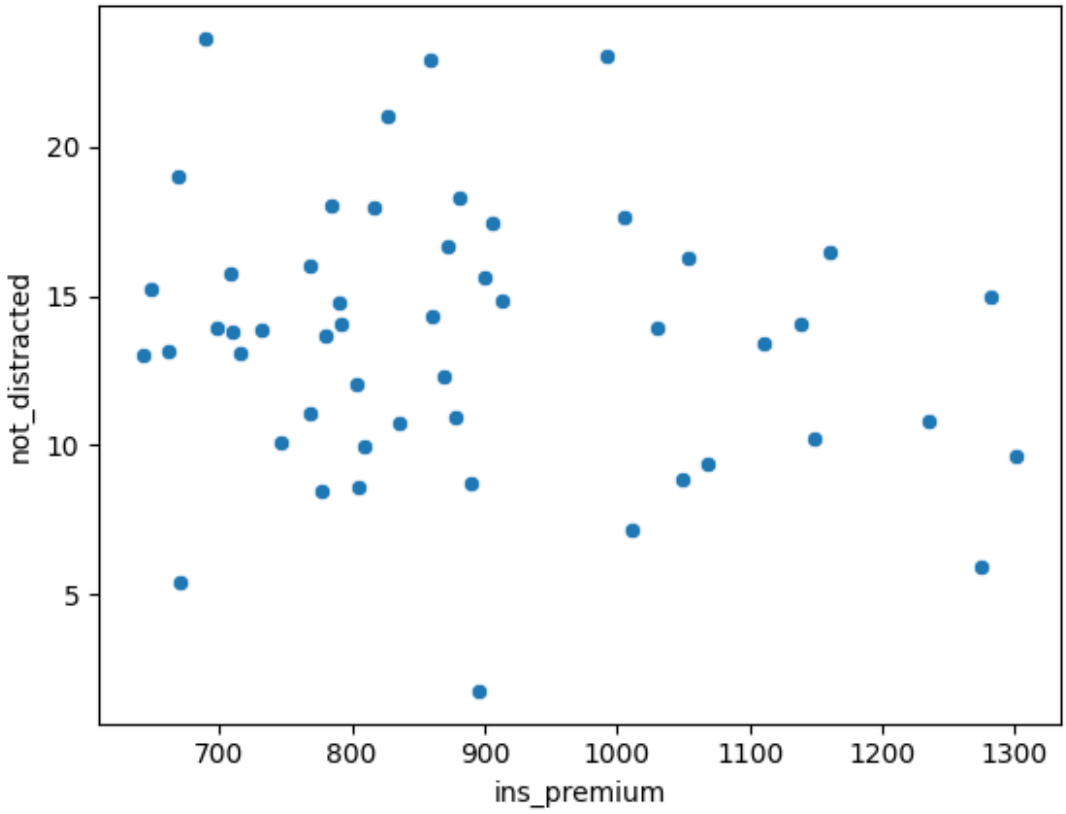
```
   abbrev
0      AL
1      AK
2      AZ
3      AR
4      CA
5      CO
6      CT
7      DE
8      DC
9      FL
10     GA
11     HI
12     ID
13     IL
14     IN
15     IA
16     KS
17     KY
18     LA
19     ME
20     MD
21     MA
22     MI
23     MN
24     MS
25     MO
26     MT
27     NE
28     NV
29     NH
30     NJ
31     NM
32     NY
```

```
33      NC
34      ND
35      OH
36      OK
37      OR
38      PA
39      RI
40      SC
41      SD
42      TN
43      TX
44      UT
45      VT
46      VA
47      WA
48      WV
49      WI
50      WY
```

#SCATTER PLOT

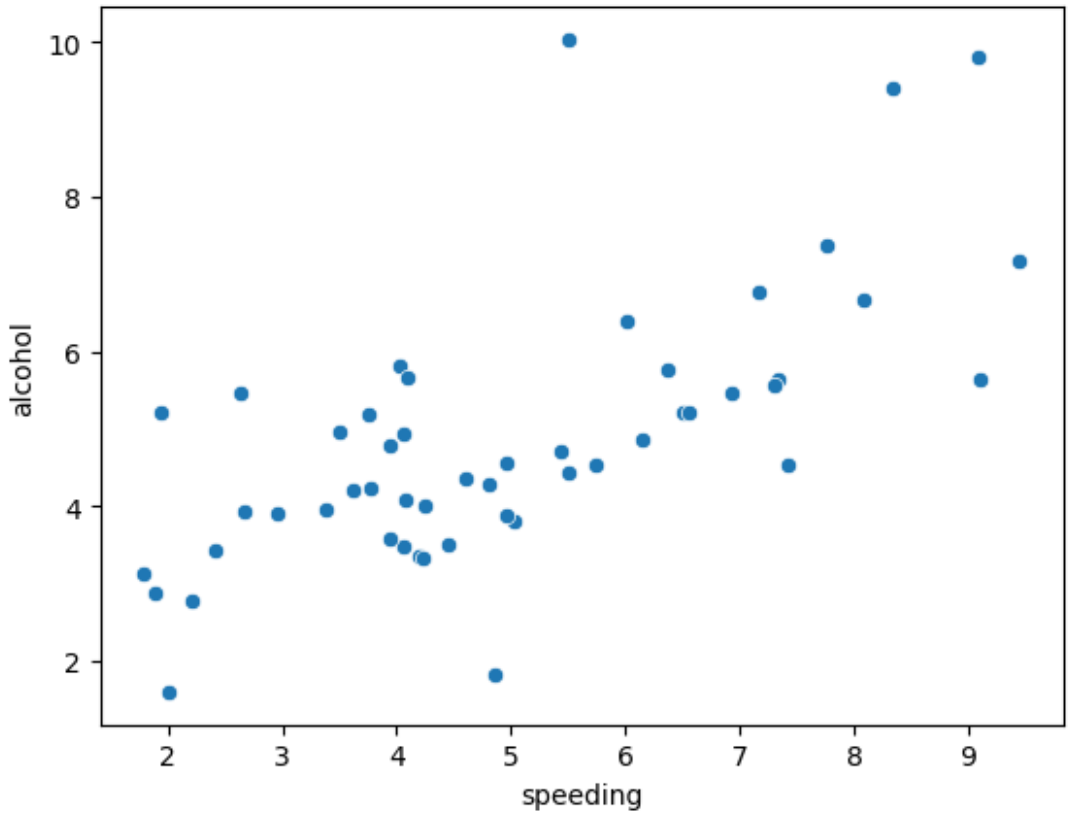
```
sns.scatterplot(x="ins_premium", y="not_distracted", data=data_car)
```

```
<Axes: xlabel='ins_premium', ylabel='not_distracted'>
```



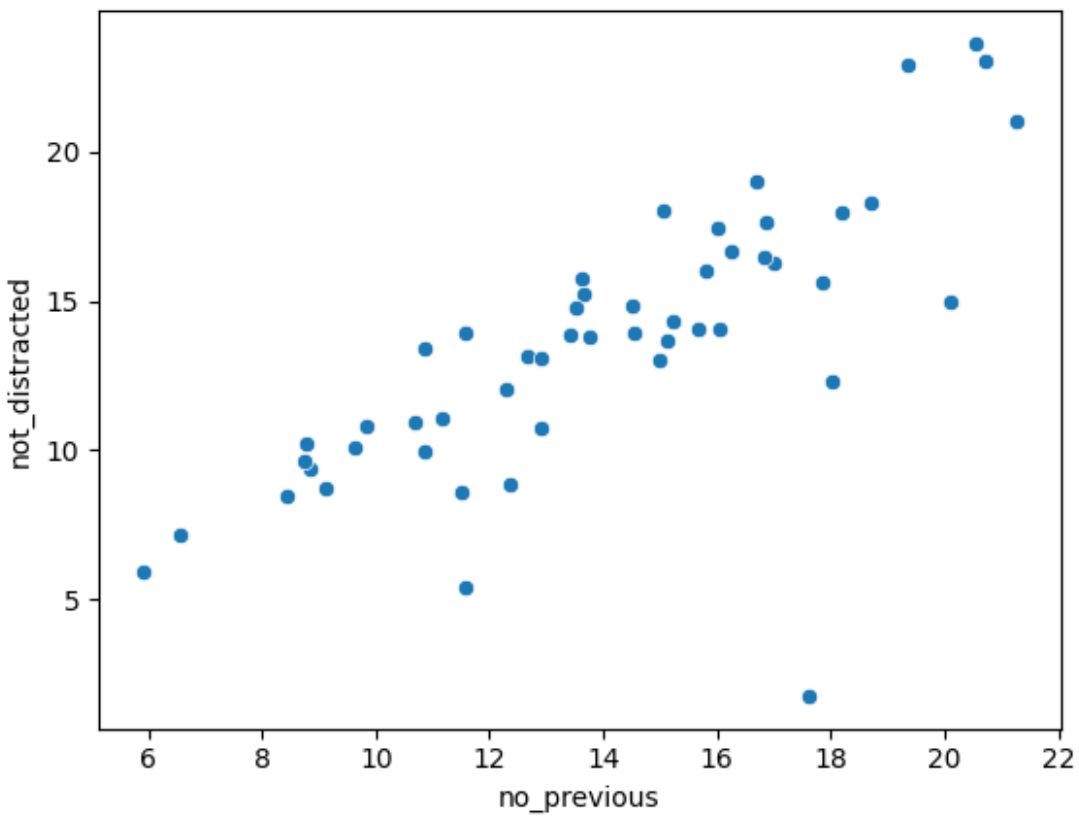
```
sns.scatterplot(x="speeding",y="alcohol",data=data_car)
```

```
<Axes: xlabel='speeding', ylabel='alcohol'>
```




```
sns.scatterplot(x="no_previous",y="not_distracted",data=data_car)
```

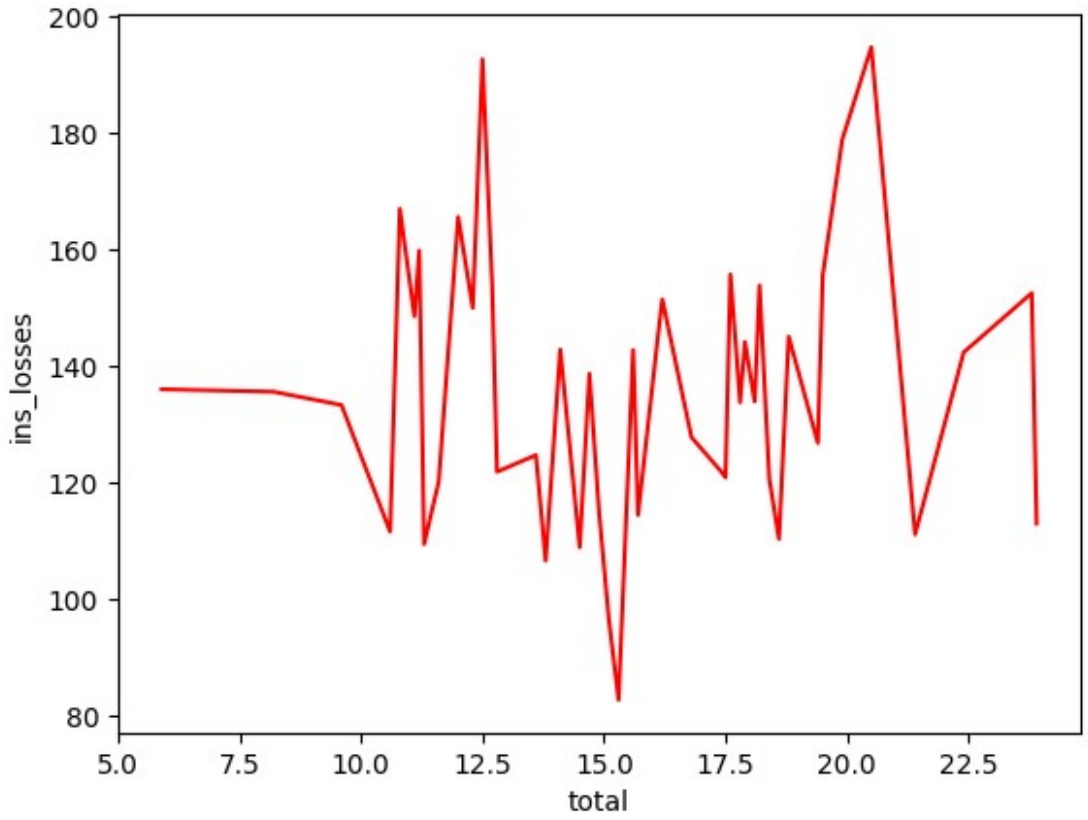
```
<Axes: xlabel='no_previous', ylabel='not_distracted'>
```



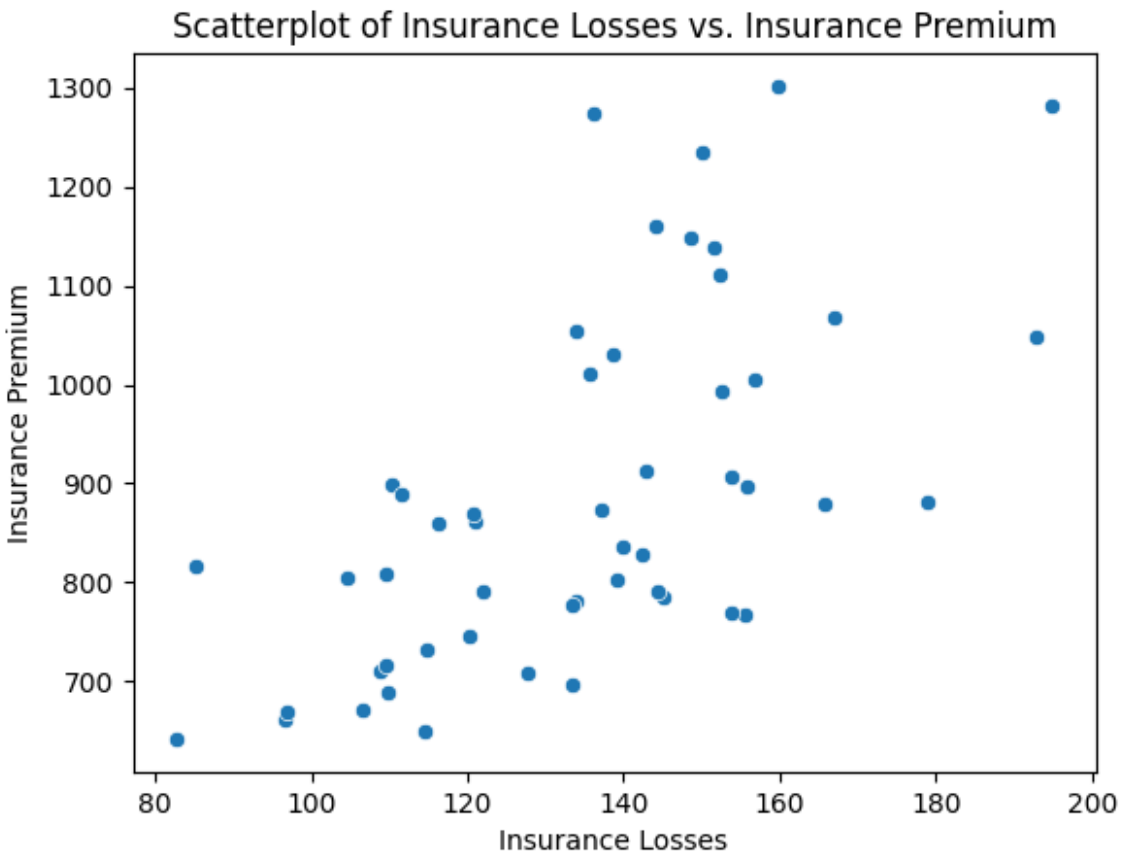
LINE PLOT

```
sns.lineplot(x="total",y="ins_losses",data=data_car,errorbar=None,colo
r="RED")
```

```
<Axes: xlabel='total', ylabel='ins_losses'>
```

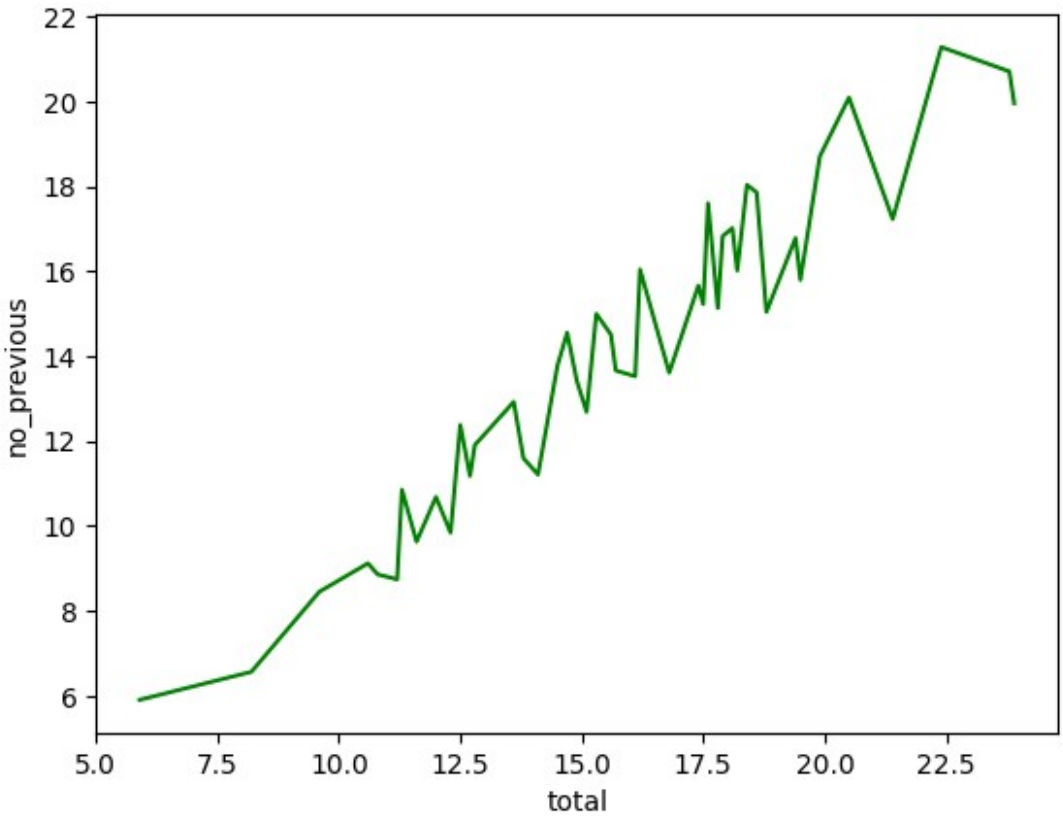



```
sns.scatterplot(x="ins_losses", y="ins_premium", data=data_car)
plt.xlabel("Insurance Losses")
plt.ylabel("Insurance Premium")
plt.title("Scatterplot of Insurance Losses vs. Insurance Premium")
plt.show()
```




```
sns.lineplot(x="total",y="no_previous",data=data_car,errorbar=None,col
or="green")
```

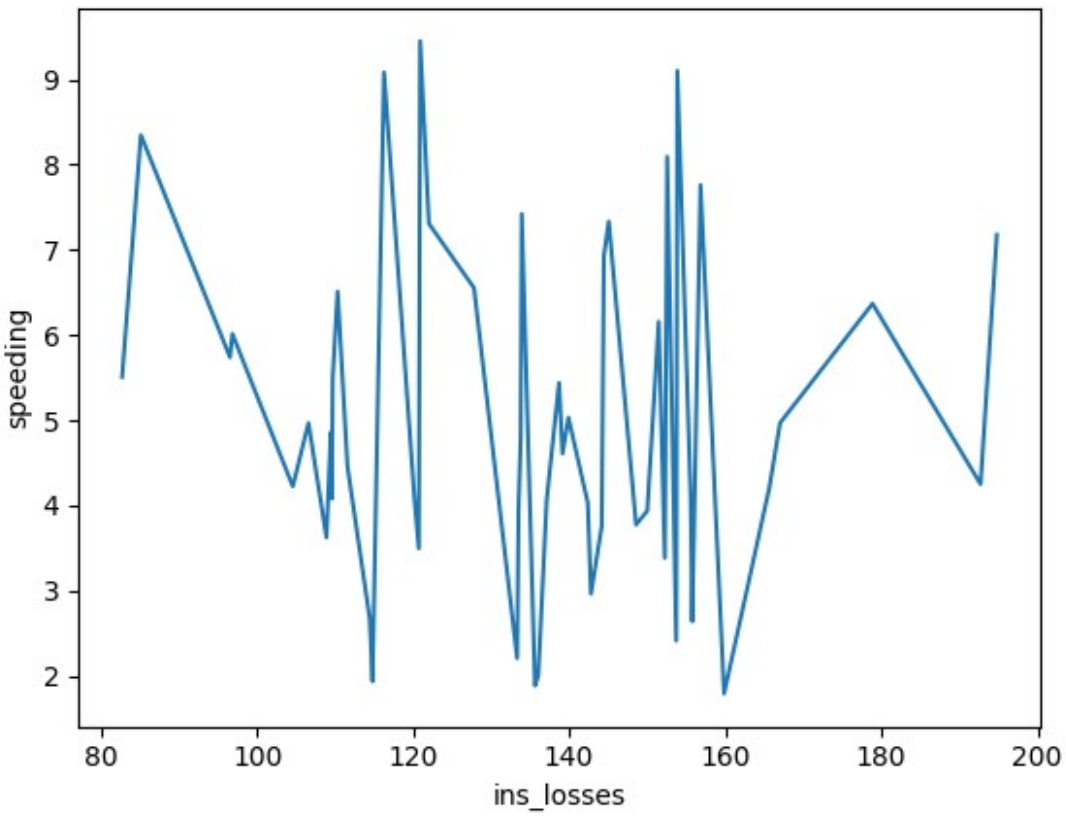
```
<Axes: xlabel='total', ylabel='no_previous'>
```




```
sns.lineplot(x="ins_losses", y="speeding", data=data_car, ci=None)
```

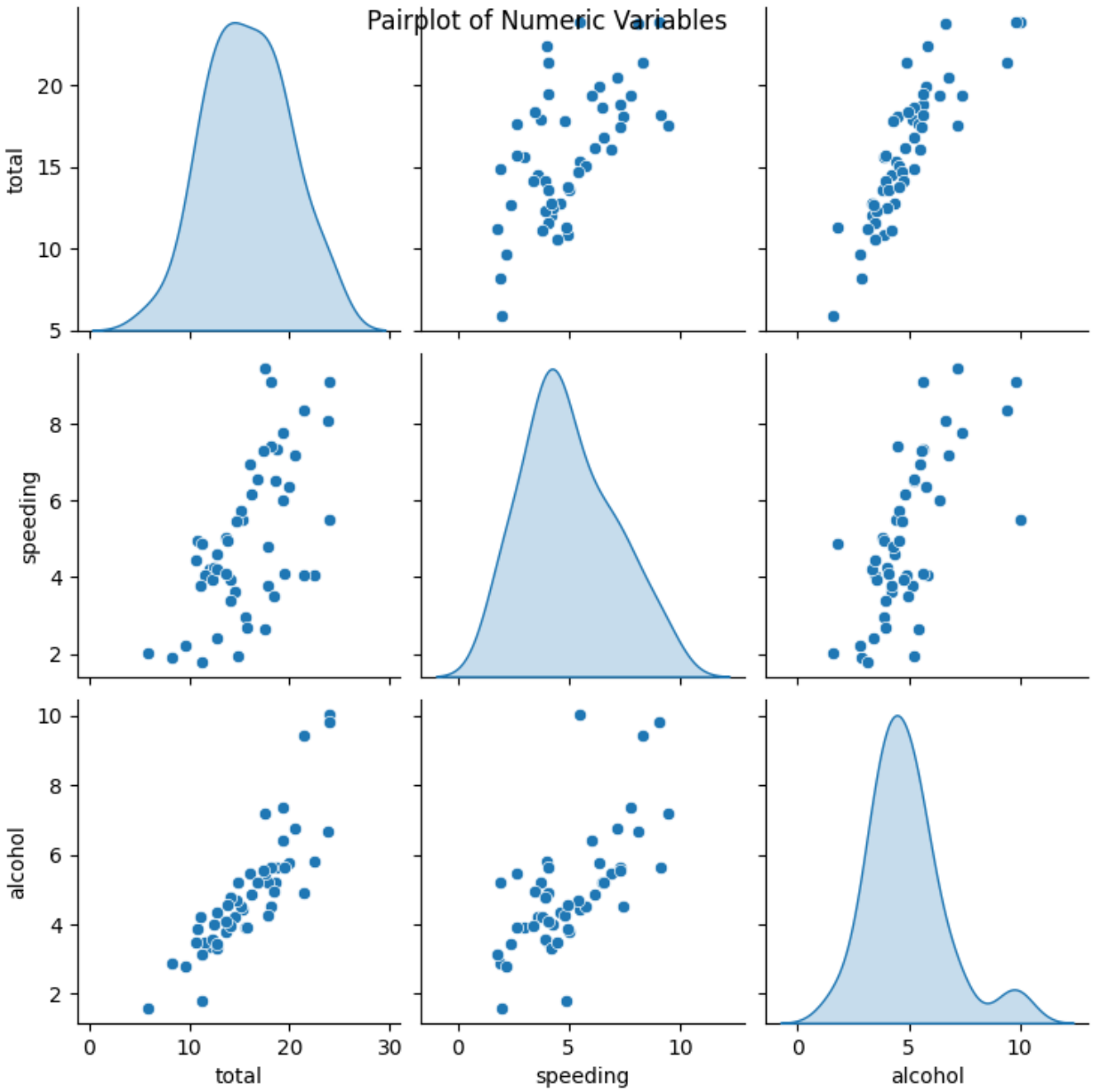
```
<ipython-input-20-b2121c4dd438>:1: FutureWarning:

The `ci` parameter is deprecated. Use `errorbar=None` for the same effect.

  sns.lineplot(x="ins_losses", y="speeding", data=data_car, ci=None)
```

```
<Axes: xlabel='ins_losses', ylabel='speeding'>
```



pair plot

```
sns.pairplot(data=data_car[['total', 'speeding', 'alcohol']],
diag_kind='kde')
plt.suptitle('Pairplot of Numeric Variables')
plt.show()
```

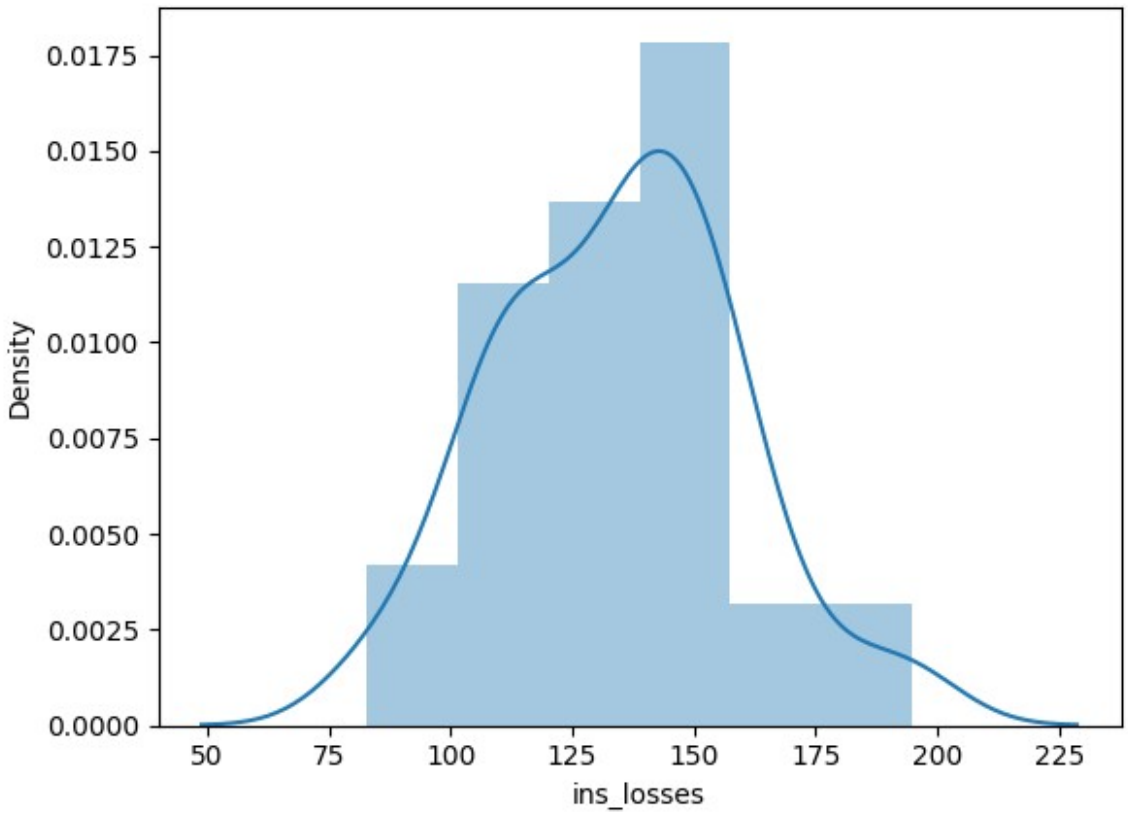


DISTINCT PLOT

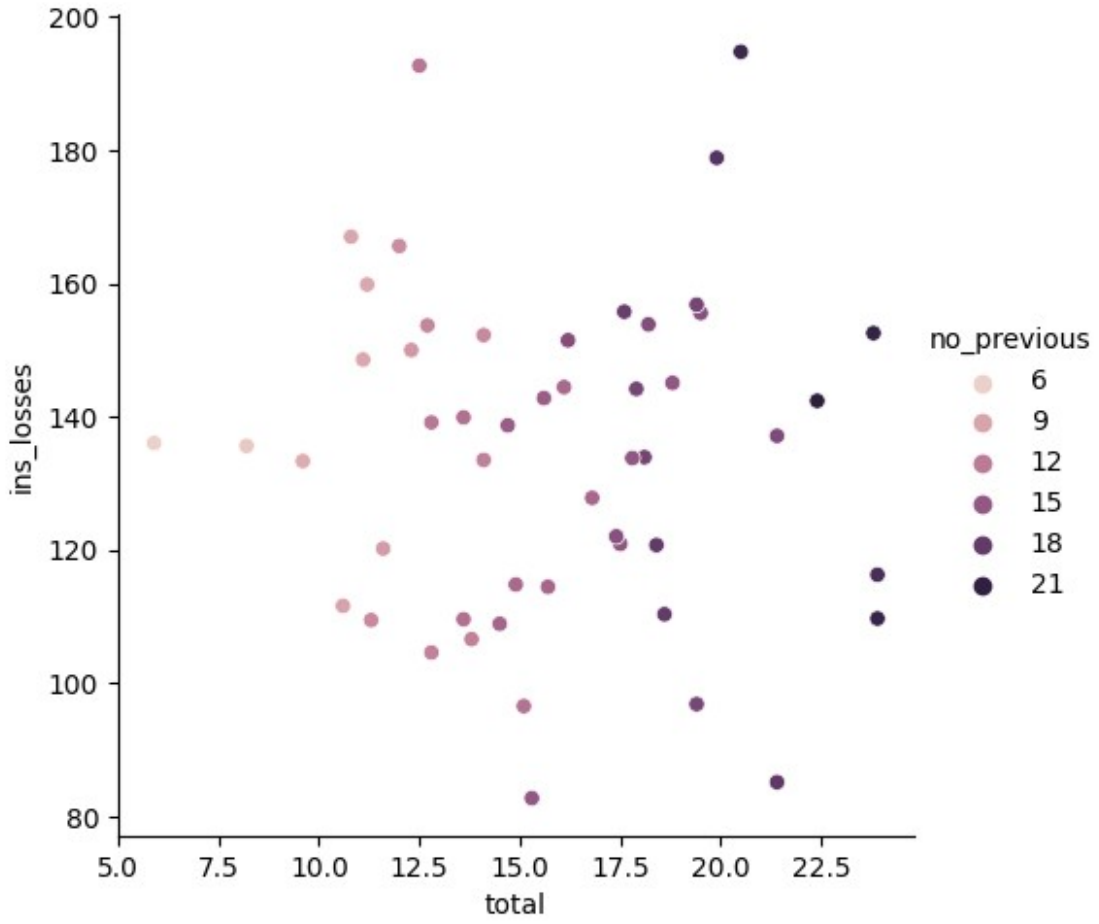
```
sns.distplot(data_car['ins_losses'])
plt.show()
```

```
<ipython-input-22-7bee938c7e06>: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_car['ins_losses'])
```

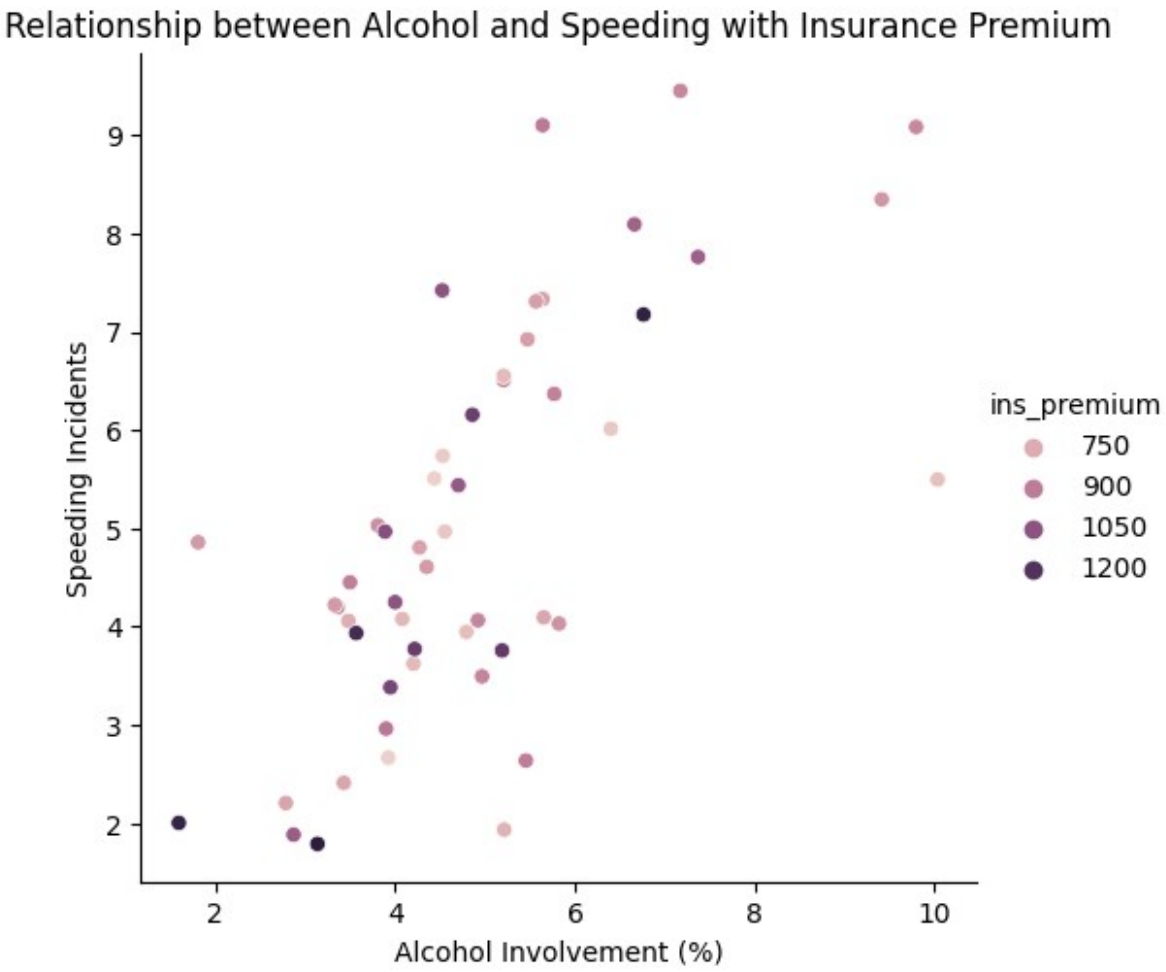



```
sns.relplot(x="total", y="ins_losses", data=data_car,
hue="no_previous")

<seaborn.axisgrid.FacetGrid at 0x7ee15d95fbe0>
```



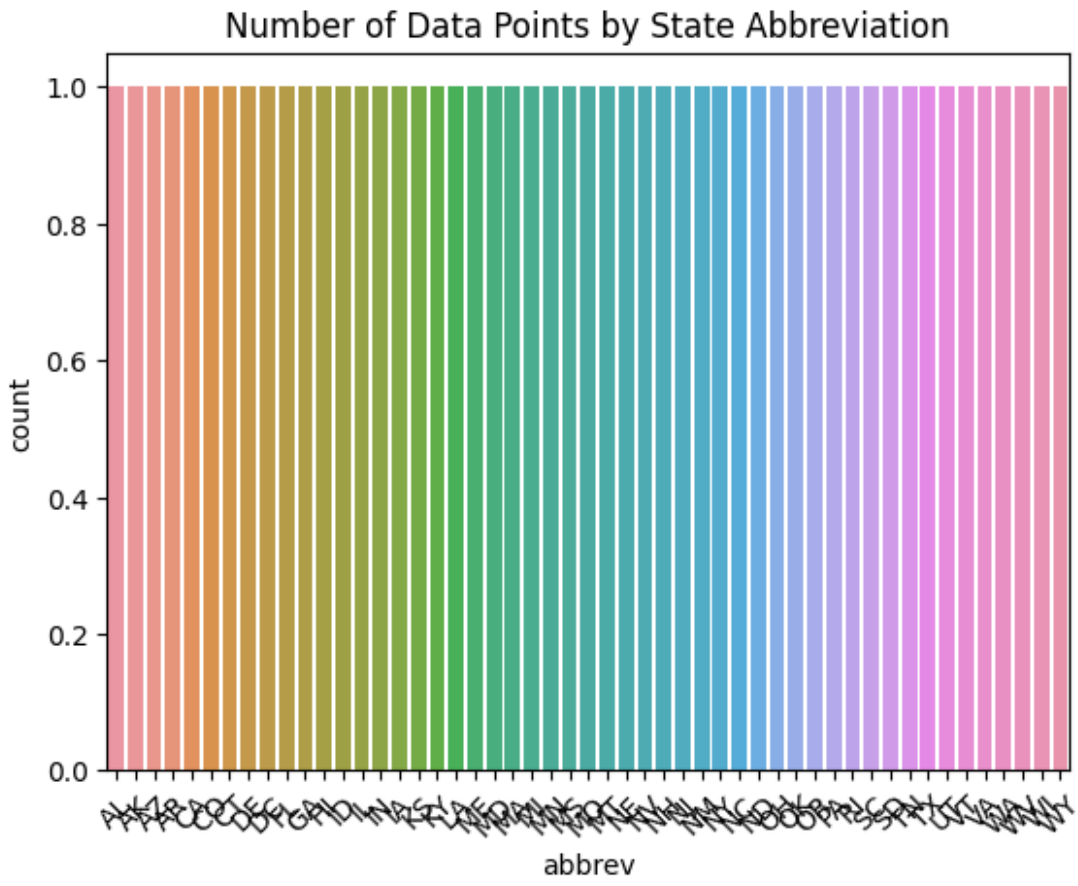
#RELATION PLOT

```
sns.relplot(x="alcohol", y="speeding", hue="ins_premium",
data=data_car)
plt.title("Relationship between Alcohol and Speeding with Insurance
Premium")
plt.xlabel("Alcohol Involvement (%)")
plt.ylabel("Speeding Incidents")
plt.show()
```



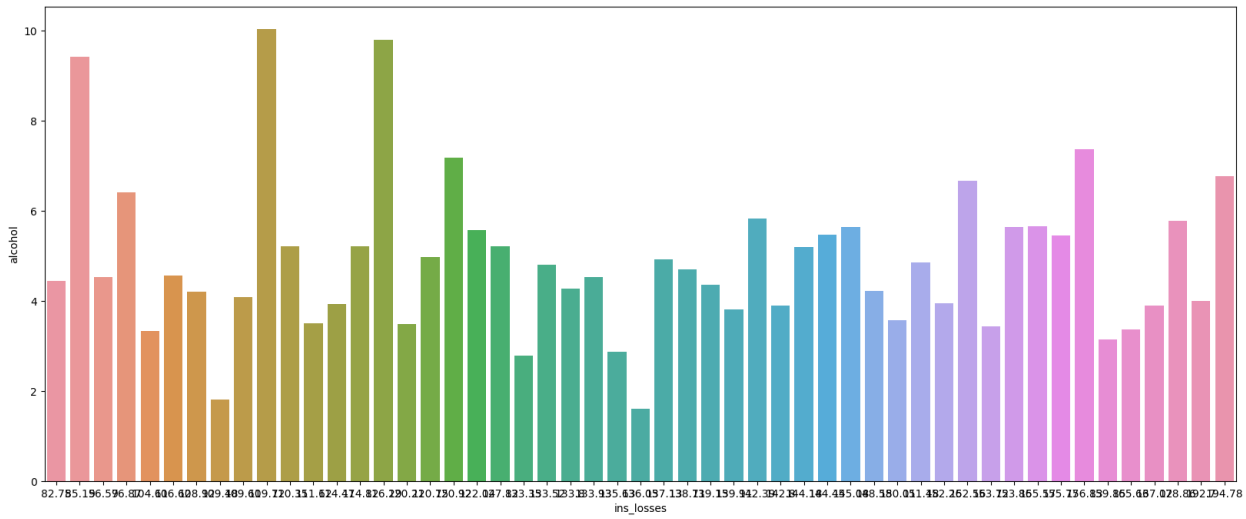
#bar plot

```
sns.countplot(data=data_car, x='abbrev')
plt.title('Number of Data Points by State Abbreviation')
plt.xticks(rotation=45)
plt.show()
```



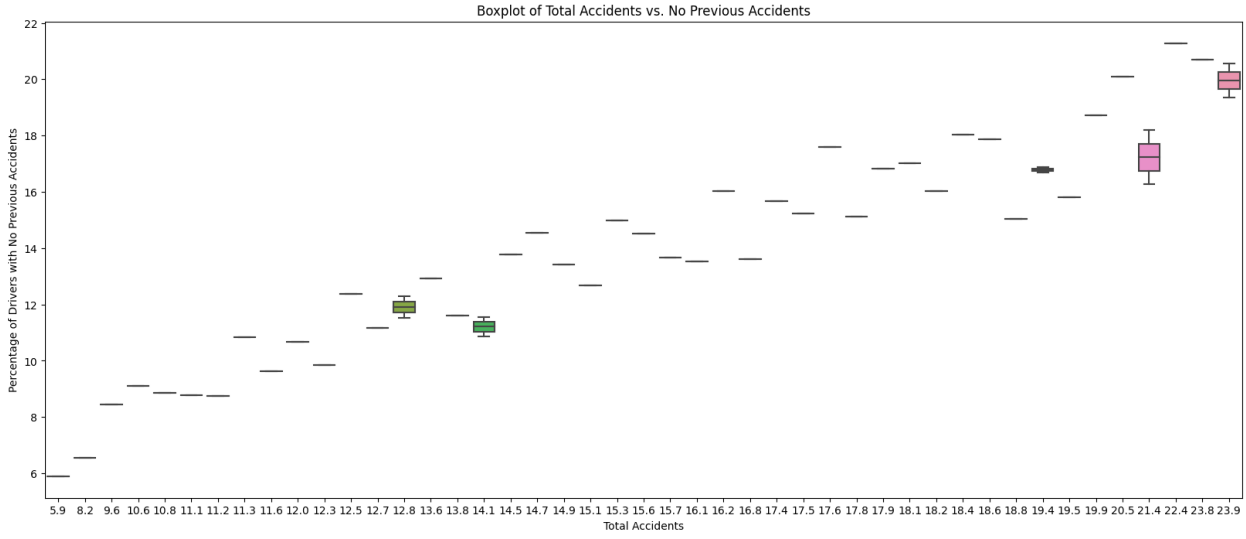

```
plt.subplots(figsize=(20,8))
sns.barplot(data=data_car,x="ins_losses",y="alcohol",ci=None)
plt.show()
```

```
<ipython-input-26-1e092c05c80c>:2: FutureWarning:

The `ci` parameter is deprecated. Use `errorbar=None` for the same
effect.

  sns.barplot(data=data_car,x="ins_losses",y="alcohol",ci=None)
```

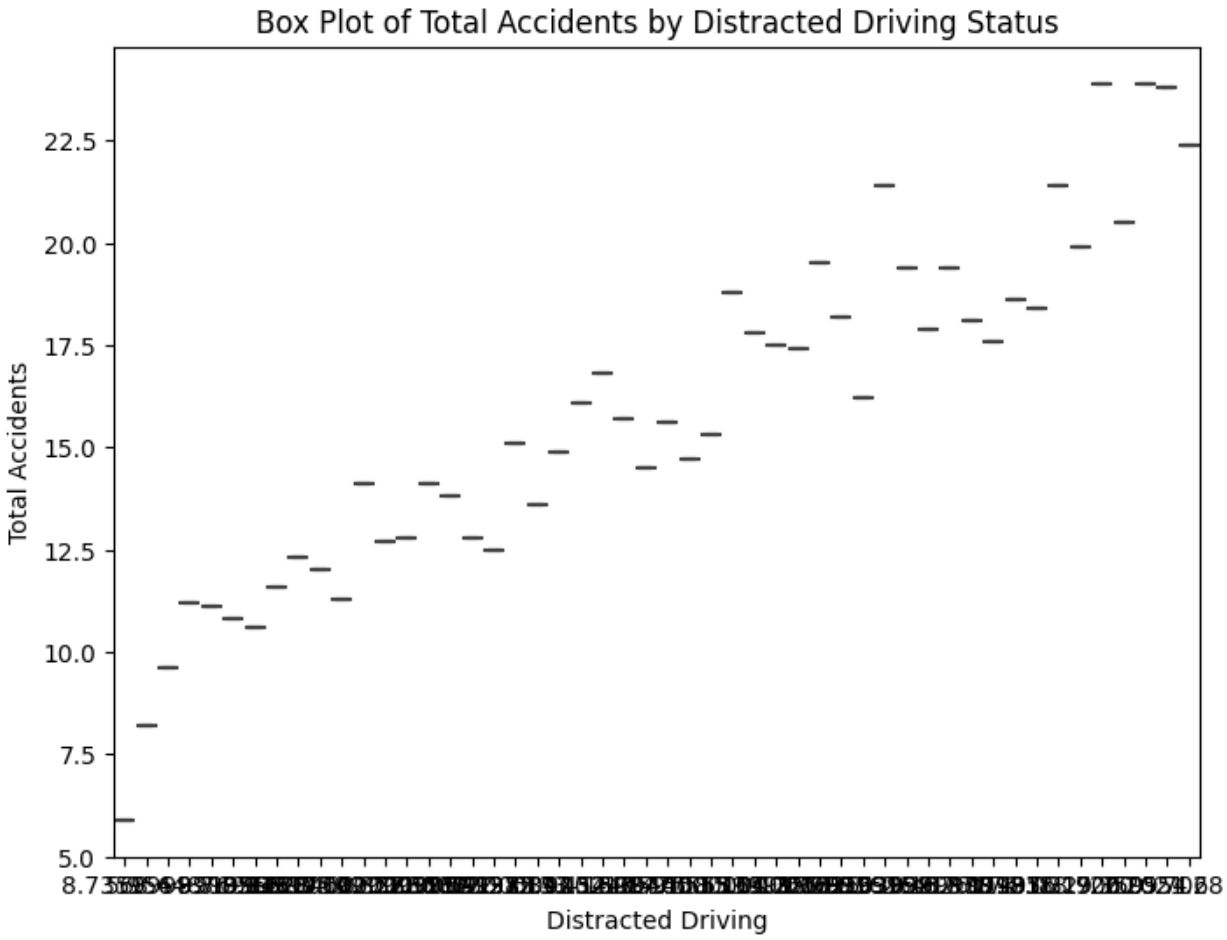


box plot

```
plt.subplots(figsize=(20,8))
sns.boxplot(x="total", y="no_previous", data=data_car)
plt.xlabel("Total Accidents")
plt.ylabel("Percentage of Drivers with No Previous Accidents")
plt.title("Boxplot of Total Accidents vs. No Previous Accidents")
plt.show()
```



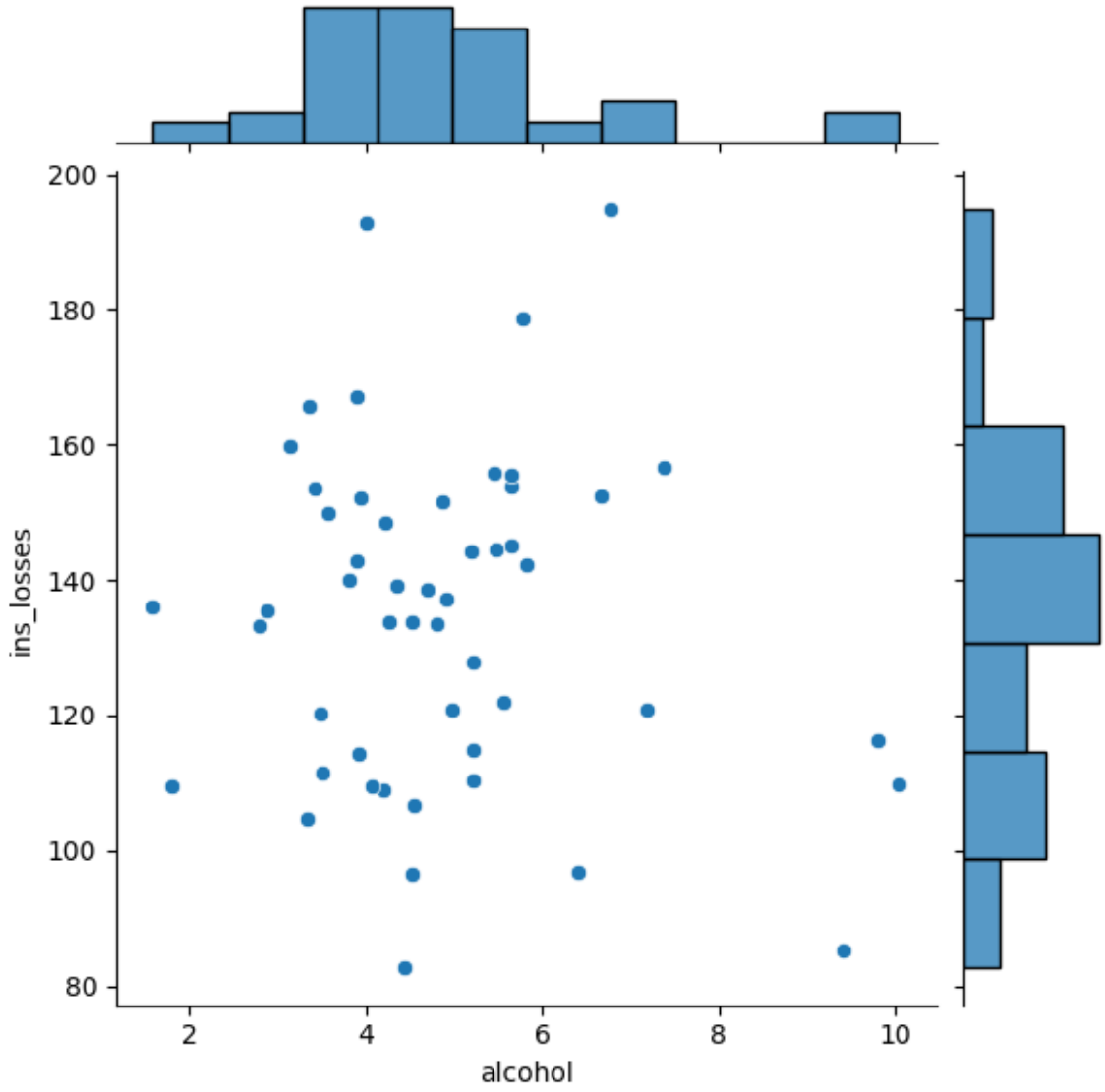

```
plt.figure(figsize=(8, 6))
sns.boxplot(x="no_previous", y="total", data=data_car)
plt.xlabel("Distracted Driving")
plt.ylabel("Total Accidents")
plt.title("Box Plot of Total Accidents by Distracted Driving Status")
plt.show()
```



joint plot

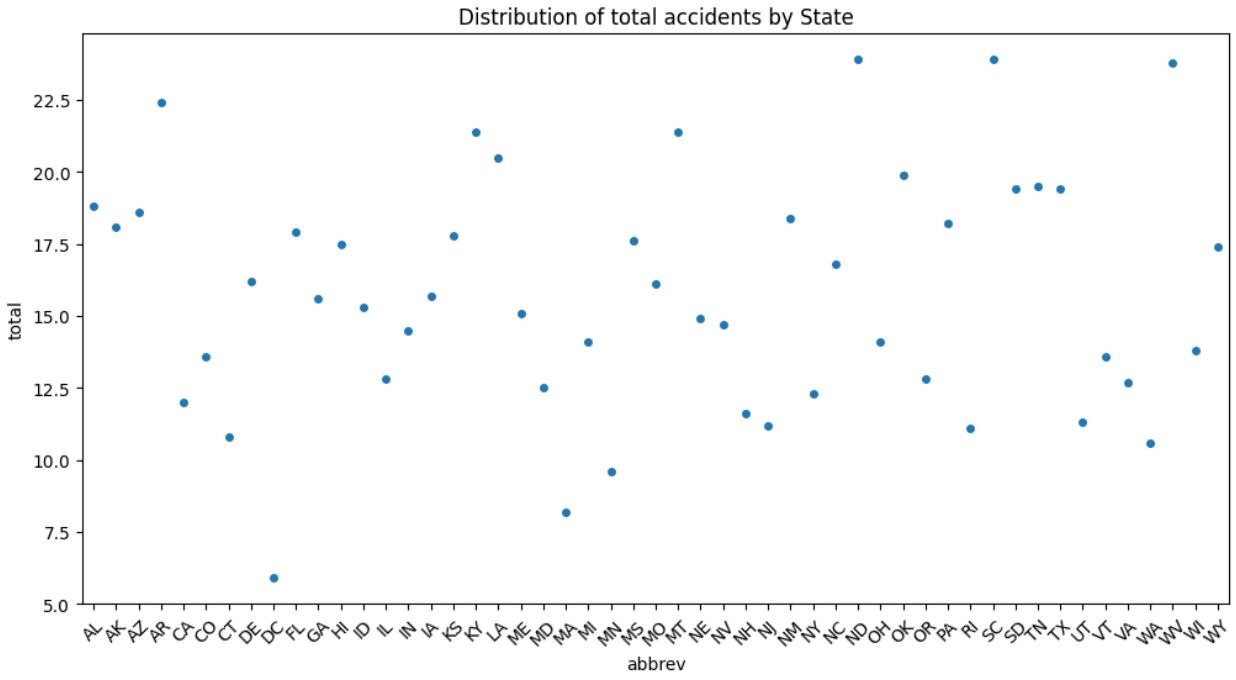
```
sns.jointplot(x="alcohol", y="ins_losses", data=data_car)
```

```
<seaborn.axisgrid.JointGrid at 0x7ee15b39c160>
```



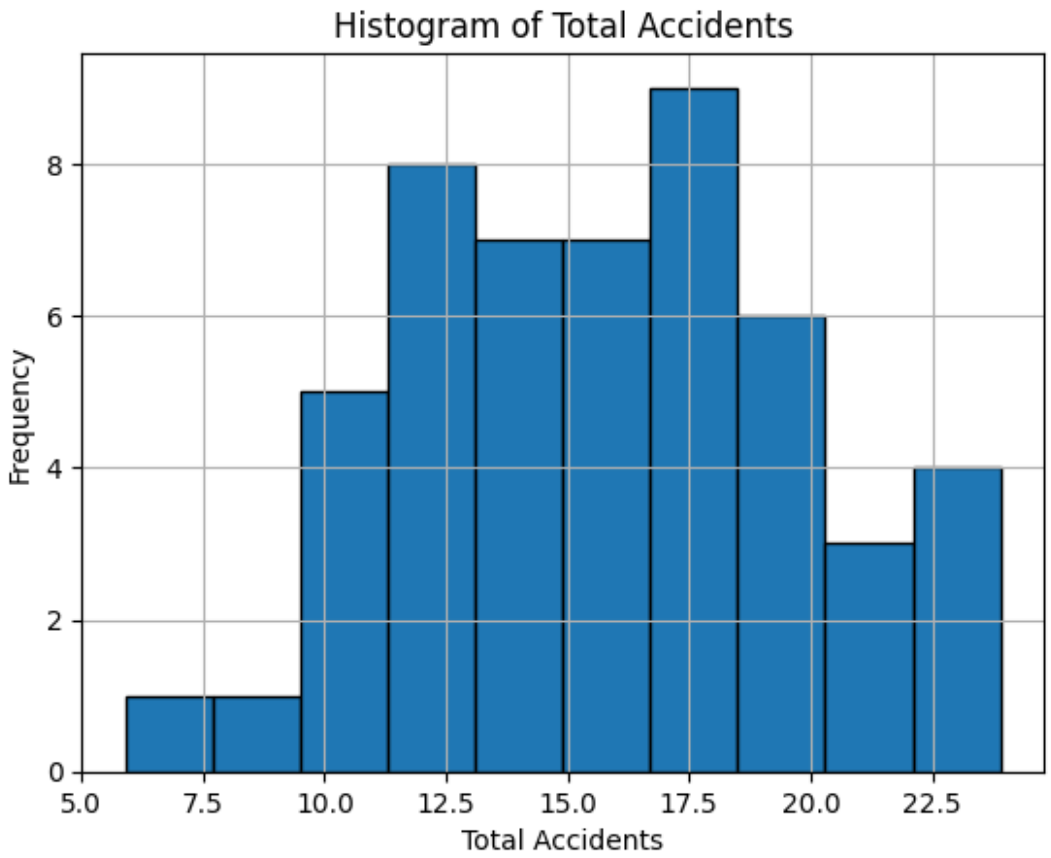
Swarm Plot.

```
plt.figure(figsize=(12, 6))
sns.swarmplot(data=data_car, x='abbrev', y='total')
plt.title('Distribution of total accidents by State')
plt.xticks(rotation=45)
plt.show()
```



#HISTOGRAM

```
plt.hist(data_car['total'], bins=10, edgecolor='k')
plt.title('Histogram of Total Accidents')
plt.xlabel('Total Accidents')
plt.ylabel('Frequency')
plt.grid(True)
plt.show()
```



correlation

```
cor=data_car.corr()
cor
```

```
<ipython-input-32-6a0072d48a75>:1: FutureWarning: The default value of
numeric_only in DataFrame.corr is deprecated. In a future version, it
will default to False. Select only valid columns or specify the value
of numeric_only to silence this warning.
  cor=data_car.corr()
```

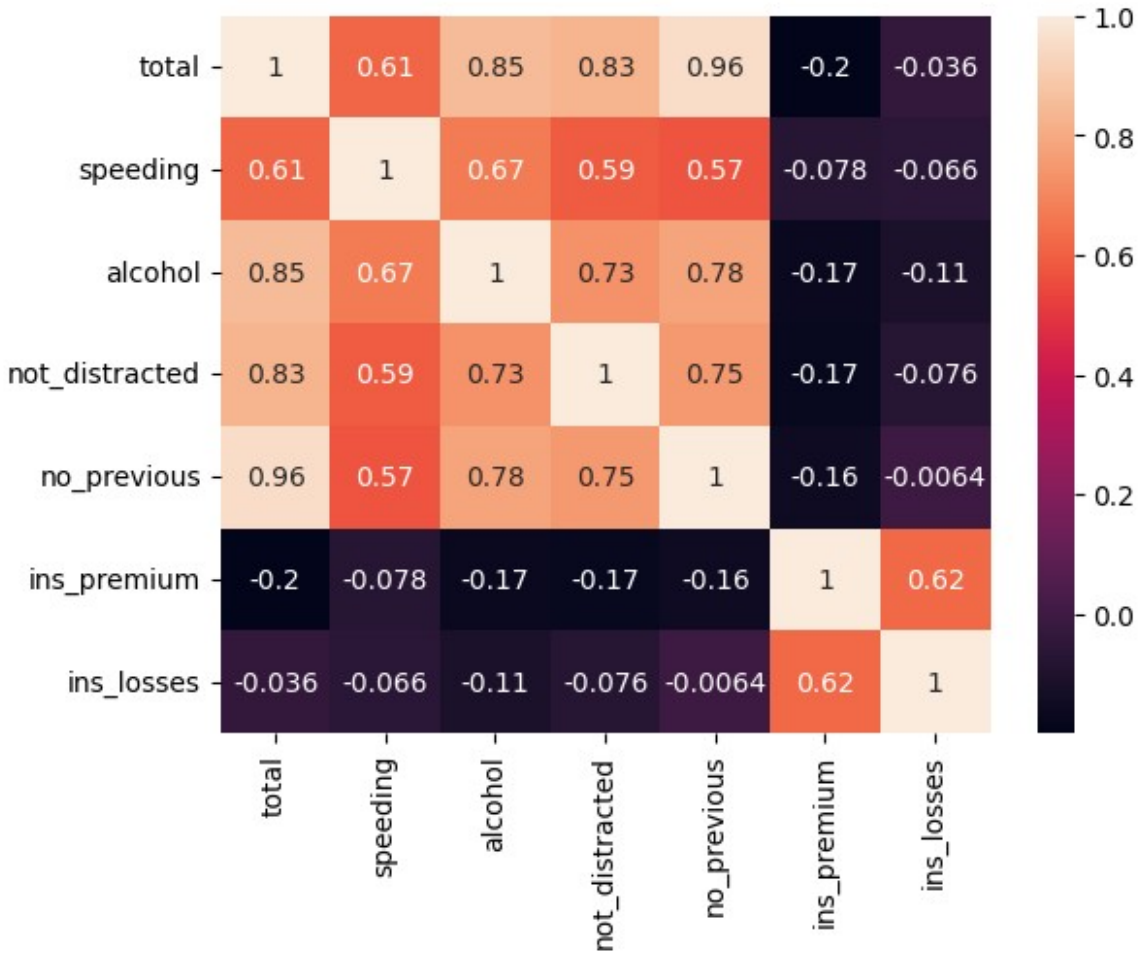
	total	speeding	alcohol	not_distracted	no_previous
total	1.000000	0.611548	0.852613	0.827560	0.956179
speeding	0.611548	1.000000	0.669719	0.588010	0.571976
alcohol	0.852613	0.669719	1.000000	0.732816	0.783520
not_distracted	0.827560	0.588010	0.732816	1.000000	0.747307
no_previous	0.956179	0.571976	0.783520	0.747307	

```
1.000000
ins_premium     -0.199702 -0.077675 -0.170612        -0.174856     -
0.156895
ins_losses      -0.036011 -0.065928 -0.112547        -0.075970     -
0.006359
```

	ins_premium	ins_losses
total	-0.199702	-0.036011
speeding	-0.077675	-0.065928
alcohol	-0.170612	-0.112547
not_distracted	-0.174856	-0.075970
no_previous	-0.156895	-0.006359
ins_premium	1.000000	0.623116
ins_losses	0.623116	1.000000

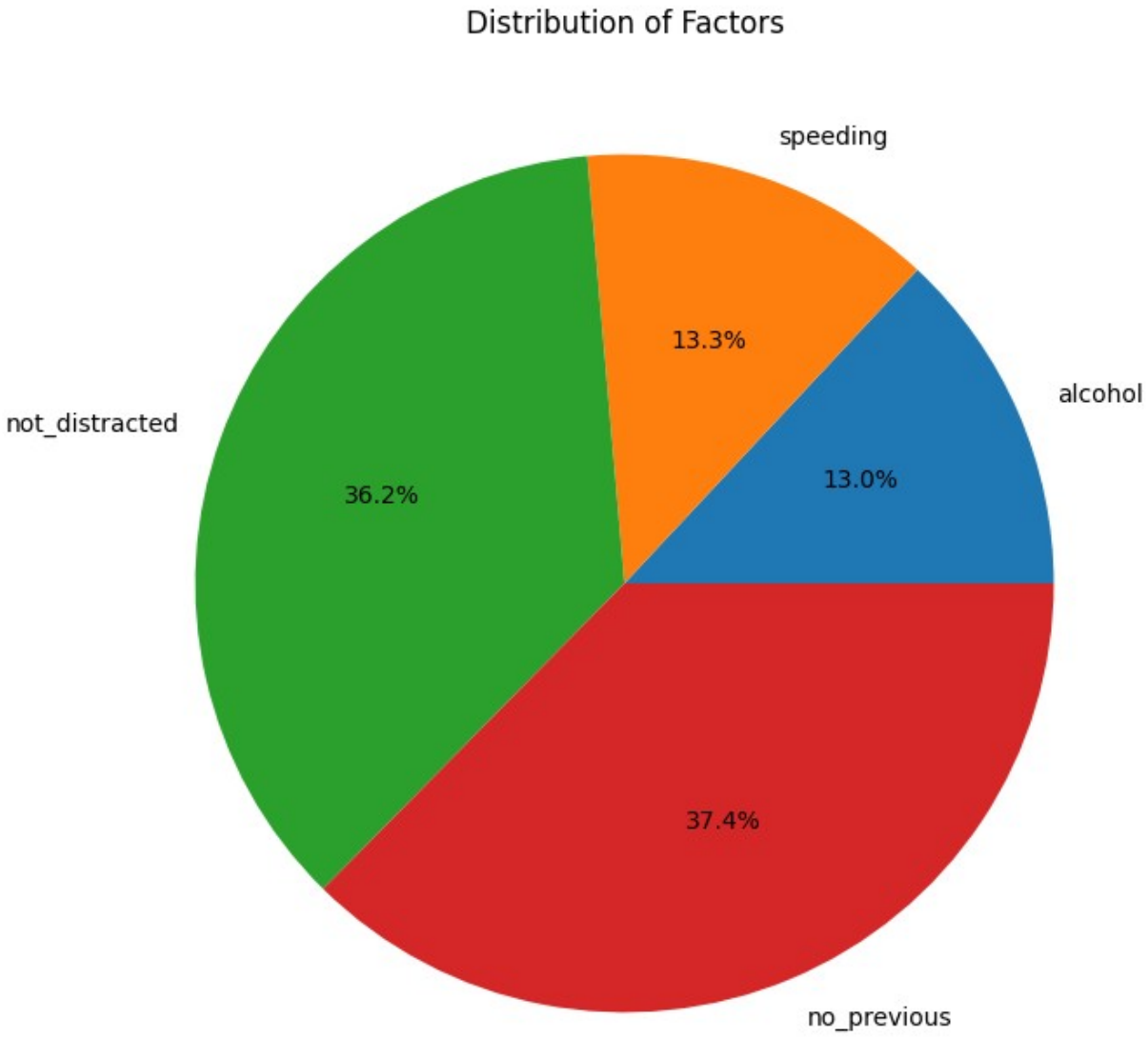
```
sns.heatmap(cor,annot=True) #heat map
```

```
<Axes: >
```



pie chart

```
cc = data_car[['alcohol', 'speeding', 'not_distracted',
'no_previous']].sum()
labels = cc.index
plt.figure(figsize=(8, 8))
plt.pie(cc, labels=labels, autopct='%1.1f%%')
plt.title('Distribution of Factors')
plt.show()
# A pie chart has been drawn.
# It shows the distribution of factors leading to the accidents in
general across all states.
```



Swarm Plot.

```
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sns.swarmplot(data=data_car, x='abbrev', y='total')
plt.title('Distribution of total accidents by State')
plt.xticks(rotation=45)
plt.show()
```