In [1]:
```
# import the packages
# read the data
# divide into numerical and categorical
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

file_path=r'C:\Users\omkar\OneDrive\Documents\Gen_AI\Data_files\Visadataset.csv'
visa_df=pd.read_csv(file_path)

cat=visa_df.select_dtypes(include='object').columns
num=visa_df.select_dtypes(exclude='object').columns
```

In [2]:
```
visa_df[['continent','case_status']]
```

Out[2]:

	continent	case_status
0	Asia	Denied
1	Asia	Certified
2	Asia	Denied
3	Asia	Denied
4	Africa	Certified
...	...	...
25475	Asia	Certified
25476	Asia	Certified
25477	Asia	Certified
25478	Asia	Certified
25479	Asia	Certified

25480 rows × 2 columns

In [3]:
```
visa_df['continent'].value_counts()
```

Out[3]:
```
continent
Asia             16861
Europe            3732
North America     3292
South America      852
Africa             551
Oceania            192
Name: count, dtype: int64
```

In [4]:
```
visa_df['case_status'].value_counts()
```

Out[4]:
```
case_status
Certified    17018
Denied        8462
Name: count, dtype: int64
```

TASK

- How many members are certified from Asia
- How many members are denied from Asia

In [7]:
```
con1=visa_df['continent']=='Asia'
con2=visa_df['case_status']=='Certified'
con3=visa_df['case_status']=='Denied'
certi_con=con1&con2
deni_con=con1&con3
len(visa_df[certi_con]),len(visa_df[deni_con])
```

Out[7]:
```
(11012, 5849)
```

In [8]:
```
labels=visa_df['continent'].unique()
certified,denied=[],[]
for i in labels:
    con1=visa_df['continent']==i
    con2=visa_df['case_status']=='Certified'
    con3=visa_df['case_status']=='Denied'
    certi_con=con1&con2
    deni_con=con1&con3
    certified.append(len(visa_df[certi_con]))
    denied.append(len(visa_df[deni_con]))
```

In [9]:
```
certified
```

Out[9]:
```
[11012, 397, 2037, 2957, 493, 122]
```

In [10]:
```
case_labels=sorted(visa_df['case_status'].unique())
```

In [11]:
```
pd.DataFrame(zip(certified,denied),
             index=labels,
             columns=case_labels)
```

Out[11]:

	Certified	Denied
Asia	11012	5849
Africa	397	154
North America	2037	1255
Europe	2957	775
South America	493	359
Oceania	122	70

crosstab

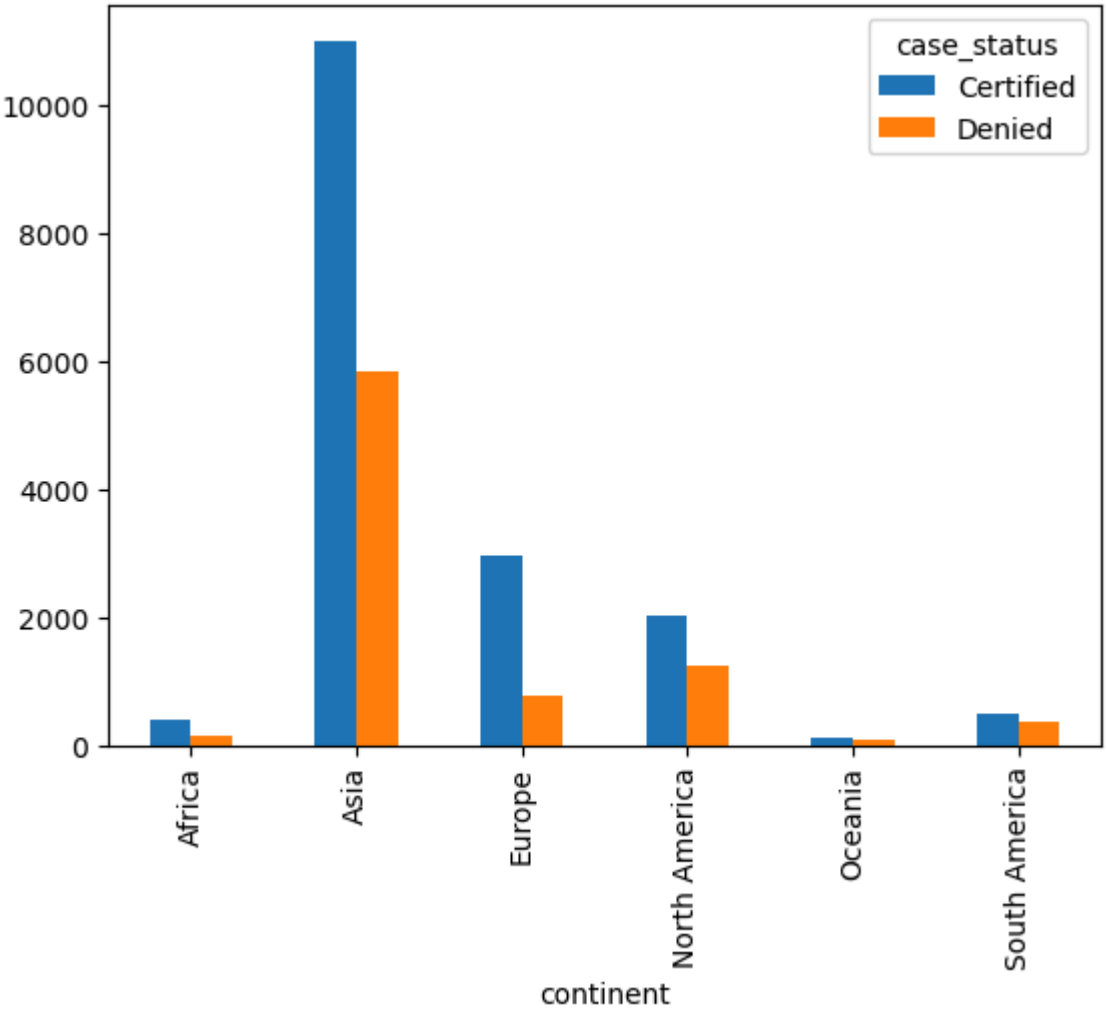
In [13]:
```
id_col=visa_df['continent']
col=visa_df['case_status']
r1=pd.crosstab(id_col,col)
r1
```

Out[13]:

case_status	Certified	Denied
continent		
Africa	397	154
Asia	11012	5849
Europe	2957	775
North America	2037	1255
Oceania	122	70
South America	493	359

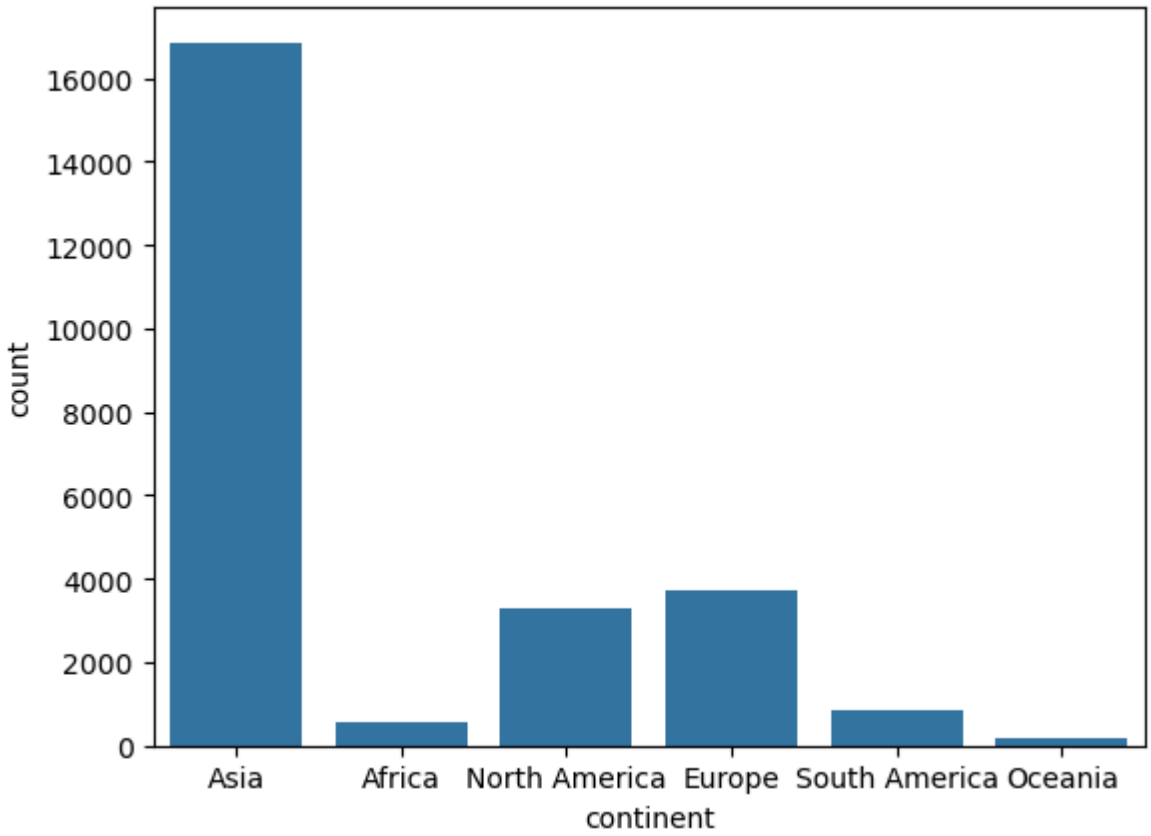
In [14]:
```
r1.plot(kind='bar')
```

Out[14]:
```
<Axes: xlabel='continent'>
```



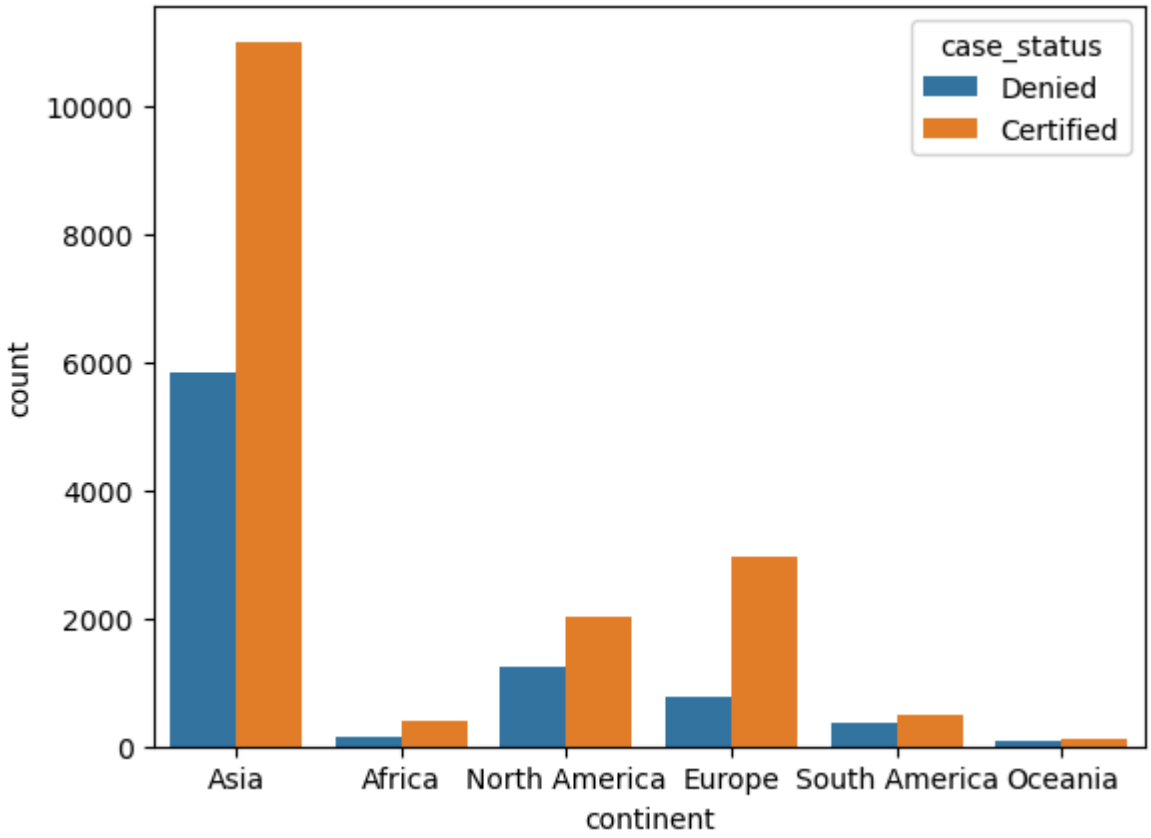
In [15]:
```
sns.countplot(data=visa_df,
              x='continent')
```

Out[15]:
```
<Axes: xlabel='continent', ylabel='count'>
```



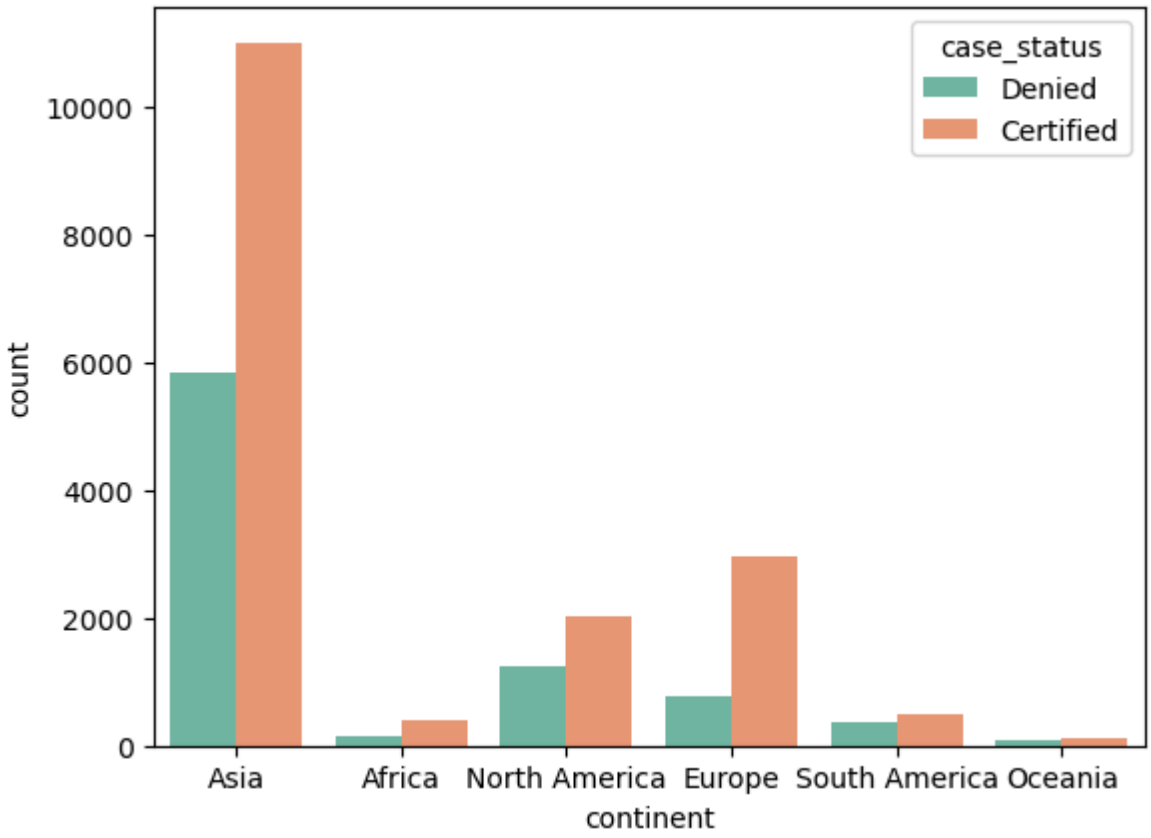
In [16]:
```
sns.countplot(data=visa_df,
              x='continent',
              hue='case_status')
```

Out[16]: <Axes: xlabel='continent', ylabel='count'>



In [17]:
```
sns.countplot(data=visa_df,
              x='continent',
              hue='case_status',
              palette='Set2',
              width=0.8)
```

Out[17]: <Axes: xlabel='continent', ylabel='count'>



In [18]:
```
# Scatter plot
# correlation
# heatmaps

# Streamlit RAG

# Sunday llma access api key 2hours 9 to 11
```

In [36]:
```
id_col=visa_df['continent']
col=visa_df['case_status']
r1=pd.crosstab(id_col,col)
r1
```

Out[36]:

case_status	Certified	Denied
continent		
Africa	397	154
Asia	11012	5849
Europe	2957	775
North America	2037	1255
Oceania	122	70
South America	493	359

In [38]:
```
col1=visa_df['continent']
col2=visa_df['education_of_employee']
col3=visa_df['case_status']
id_col=col1
cols=[col2,col3]
pd.crosstab(col1,cols)
```

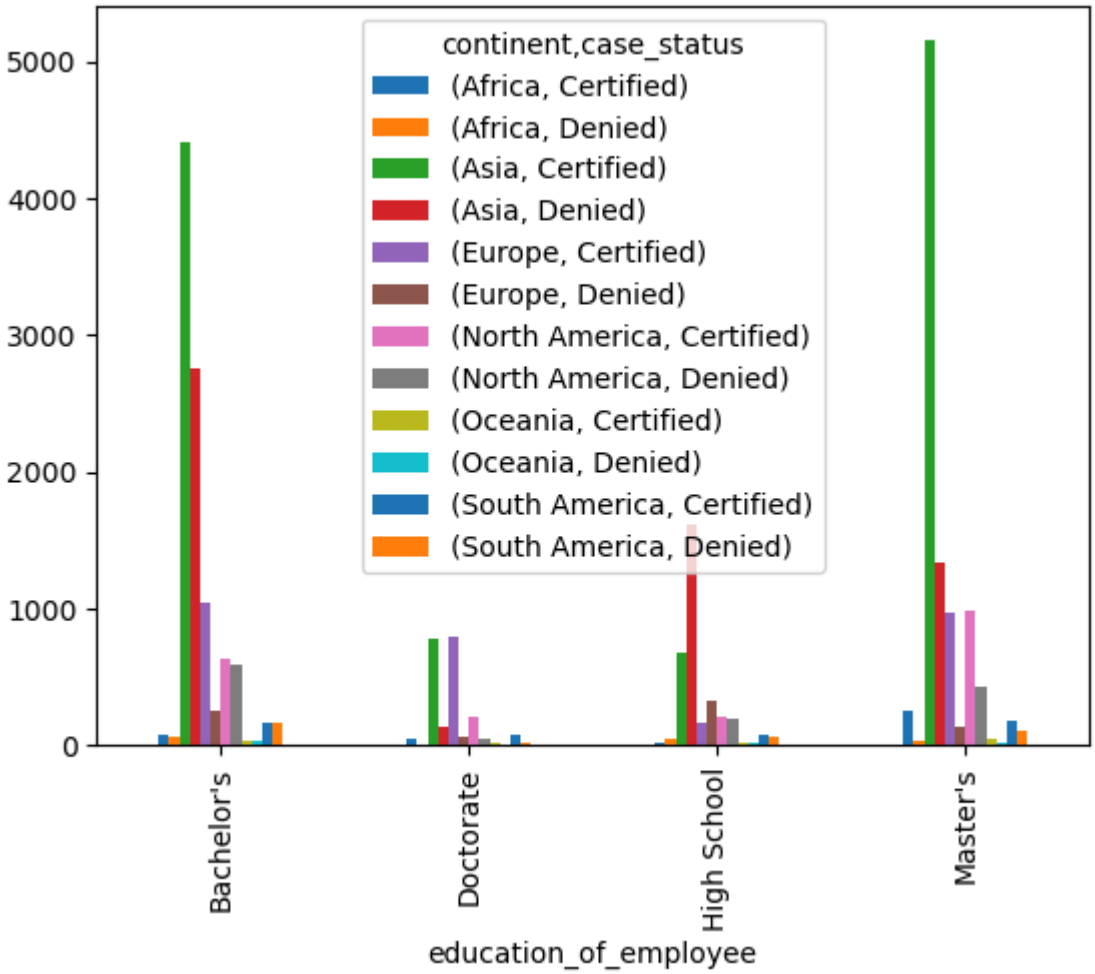
Out[38]:

education_of_employee	Bachelor's		Doctorate		High School		
case_status	Certified	Denied	Certified	Denied	Certified	Denied	Certifie
continent							
Africa	81	62	43	11	23	43	25
Asia	4407	2761	780	143	676	1614	514
Europe	1040	259	788	58	162	328	96
North America	641	584	207	51	210	191	97
Oceania	38	28	19	3	19	17	4
South America	160	173	75	14	74	63	18

In [42]:
```
col1=visa_df['continent']
col2=visa_df['education_of_employee']
col3=visa_df['case_status']
id_col=col2
cols=[col1,col3]
r2=pd.crosstab(id_col,cols)
```

In [44]:
```
r2.plot(kind='bar')
```

Out[44]:
```
<Axes: xlabel='education_of_employee'>
```

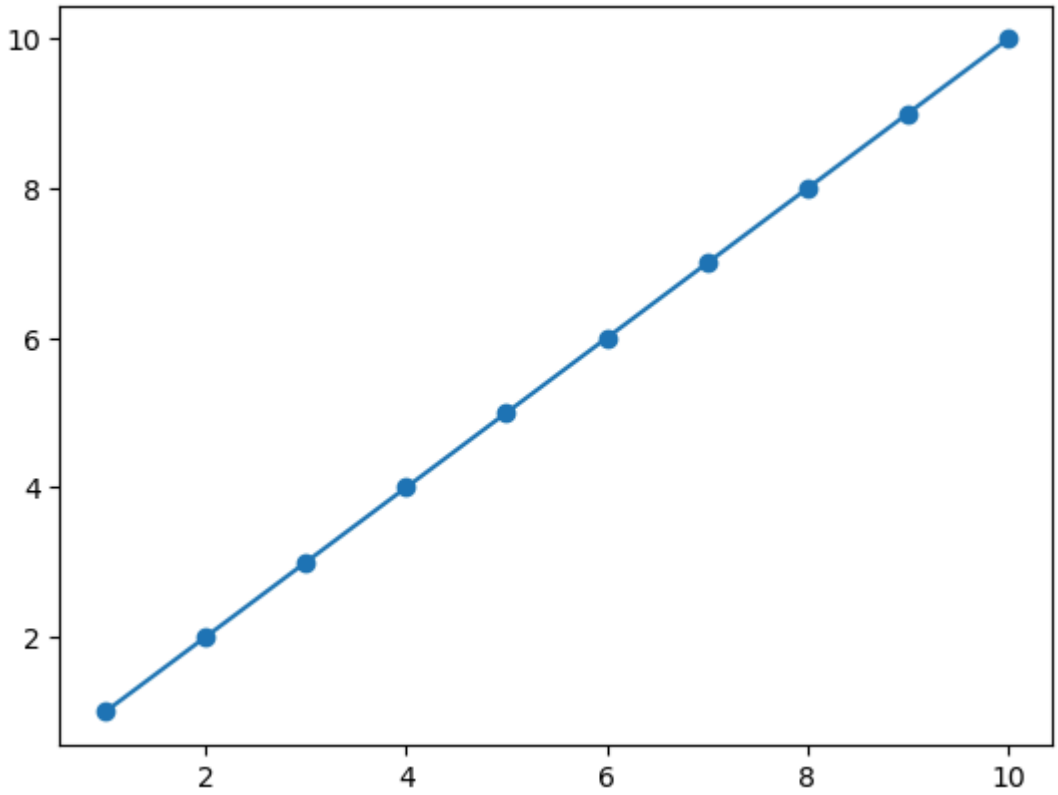


Scatter plots

- bar chart : frequency table
- pie chart : relative frequency table
- histogram : frequency distribution plot
- box plot : Outlier analysis
- scatterplot : Relation between two Numerical columns

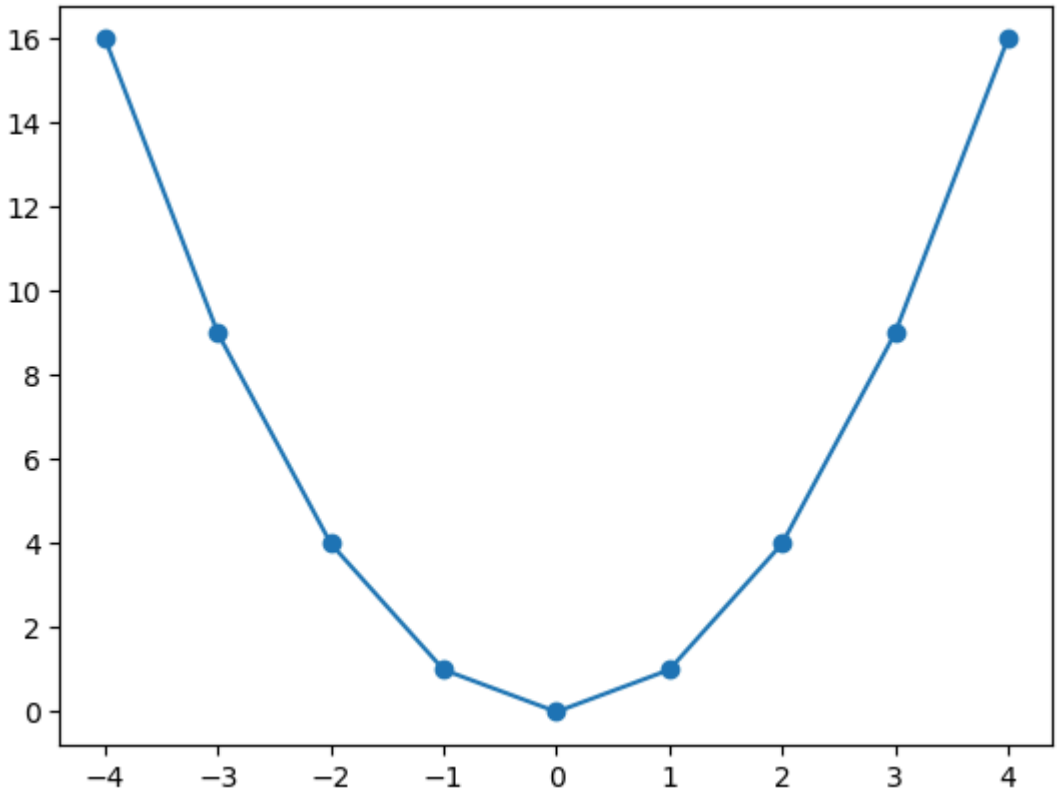
In [52]:
```
x=list(range(1,11))
y=list(range(1,11))
plt.scatter(x,y)
plt.plot(x,y)
```

Out[52]:
```
[<matplotlib.lines.Line2D at 0x22f682929f0>]
```



In [54]:
```
x=list(range(-4,5))
y=[i*i for i in x]
plt.scatter(x,y)
plt.plot(x,y)
```

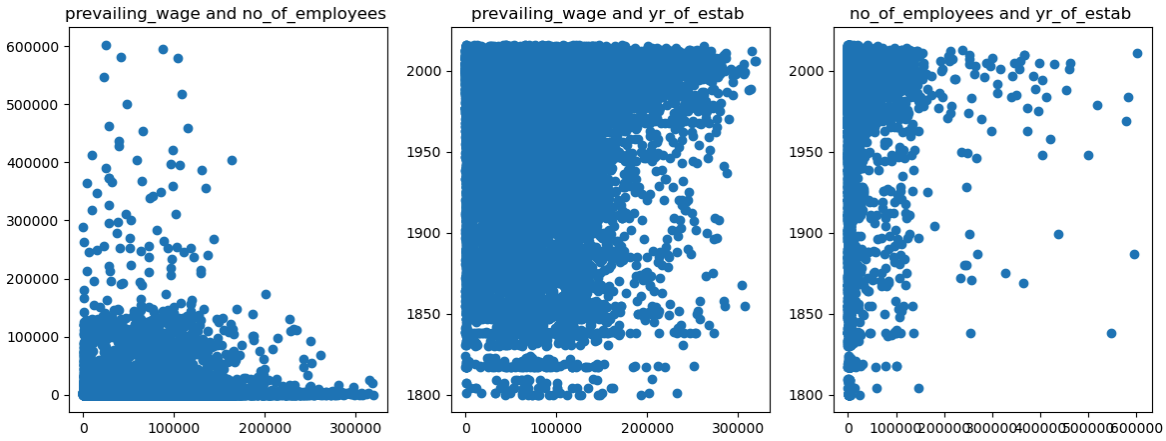
Out[54]: [<matplotlib.lines.Line2D at 0x22f679c5190>]



In [60]:
```
col1=visa_df['prevailing_wage']
col2=visa_df['no_of_employees']
col3=visa_df['yr_of_estab']
```

```
plt.figure(figsize=(14,5))
plt.subplot(1,3,1).scatter(col1,col2)
plt.title('prevailing_wage and no_of_employees ')
plt.subplot(1,3,2).scatter(col1,col3)
plt.title('prevailing_wage and yr_of_estab ')
plt.subplot(1,3,3).scatter(col2,col3)
plt.title('no_of_employees and yr_of_estab ')
```

Out[60]: Text(0.5, 1.0, 'no_of_employees and yr_of_estab ')



Correlation

In [65]:
```
visa_df.corr(numeric_only=True)
```

Out[65]:

	no_of_employees	yr_of_estab	prevailing_wage
no_of_employees	1.000000	-0.017770	-0.009523
yr_of_estab	-0.017770	1.000000	0.012342
prevailing_wage	-0.009523	0.012342	1.000000

Heatmap

In [70]:
```
corr=visa_df.corr(numeric_only=True)
sns.heatmap(corr,annot=True)
```

Out[70]: <Axes: >

In [ ]:
```
# step-1: Wine quality dataset
# Step-2: apply the correlation : 12x12=144 values
# Step-3: By seeing this 144 human eyes can't identify which high and which low
# Step-4: Get the column pair  high post, high neg,no relation
# Step-5: Draw the scatter plot
```

In [74]:
```
file_path=r'C:\Users\omkar\OneDrive\Documents\Gen_AI\Data_files\winequality_red.
wine_df=pd.read_csv(file_path)
wine_df
```

Out[74]:

	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	pH	sulph
0	7.4	0.700	0.00	1.9	0.076	11.0	34.0	0.99780	3.51	
1	7.8	0.880	0.00	2.6	0.098	25.0	67.0	0.99680	3.20	
2	7.8	0.760	0.04	2.3	0.092	15.0	54.0	0.99700	3.26	
3	11.2	0.280	0.56	1.9	0.075	17.0	60.0	0.99800	3.16	
4	7.4	0.700	0.00	1.9	0.076	11.0	34.0	0.99780	3.51	
...	...	...	...	...	...	...	...	...	...	
1594	6.2	0.600	0.08	2.0	0.090	32.0	44.0	0.99490	3.45	
1595	5.9	0.550	0.10	2.2	0.062	39.0	51.0	0.99512	3.52	
1596	6.3	0.510	0.13	2.3	0.076	29.0	40.0	0.99574	3.42	
1597	5.9	0.645	0.12	2.0	0.075	32.0	44.0	0.99547	3.57	
1598	6.0	0.310	0.47	3.6	0.067	18.0	42.0	0.99549	3.39	

1599 rows × 12 columns

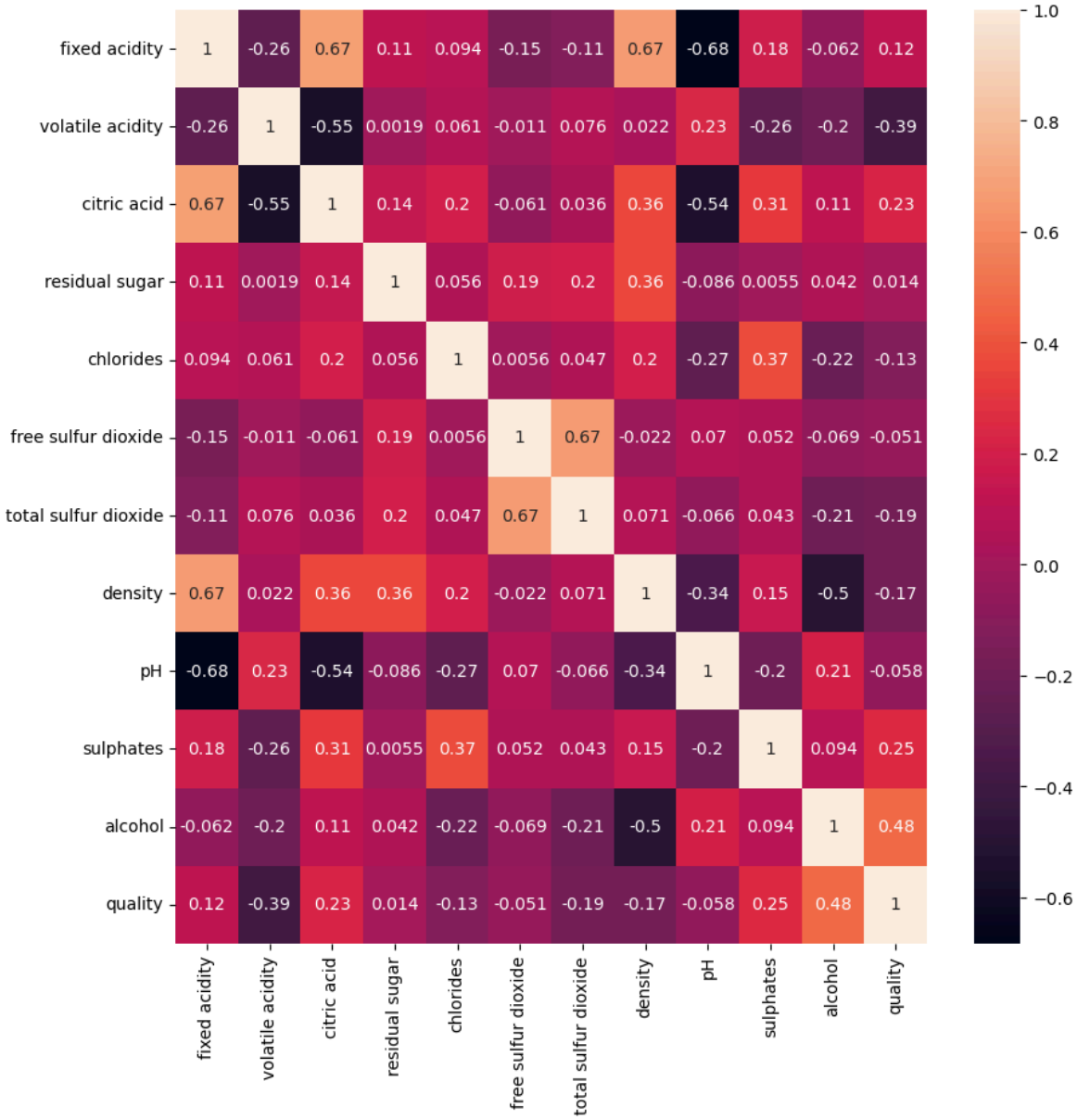
In [76]:
```
wine_df.corr()
```

Out[76]:

	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	
fixed acidity	1.000000	-0.256131	0.671703	0.114777	0.093705	-0.153794	-0.113181	(
volatile acidity	-0.256131	1.000000	-0.552496	0.001918	0.061298	-0.010504	0.076470	(
citric acid	0.671703	-0.552496	1.000000	0.143577	0.203823	-0.060978	0.035533	(
residual sugar	0.114777	0.001918	0.143577	1.000000	0.055610	0.187049	0.203028	(
chlorides	0.093705	0.061298	0.203823	0.055610	1.000000	0.005562	0.047400	(
free sulfur dioxide	-0.153794	-0.010504	-0.060978	0.187049	0.005562	1.000000	0.667666	-(
total sulfur dioxide	-0.113181	0.076470	0.035533	0.203028	0.047400	0.667666	1.000000	(
density	0.668047	0.022026	0.364947	0.355283	0.200632	-0.021946	0.071269	1
pH	-0.682978	0.234937	-0.541904	-0.085652	-0.265026	0.070377	-0.066495	-(
sulphates	0.183006	-0.260987	0.312770	0.005527	0.371260	0.051658	0.042947	(
alcohol	-0.061668	-0.202288	0.109903	0.042075	-0.221141	-0.069408	-0.205654	-(
quality	0.124052	-0.390558	0.226373	0.013732	-0.128907	-0.050656	-0.185100	-(

In [80]:
```
plt.figure(figsize=(10,10))
sns.heatmap(wine_df.corr(),annot=True)
```

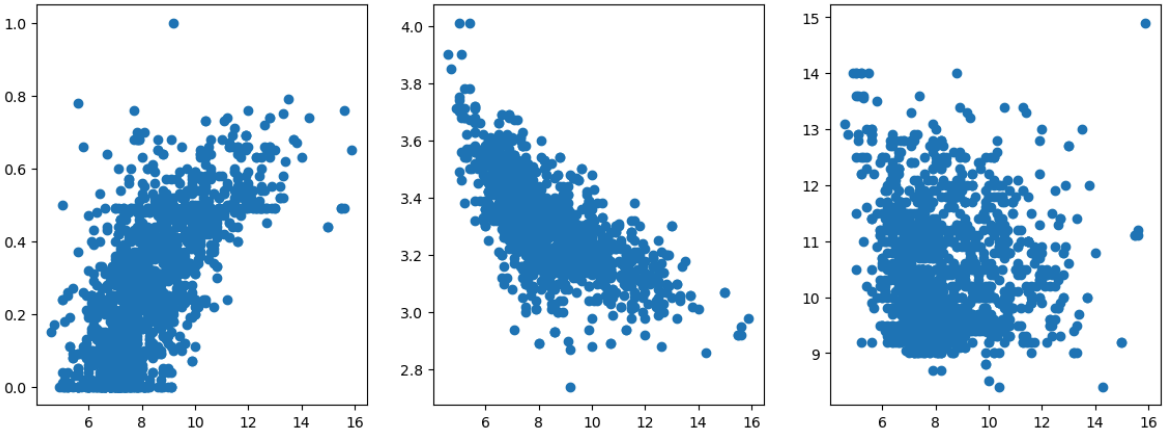
Out[80]: <Axes: >



In [ ]:
```
fixed acidity has 67% postive relation with citiric acide and 68% negative ph
no relation with alchol
```

In [84]:
```
col1=wine_df['fixed acidity']
col2=wine_df['citric acid']
col3=wine_df['pH']
col4=wine_df['alcohol']
plt.figure(figsize=(14,5))
plt.subplot(1,3,1).scatter(col1,col2)
plt.subplot(1,3,2).scatter(col1,col3)
plt.subplot(1,3,3).scatter(col1,col4)
```

Out[84]:
```
<matplotlib.collections.PathCollection at 0x22f70615580>
```



In [ ]: