In [1]:

```
#  NAME:Dhanush 21BCE8317
```

In [2]:

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

In [3]:

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

In [4]:

```
df
```

Out[4]:

	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

	total	speeding	alcohol	not_distracted	no_previous	ins_premium	ins_losses	abbrev
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]:

```
df.info
```

Out[6]:

```
<bound method DataFrame.info of     total  speeding  alcohol  not_dis
tracted  no_previous  ins_premium  \
0    18.8     7.332    5.640          18.048       15.040       784.5
5
1    18.1     7.421    4.525          16.290       17.014      1053.4
8
2    18.6     6.510    5.208          15.624       17.856       899.4
7
3    22.4     4.032    5.824          21.056       21.280       827.3
4
4    12.0     4.200    3.360          10.920       10.680       878.4
1
5    13.6     5.032    3.808          10.744       12.920       835.5
0
6    10.8     4.968    3.888           9.396        8.856      1068.7
3
7    16.2     6.156    4.860          14.094       16.038      1137.8
7
8     5.9     2.006    1.593           5.900        5.900      1273.8
9
9    17.9     3.759    5.191          16.468       16.826      1160.1
3
10   15.6     2.964    3.900          14.820       14.508       913.1
5
11   17.5     9.450    7.175          14.350       15.225       861.1
8
12   15.3     5.508    4.437          13.005       14.994       641.9
6
13   12.8     4.608    4.352          12.032       12.288       803.1
1
14   14.5     3.625    4.205          13.775       13.775       710.4
6
15   15.7     2.669    3.925          15.229       13.659       649.0
6
16   17.8     4.806    4.272          13.706       15.130       780.4
5
17   21.4     4.066    4.922          16.692       16.264       872.5
1
18   20.5     7.175    6.765          14.965       20.090      1281.5
5
19   15.1     5.738    4.530          13.137       12.684       661.8
8
20   12.5     4.250    4.000           8.875       12.375      1048.7
8
21    8.2     1.886    2.870           7.134        6.560      1011.1
4
22   14.1     3.384    3.948          13.395       10.857      1110.6
1
23    9.6     2.208    2.784           8.448        8.448       777.1
```

```
8
24   17.6    2.640    5.456          1.760      17.600      896.0
7
25   16.1    6.923    5.474         14.812      13.524      790.3
2
26   21.4    8.346    9.416         17.976      18.190      816.2
1
27   14.9    1.937    5.215         13.857      13.410      732.2
8
28   14.7    5.439    4.704         13.965      14.553     1029.8
7
29   11.6    4.060    3.480         10.092       9.628      746.5
4
30   11.2    1.792    3.136          9.632       8.736     1301.5
2
31   18.4    3.496    4.968         12.328      18.032      869.8
5
32   12.3    3.936    3.567         10.824       9.840     1234.3
1
33   16.8    6.552    5.208         15.792      13.608      708.2
4
34   23.9    5.497   10.038         23.661      20.554      688.7
5
35   14.1    3.948    4.794         13.959      11.562      697.7
3
36   19.9    6.368    5.771         18.308      18.706      881.5
1
37   12.8    4.224    3.328          8.576      11.520      804.7
1
38   18.2    9.100    5.642         17.472      16.016      905.9
9
39   11.1    3.774    4.218         10.212       8.769     1148.9
9
40   23.9    9.082    9.799         22.944      19.359      858.9
7
41   19.4    6.014    6.402         19.012      16.684      669.3
1
42   19.5    4.095    5.655         15.990      15.795      767.9
1
43   19.4    7.760    7.372         17.654      16.878     1004.7
5
44   11.3    4.859    1.808          9.944      10.848      809.3
8
45   13.6    4.080    4.080         13.056      12.920      716.2
0
46   12.7    2.413    3.429         11.049      11.176      768.9
5
47   10.6    4.452    3.498          8.692       9.116      890.0
3
```

```
48   23.8     8.092    6.664           23.086       20.706       992.6
1
49   13.8     4.968    4.554            5.382       11.592       670.3
1
50   17.4     7.308    5.568           14.094       15.660       791.1
4

    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  >
```

In [7]:

```
df.head()
```

Out[7]:

	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

In [8]:

```
df.tail()
```

Out[8]:

	total	speeding	alcohol	not_distracted	no_previous	ins_premium	ins_losses	abbrev
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 [9]:

```
#correlation
cor=df.corr()
```

```
C:\Users\venka\AppData\Local\Temp\ipykernel_54328\1101708189.py:2: Fu
tureWarning: The default value of numeric_only in DataFrame.corr is d
eprecated. In a future version, it will default to False. Select only
valid columns or specify the value of numeric_only to silence this wa
rning.
  cor=df.corr()
```

In [10]:

```
cor
```

Out[10]:

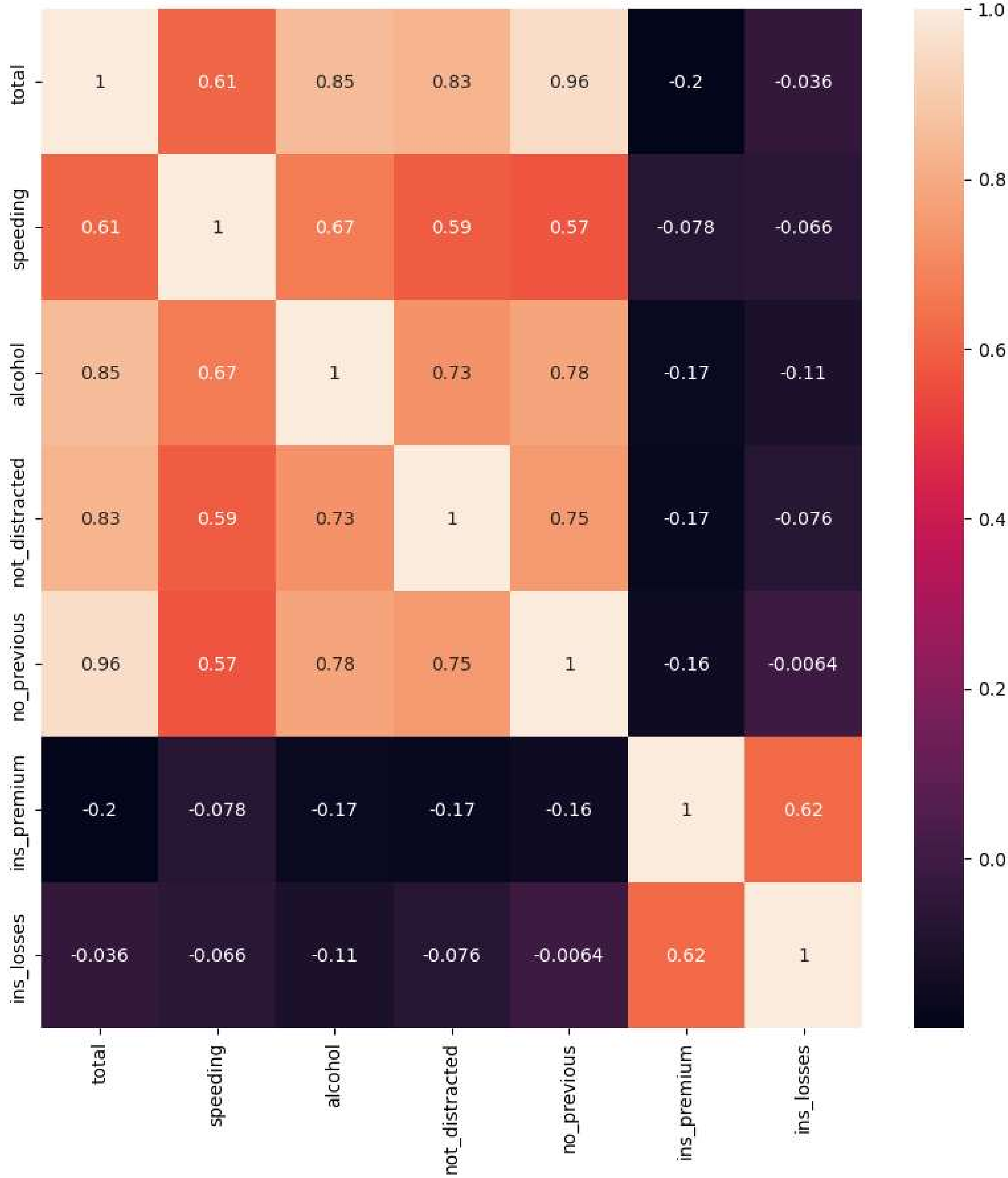
	total	speeding	alcohol	not_distracted	no_previous	ins_premium	ins_los
total	1.000000	0.611548	0.852613	0.827560	0.956179	-0.199702	-0.036
speeding	0.611548	1.000000	0.669719	0.588010	0.571976	-0.077675	-0.065
alcohol	0.852613	0.669719	1.000000	0.732816	0.783520	-0.170612	-0.112
not_distracted	0.827560	0.588010	0.732816	1.000000	0.747307	-0.174856	-0.075
no_previous	0.956179	0.571976	0.783520	0.747307	1.000000	-0.156895	-0.006
ins_premium	-0.199702	-0.077675	-0.170612	-0.174856	-0.156895	1.000000	0.623
ins_losses	-0.036011	-0.065928	-0.112547	-0.075970	-0.006359	0.623116	1.000

In [11]:

```
#correlation 2D-matrix
plt.figure(figsize=(10,10))
sns.heatmap(cor,annot=True)
```

Out[11]:

```
<Axes: >
```



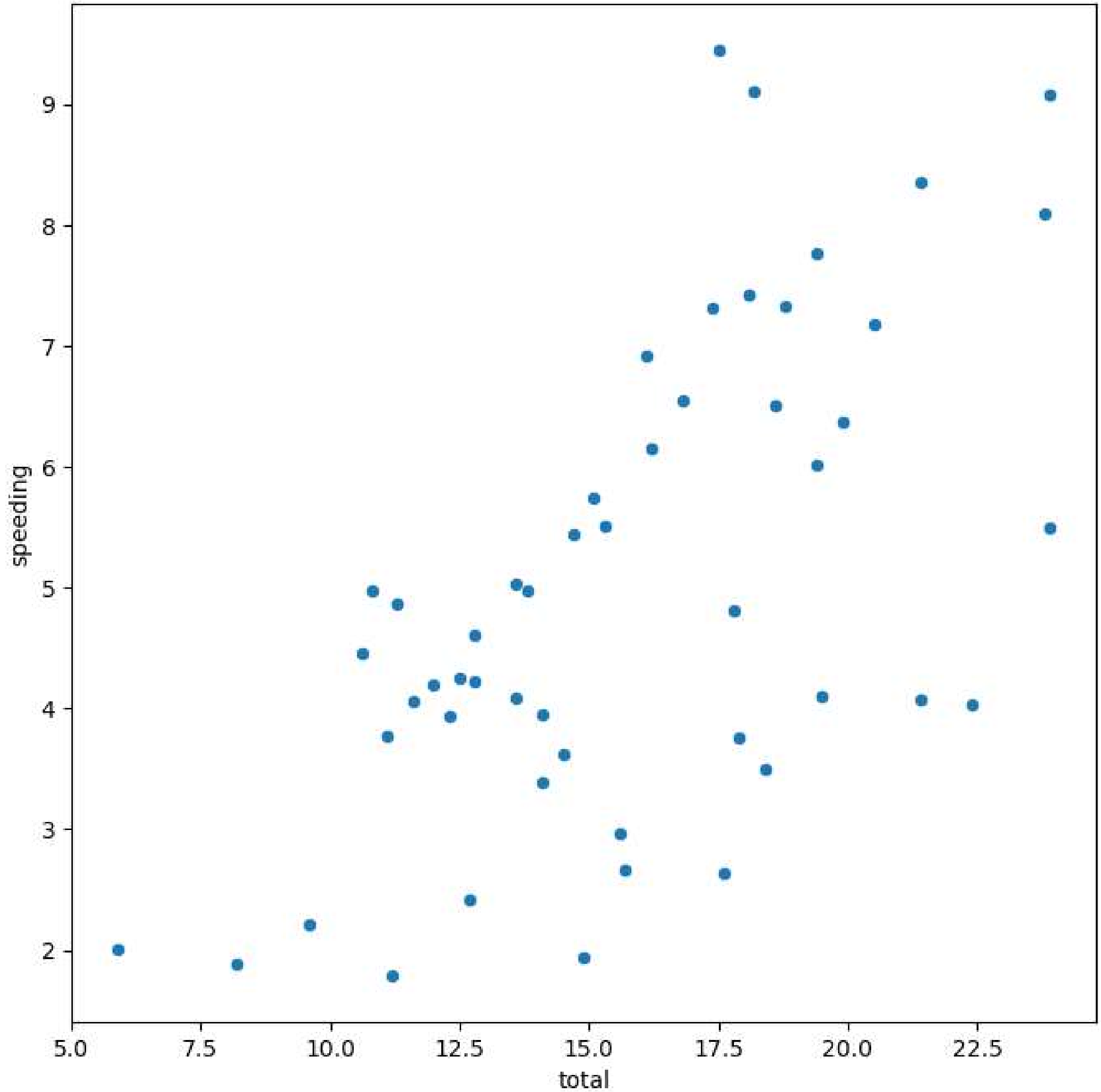
Inference from the above graph : from the above graph some are highly correlated (value >0.5) andsome are less correlated (less than <0.5) ex : here both the features total and speeding are highlycorrelated because the value is greater than 0.61 which is greater than 0.5. if we take the featurestotal and ins_losses they are negativley correlated or we can say they are less correlated becausethe value is -0.036 which is less than 0.5

In [12]:

```
plt.figure(figsize=(8,8))
sns.scatterplot(x="total",y="speeding",data=df)
```

Out[12]:

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



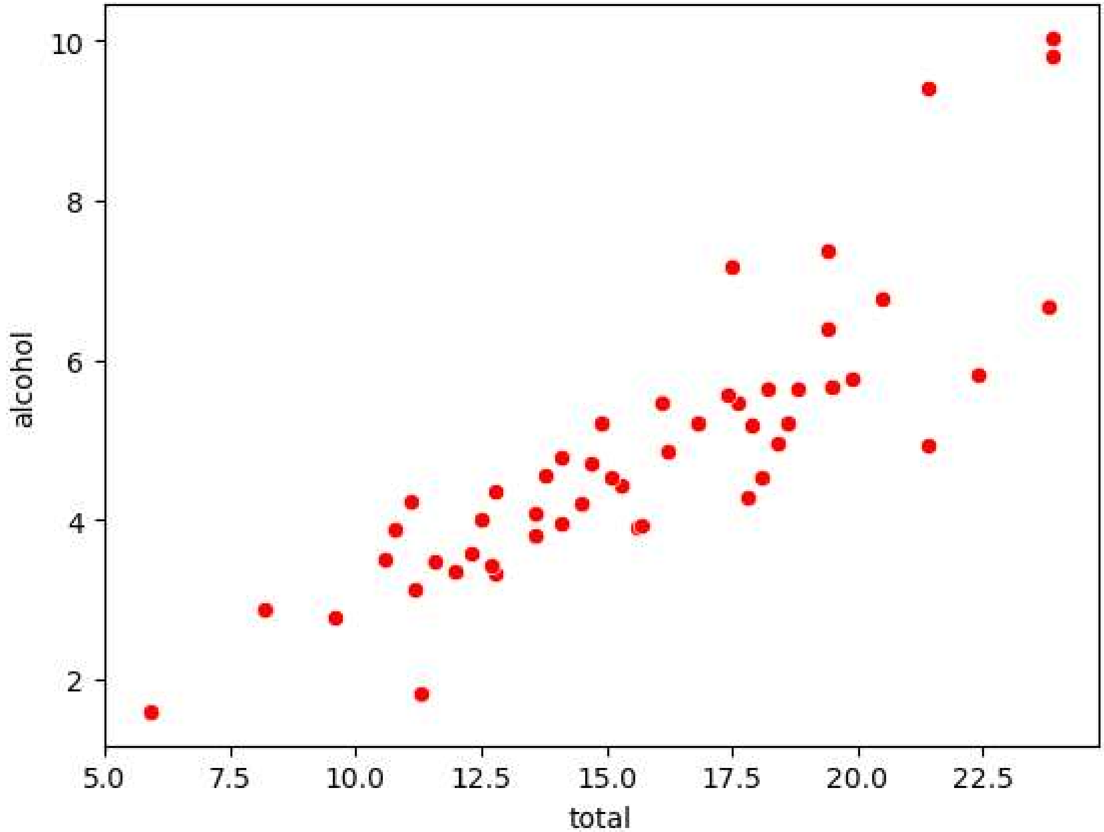
INFERENCE: It appears that there is a linear relationship between the total number of drivers involved in fatal collisions and the percentage of those drivers who were speeding. As the percentage of speeding drivers increases, the total number of drivers in fatal collisions also tends to increase in a proportional manner.

In [13]:

```
sns.scatterplot(x="total",y="alcohol",data=df,color="r")
```

Out[13]:

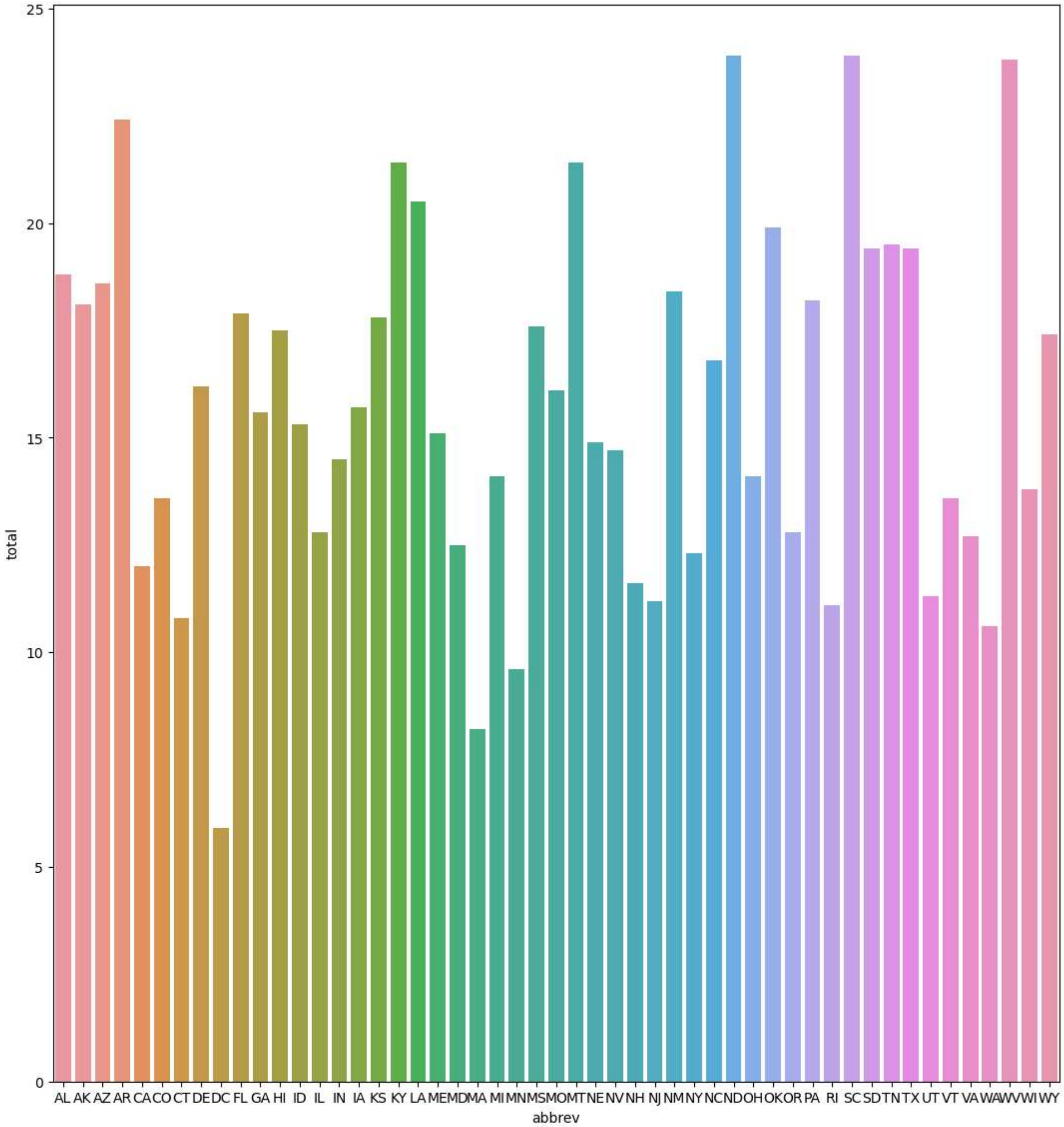
```
<Axes: xlabel='total', ylabel='alcohol'>
```



INFERENCE: It is evident that there exists a linear relationship between the total number of drivers involved in fatal collisions and the percentage of those drivers who were distracted. As the percentage of distracted drivers increases, the total number of drivers in fatal collisions also tends to increase in a proportional manner.

In [16]:

```
#BARPLOT :
plt.figure(figsize=(13,14))
sns.barplot(x="abbrev",y="total",data=df)
plt.show()
```



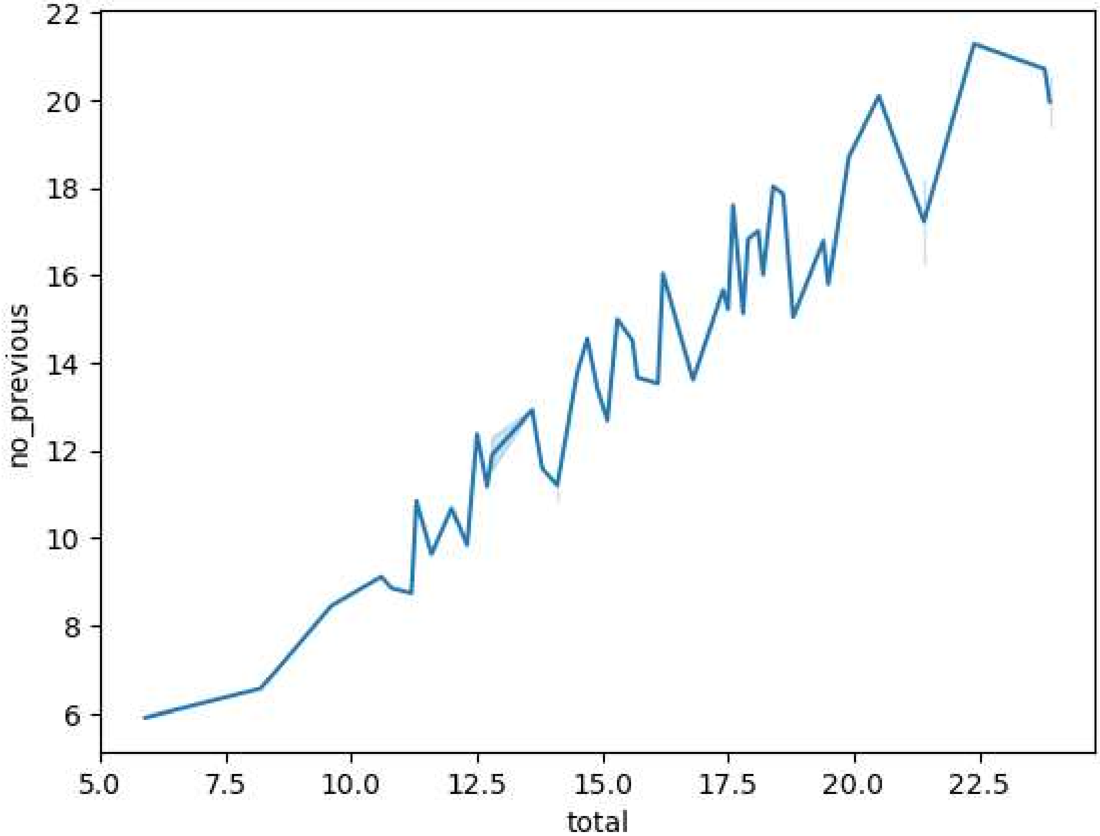
INFERENCE: Among all state ND has total no.of highest collisions

In [15]:

```
sns.lineplot(x="total",y="no_previous",data=df)
```

Out[15]:

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



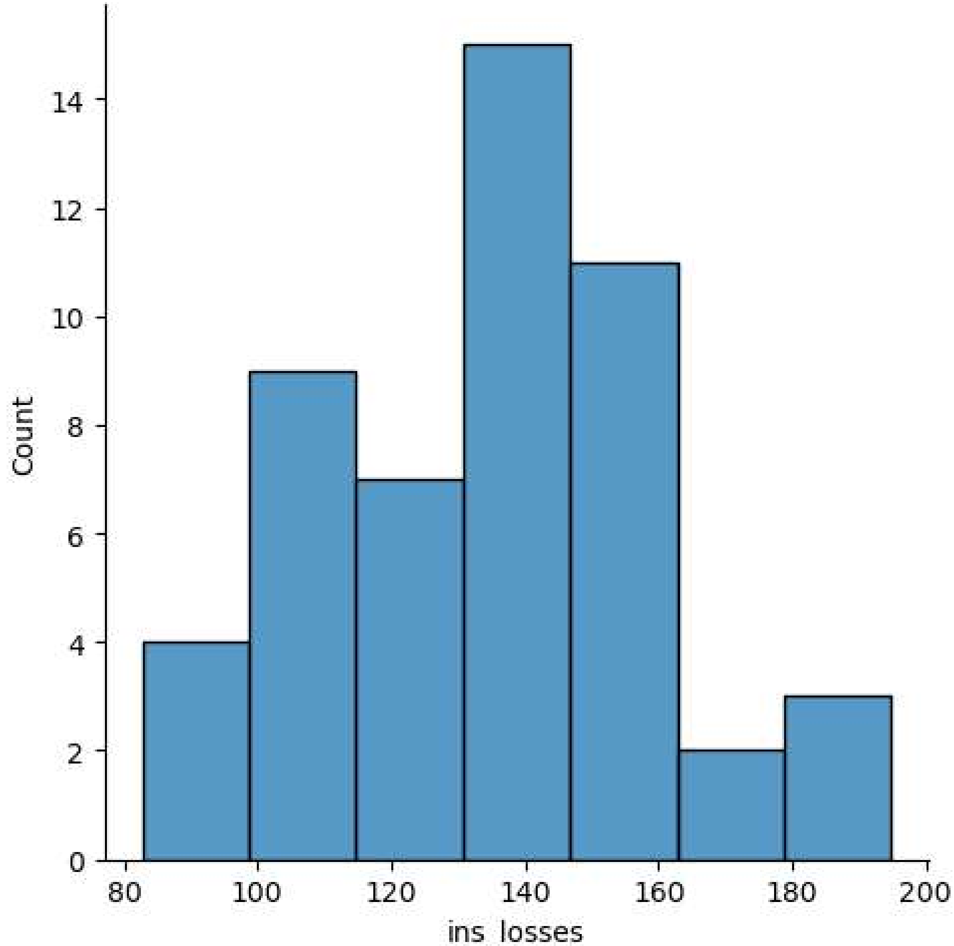
INFERENCE: It appears that there is a linear relationship between the total number of drivers involved in fatal collisions and the percentage of those drivers who do not have previous accidents on their record. As the percentage of drivers without previous accidents increases, the total number of drivers involved in fatal collisions tends to increase in a proportional manner.

In [17]:

```
sns.displot(df["ins_losses"])
```

Out[17]:

```
<seaborn.axisgrid.FacetGrid at 0x237b4d82050>
```



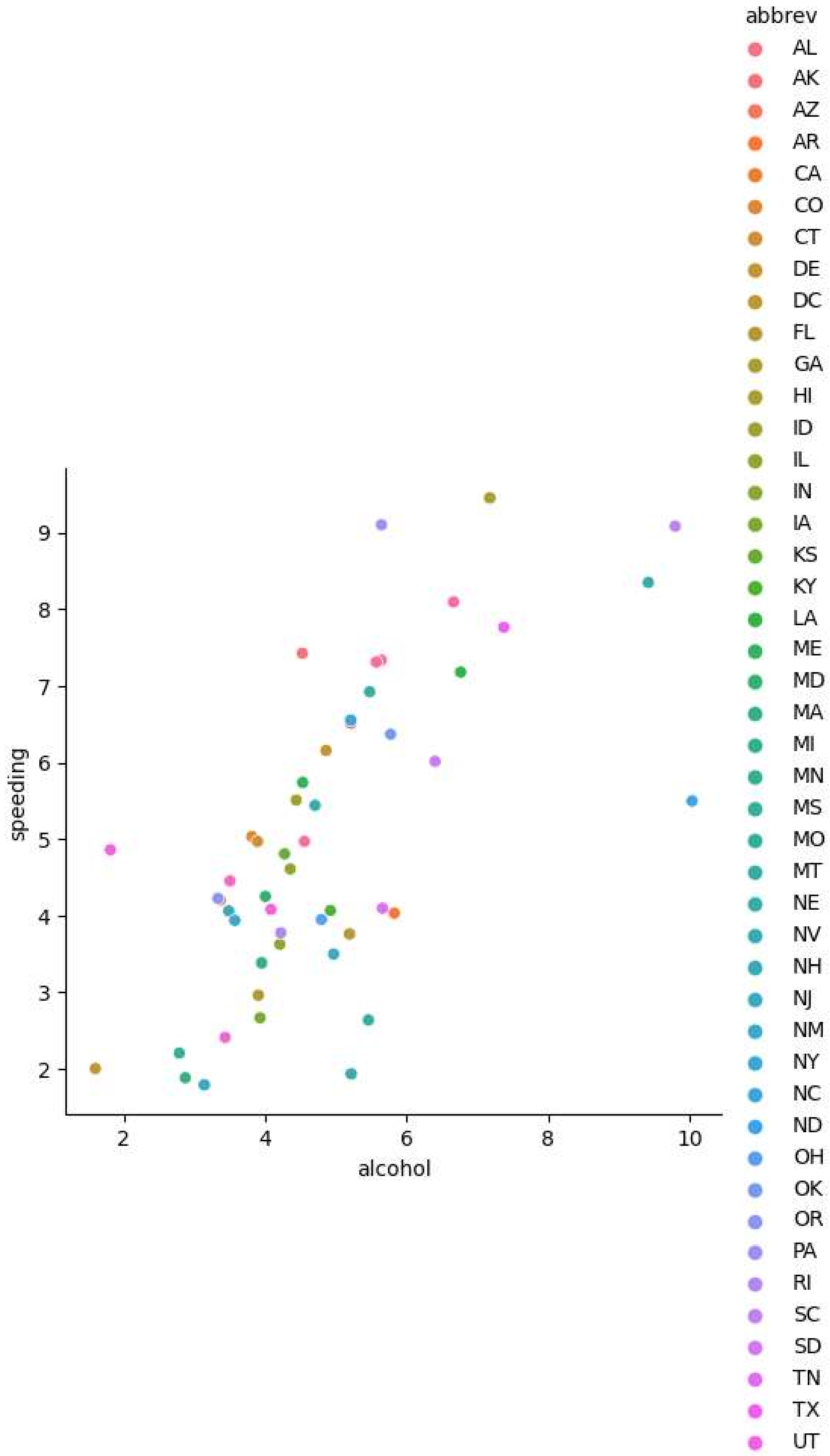
INFERENCE: It is apparent that insurance losses predominantly fall within the range of 100 to 160, with the highest concentration of losses occurring around 140.

In [18]:

```
sns.relplot(x="alcohol",y="speeding",data=df,hue="abbrev")
```

Out[18]:

```
<seaborn.axisgrid.FacetGrid at 0x237b4f52510>
```


abbrev
AL
AK
AZ
AR
CA
CO
CT
DE
DC
FL
GA
HI
ID
IL
IN
IA
KS
KY
LA
ME
MD
MA
MI
MN
MS
MO
MT
NE
NV
NH
NJ
NM
NY
NC
ND
OH
OK
OR
PA
RI
SC
SD
TN
TX
UT
speeding
alcohol
9
8
7
6
5
4
3
2
2
4
6
8
10

INFERENCE: It appears that there may be a correlation between higher levels of alcohol consumption and an increase in speeding incidents, as suggested by the graph. However, it's

In [ ]: