In [ ]:

```
pip install cufflinks
```

```
Requirement already satisfied: cufflinks in c:\python 3.11.12\lib\site-packages (0.17.3)
Requirement already satisfied: numpy>=1.9.2 in c:\python 3.11.12\lib\site-packages (from cuff
links) (1.24.2)
Requirement already satisfied: pandas>=0.19.2 in c:\python 3.11.12\lib\site-packages (from cu
fflinks) (1.5.3)
Requirement already satisfied: plotly>=4.1.1 in c:\python 3.11.12\lib\site-packages (from cuf
flinks) (5.15.0)
Requirement already satisfied: six>=1.9.0 in c:\python 3.11.12\lib\site-packages (from cuffli
nks) (1.16.0)
Requirement already satisfied: colorlover>=0.2.1 in c:\python 3.11.12\lib\site-packages (from
cufflinks) (0.3.0)
Requirement already satisfied: setuptools>=34.4.1 in c:\python 3.11.12\lib\site-packages (fro
m cufflinks) (65.5.0)
Requirement already satisfied: ipython>=5.3.0 in c:\users\psure\appdata\roaming\python\python
311\site-packages (from cufflinks) (8.12.0)
Requirement already satisfied: ipywidgets>=7.0.0 in c:\python 3.11.12\lib\site-packages (from
cufflinks) (8.0.7)
Requirement already satisfied: backcall in c:\users\psure\appdata\roaming\python\python311\si
te-packages (from ipython>=5.3.0->cufflinks) (0.2.0)
Requirement already satisfied: decorator in c:\python 3.11.12\lib\site-packages (from ipython
>=5.3.0->cufflinks) (5.1.1)
Requirement already satisfied: jedi>=0.16 in c:\users\psure\appdata\roaming\python\python311
\site-packages (from ipython>=5.3.0->cufflinks) (0.18.2)
Requirement already satisfied: matplotlib-inline in c:\users\psure\appdata\roaming\python\pyt
hon311\site-packages (from ipython>=5.3.0->cufflinks) (0.1.6)
Requirement already satisfied: pickleshare in c:\users\psure\appdata\roaming\python\python311
\site-packages (from ipython>=5.3.0->cufflinks) (0.7.5)
Requirement already satisfied: prompt-toolkit!=3.0.37,<3.1.0,>=3.0.30 in c:\users\psure\appda
ta\roaming\python\python311\site-packages (from ipython>=5.3.0->cufflinks) (3.0.38)
Requirement already satisfied: pygments>=2.4.0 in c:\python 3.11.12\lib\site-packages (from i
python>=5.3.0->cufflinks) (2.15.0)
Requirement already satisfied: stack-data in c:\users\psure\appdata\roaming\python\python311
\site-packages (from ipython>=5.3.0->cufflinks) (0.6.2)
Requirement already satisfied: traitlets>=5 in c:\users\psure\appdata\roaming\python\python31
1\site-packages (from ipython>=5.3.0->cufflinks) (5.9.0)
Requirement already satisfied: colorama in c:\python 3.11.12\lib\site-packages (from ipython>
=5.3.0->cufflinks) (0.4.6)
Requirement already satisfied: ipykernel>=4.5.1 in c:\users\psure\appdata\roaming\python\pyth
on311\site-packages (from ipywidgets>=7.0.0->cufflinks) (6.22.0)
Requirement already satisfied: widgetsnbextension~=4.0.7 in c:\python 3.11.12\lib\site-packag
es (from ipywidgets>=7.0.0->cufflinks) (4.0.8)
Requirement already satisfied: jupyterlab-widgets~=3.0.7 in c:\python 3.11.12\lib\site-packag
es (from ipywidgets>=7.0.0->cufflinks) (3.0.8)
Requirement already satisfied: python-dateutil>=2.8.1 in c:\python 3.11.12\lib\site-packages
(from pandas>=0.19.2->cufflinks) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\python 3.11.12\lib\site-packages (from pand
as>=0.19.2->cufflinks) (2023.3)
Requirement already satisfied: tenacity>=6.2.0 in c:\python 3.11.12\lib\site-packages (from p
lotly>=4.1.1->cufflinks) (8.2.2)
Requirement already satisfied: packaging in c:\python 3.11.12\lib\site-packages (from plotly>
=4.1.1->cufflinks) (23.1)
Requirement already satisfied: comm>=0.1.1 in c:\users\psure\appdata\roaming\python\python311
\site-packages (from ipykernel>=4.5.1->ipywidgets>=7.0.0->cufflinks) (0.1.3)
Requirement already satisfied: debugpy>=1.6.5 in c:\users\psure\appdata\roaming\python\python
311\site-packages (from ipykernel>=4.5.1->ipywidgets>=7.0.0->cufflinks) (1.6.7)
Requirement already satisfied: jupyter-client>=6.1.12 in c:\users\psure\appdata\roaming\pytho
n\python311\site-packages (from ipykernel>=4.5.1->ipywidgets>=7.0.0->cufflinks) (8.2.0)
Requirement already satisfied: jupyter-core!=5.0.*,>=4.12 in c:\users\psure\appdata\roaming\p
ython\python311\site-packages (from ipykernel>=4.5.1->ipywidgets>=7.0.0->cufflinks) (5.3.0)
Requirement already satisfied: nest-asyncio in c:\users\psure\appdata\roaming\python\python31
1\site-packages (from ipykernel>=4.5.1->ipywidgets>=7.0.0->cufflinks) (1.5.6)
Requirement already satisfied: psutil in c:\users\psure\appdata\roaming\python\python311\site
-packages (from ipykernel>=4.5.1->ipywidgets>=7.0.0->cufflinks) (5.9.5)
Requirement already satisfied: pyzmq>=20 in c:\users\psure\appdata\roaming\python\python311\s
ite-packages (from ipykernel>=4.5.1->ipywidgets>=7.0.0->cufflinks) (25.0.2)
Requirement already satisfied: tornado>=6.1 in c:\python 3.11.12\lib\site-packages (from ipyk
ernel>=4.5.1->ipywidgets>=7.0.0->cufflinks) (6.2)
Requirement already satisfied: parso<0.9.0,>=0.8.0 in c:\users\psure\appdata\roaming\python\p
ython311\site-packages (from jedi>=0.16->ipython>=5.3.0->cufflinks) (0.8.3)
```

```
Requirement already satisfied: wcwidth in c:\users\psure\appdata\roaming\python\python311\sit
e-packages (from prompt-toolkit!=3.0.37,<3.1.0,>=3.0.30->ipython>=5.3.0->cufflinks) (0.2.6)
Requirement already satisfied: executing>=1.2.0 in c:\users\psure\appdata\roaming\python\pyth
on311\site-packages (from stack-data->ipython>=5.3.0->cufflinks) (1.2.0)
Requirement already satisfied: asttokens>=2.1.0 in c:\users\psure\appdata\roaming\python\pyth
on311\site-packages (from stack-data->ipython>=5.3.0->cufflinks) (2.2.1)
Requirement already satisfied: pure-eval in c:\users\psure\appdata\roaming\python\python311\s
ite-packages (from stack-data->ipython>=5.3.0->cufflinks) (0.2.2)
Requirement already satisfied: platformdirs>=2.5 in c:\users\psure\appdata\roaming\python\pyt
hon311\site-packages (from jupyter-core!=5.0.*,>=4.12->ipykernel>=4.5.1->ipywidgets>=7.0.0->c
ufflinks) (3.3.0)
Requirement already satisfied: pywin32>=300 in c:\users\psure\appdata\roaming\python\python31
1\site-packages (from jupyter-core!=5.0.*,>=4.12->ipykernel>=4.5.1->ipywidgets>=7.0.0->cuffli
nks) (306)
Note: you may need to restart the kernel to use updated packages.
```

In [ ]:

```
import cufflinks as cf
import numpy as np
import pandas as pd
import seaborn as sns
```

In [ ]:

```
df = pd.DataFrame(np.random.randn(100,3), columns = ["A", "B", "C"])
```

In [ ]:

```
df
```

Out[ ]:

	A	B	C
0	0.826573	-0.027969	-0.977671
1	0.536909	0.693824	-0.235018
2	0.046147	0.012307	-0.005729
3	1.274929	-0.876292	-1.209962
4	-0.581185	-0.196095	-0.015610
...	...	...	...
95	0.352545	0.864862	0.569106
96	-0.650074	0.965631	-0.015619
97	1.839851	1.488863	1.109383
98	0.211553	0.326846	0.131060
99	1.045024	-1.084243	-0.797473

100 rows × 3 columns

In [ ]:

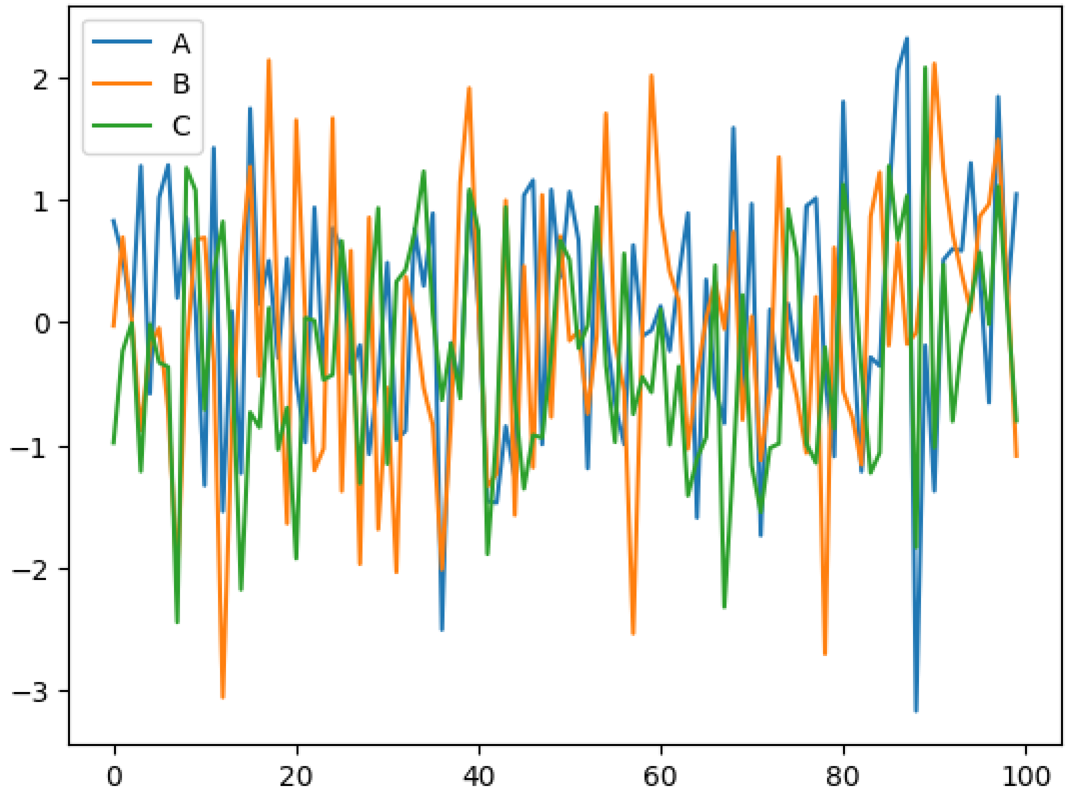
```
cf.go_offline()
```

In [ ]:

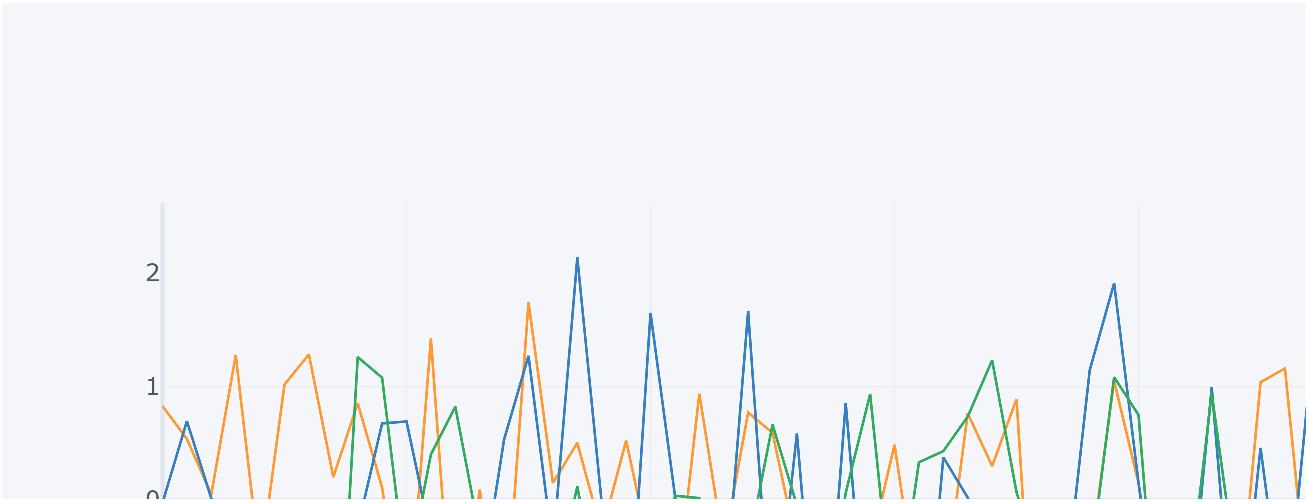
```
df.plot()
```

Out[ ]:

```
<Axes: >
```



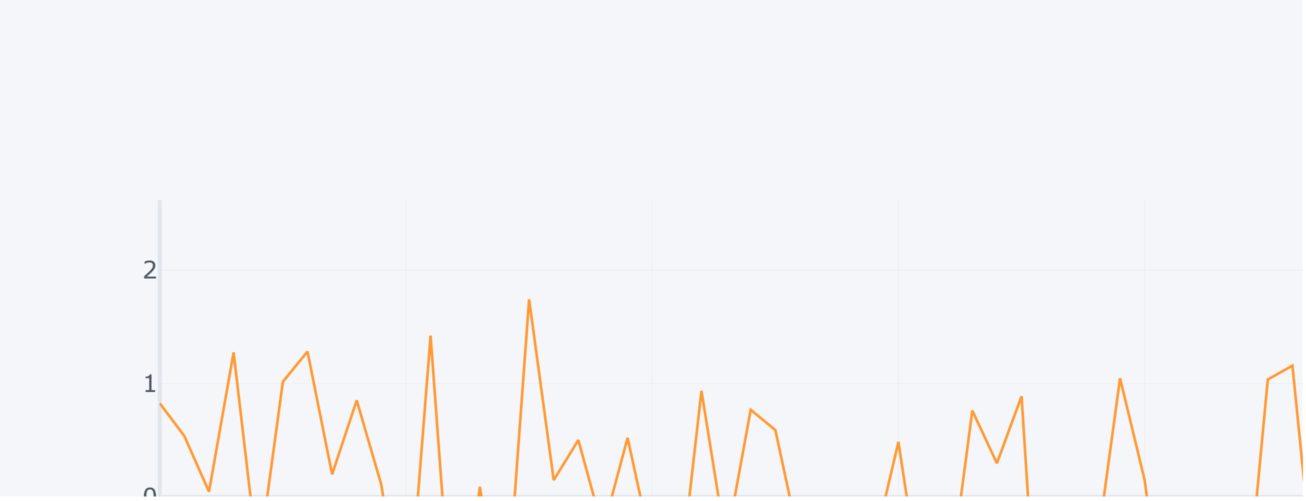
```
In [ ]: df.iplot()
```



```
In [ ]: pip install nbformat>=4.2.0
```

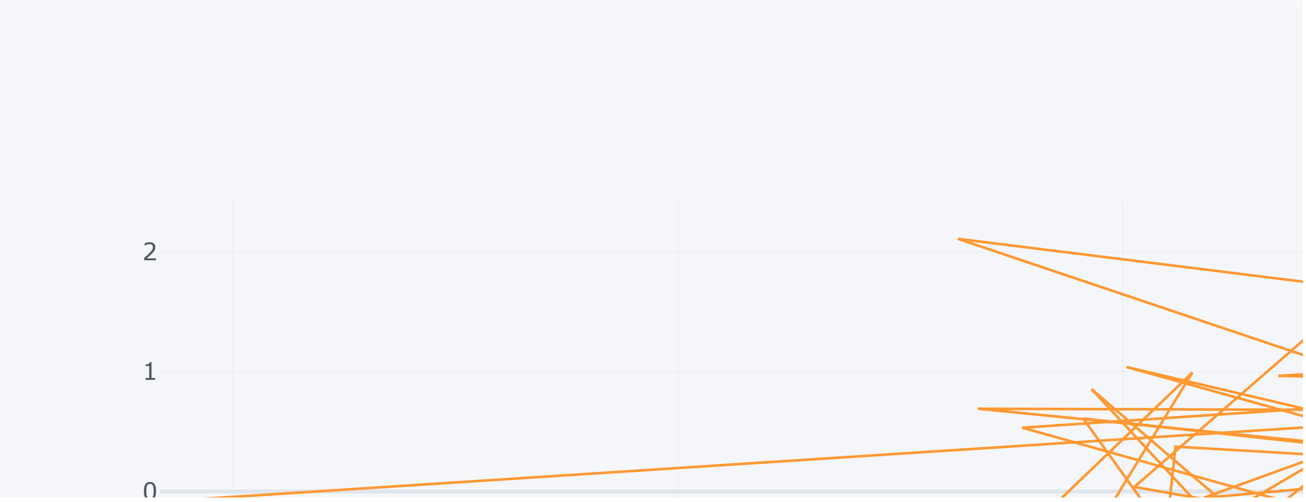
```
Note: you may need to restart the kernel to use updated packages.
```

```
In [ ]: df[["A"]].iplot()
```



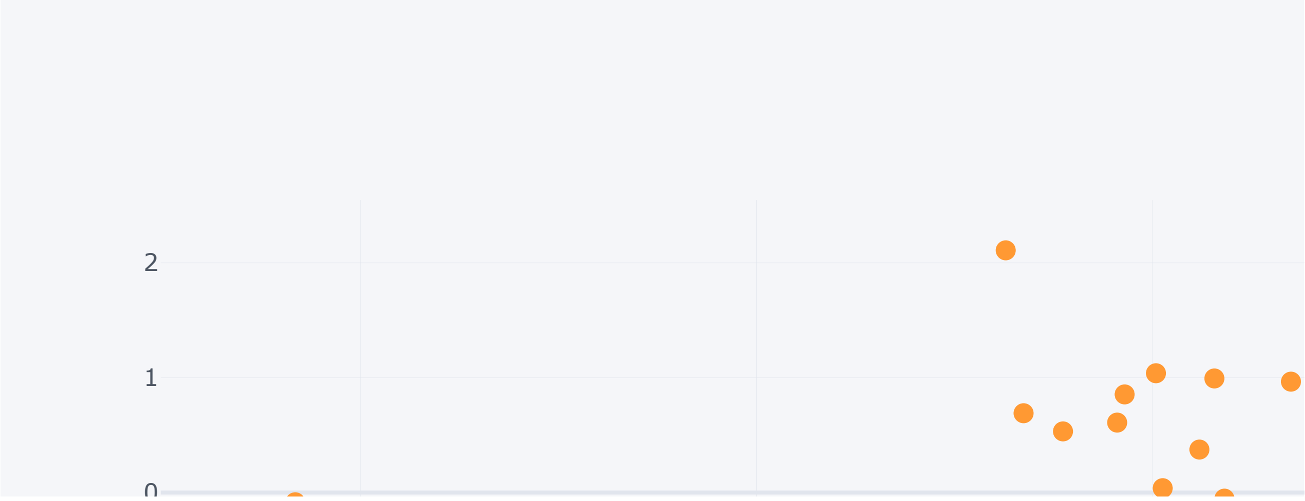
In [ ]:

```
df.iplot(x = "A", y = "B")
```



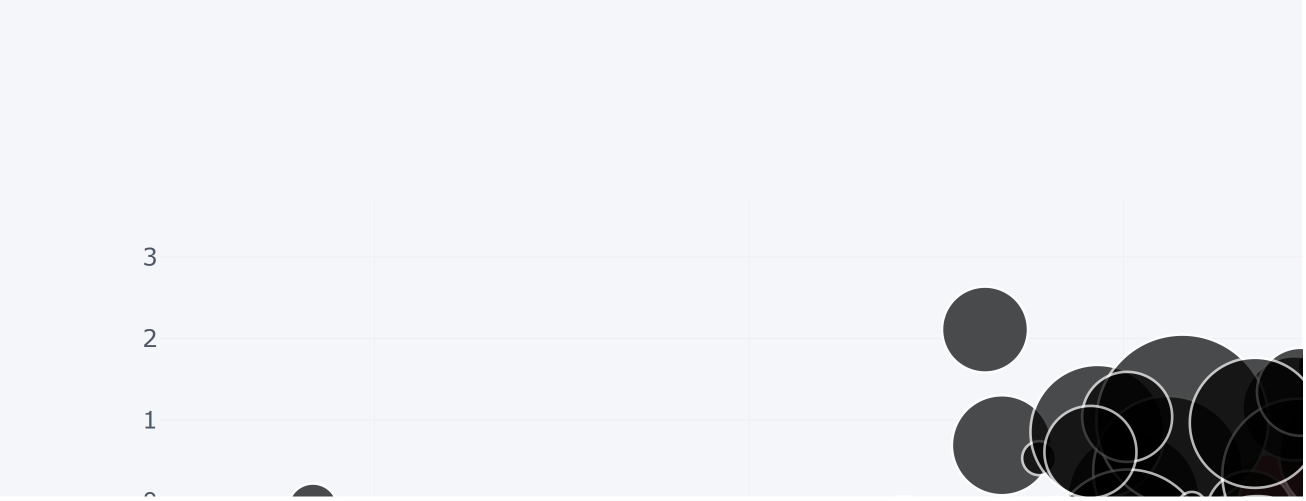
In [ ]:

```
df.iplot(x = "A", y = "B", mode = "markers", size = 10)
```



In [ ]:

```
df.iplot(kind = "bubble", x = "A", y = "B", size = "C")
```



In [ ]:
```
df1 = sns.load_dataset("titanic")
```

In [ ]:
```
df1.head()
```

Out[ ]:

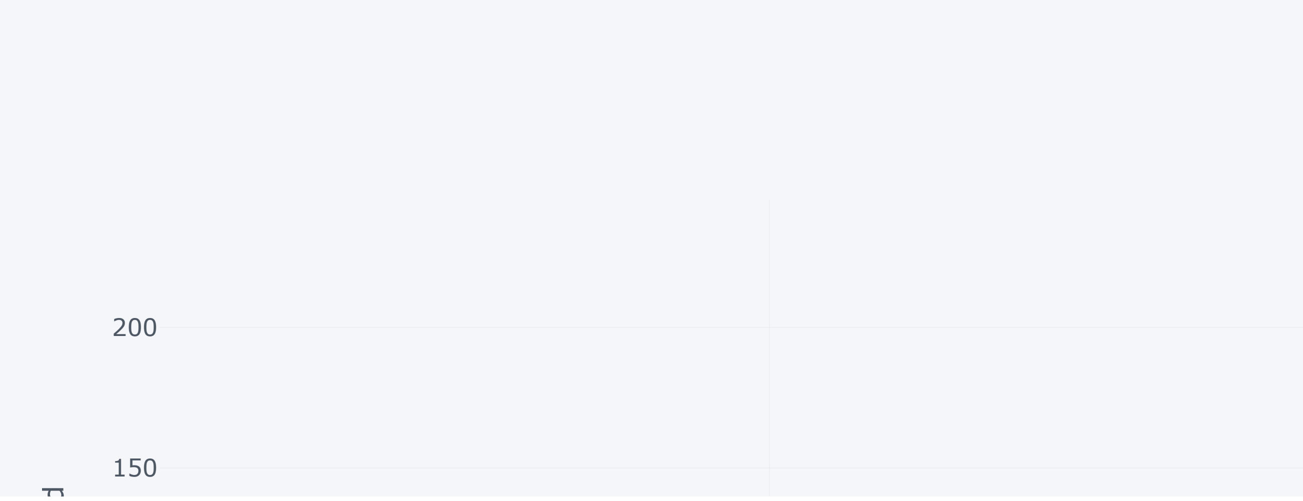
	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adult_male	deck	embark_t
0	0	3	male	22.0	1	0	7.2500	S	Third	man	True	NaN	Southam
1	1	1	female	38.0	1	0	71.2833	C	First	woman	False	C	Cherb
2	1	3	female	26.0	0	0	7.9250	S	Third	woman	False	NaN	Southam
3	1	1	female	35.0	1	0	53.1000	S	First	woman	False	C	Southam
4	0	3	male	35.0	0	0	8.0500	S	Third	man	True	NaN	Southam

In [ ]:
```
df1.sample(5)
```

Out[ ]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adult_male	deck	emb
176	0	3	male	NaN	3	1	25.4667	S	Third	man	True	NaN	Sou
627	1	1	female	21.0	0	0	77.9583	S	First	woman	False	D	Sou
72	0	2	male	21.0	0	0	73.5000	S	Second	man	True	NaN	Sou
108	0	3	male	38.0	0	0	7.8958	S	Third	man	True	NaN	Sou
196	0	3	male	NaN	0	0	7.7500	Q	Third	man	True	NaN	Qu

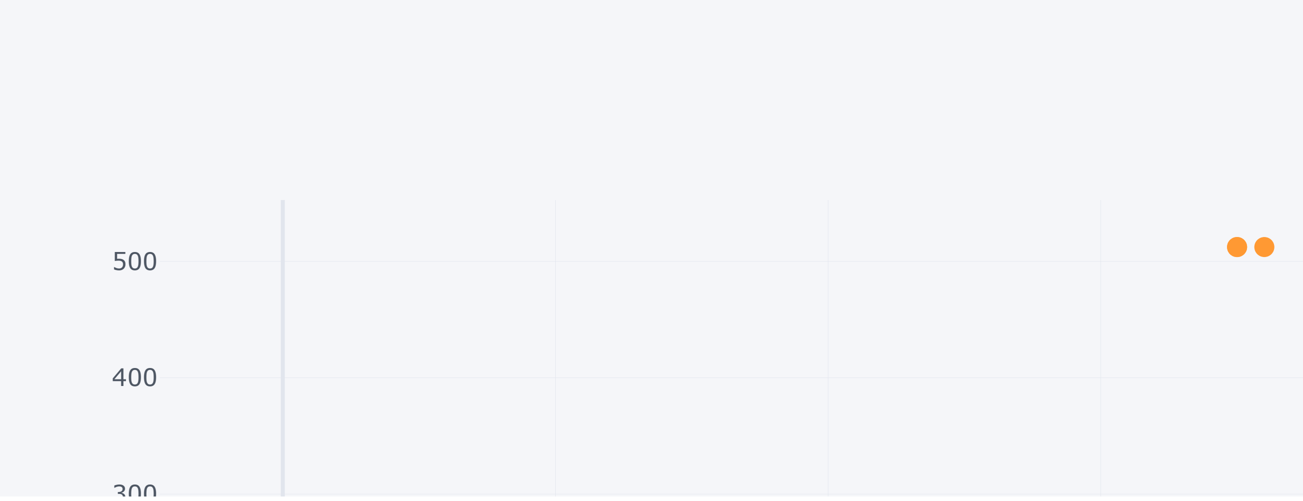
In [ ]:
```
df1.iplot(x = "sex", y = "survived", kind = "bar", xTitle="sex", yTitle="survived")
```



In [ ]:
```
df1["sex"].value_counts()
```

Out[ ]:
```
male      577
female    314
Name: sex, dtype: int64
```

In [ ]:
```
df1[["age", "fare"]].iplot(x = "age", y = "fare",mode = "markers", size= 10)
```



In [ ]:

```
### No relationship between age and fare
df1[["age", "fare"]].iplot()
```

```
In [ ]: tip = sns.load_dataset("tips")
```

```
In [ ]: tip.head()
```

Out[ ]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

```
In [ ]: tip.shape
```

```
Out[ ]: (244, 7)
```

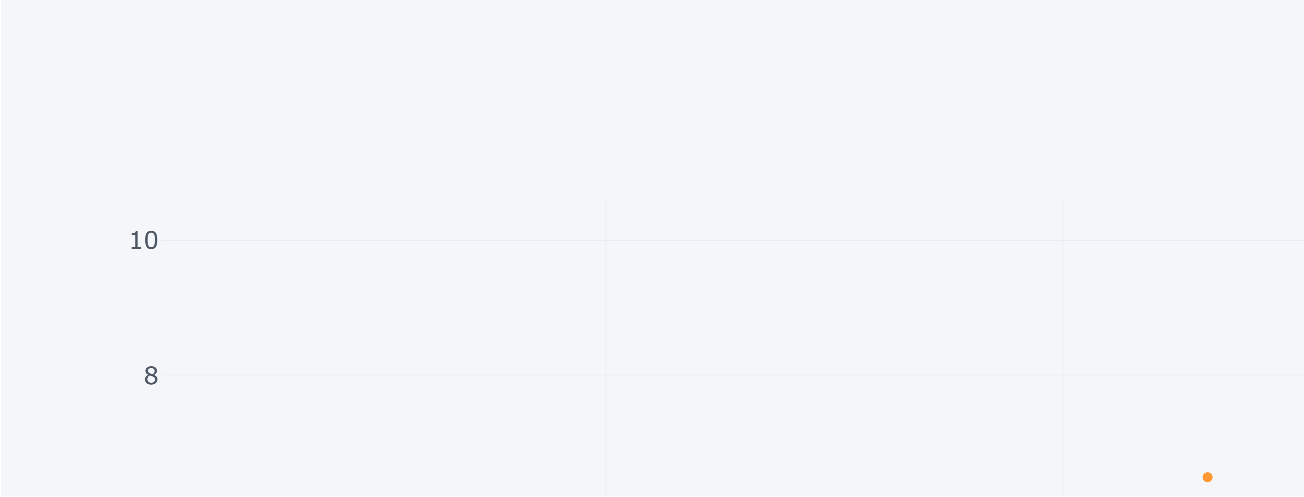
```
In [ ]: tip.tail()
```

Out[ ]:

	total_bill	tip	sex	smoker	day	time	size
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

In [ ]:

```
tip[["total_bill", "tip"]].iplot(x = "total_bill", y ="tip", mode = "markers", size = 5 ,xTit
```



In [ ]:

```
tip["total_bill"].unique()
```

Out[ ]:

```
array([16.99, 10.34, 21.01, 23.68, 24.59, 25.29,  8.77, 26.88, 15.04,
       14.78, 10.27, 35.26, 15.42, 18.43, 14.83, 21.58, 10.33, 16.29,
       16.97, 20.65, 17.92, 20.29, 15.77, 39.42, 19.82, 17.81, 13.37,
       12.69, 21.7 , 19.65,  9.55, 18.35, 15.06, 20.69, 17.78, 24.06,
       16.31, 16.93, 18.69, 31.27, 16.04, 17.46, 13.94,  9.68, 30.4 ,
       18.29, 22.23, 32.4 , 28.55, 18.04, 12.54, 10.29, 34.81,  9.94,
       25.56, 19.49, 38.01, 26.41, 11.24, 48.27, 13.81, 11.02, 17.59,
       20.08, 16.45,  3.07, 20.23, 15.01, 12.02, 17.07, 26.86, 25.28,
       14.73, 10.51, 27.2 , 22.76, 17.29, 19.44, 16.66, 10.07, 32.68,
       15.98, 34.83, 13.03, 18.28, 24.71, 21.16, 28.97, 22.49,  5.75,
       16.32, 22.75, 40.17, 27.28, 12.03, 12.46, 11.35, 15.38, 44.3 ,
       22.42, 20.92, 15.36, 20.49, 25.21, 18.24, 14.31, 14.  ,  7.25,
       38.07, 23.95, 25.71, 17.31, 29.93, 10.65, 12.43, 24.08, 11.69,
       13.42, 14.26, 15.95, 12.48, 29.8 ,  8.52, 14.52, 11.38, 22.82,
       19.08, 20.27, 11.17, 12.26, 18.26,  8.51, 14.15, 16.  , 13.16,
       17.47, 34.3 , 41.19, 27.05, 16.43,  8.35, 18.64, 11.87,  9.78,
        7.51, 14.07, 13.13, 17.26, 24.55, 19.77, 29.85, 48.17, 25.  ,
       13.39, 16.49, 21.5 , 12.66, 16.21, 17.51, 24.52, 20.76, 31.71,
       10.59, 10.63, 50.81, 15.81, 31.85, 16.82, 32.9 , 17.89, 14.48,
        9.6 , 34.63, 34.65, 23.33, 45.35, 23.17, 40.55, 20.9 , 30.46,
       18.15, 23.1 , 15.69, 19.81, 28.44, 15.48, 16.58,  7.56, 43.11,
       13.  , 13.51, 18.71, 12.74, 16.4 , 20.53, 16.47, 26.59, 38.73,
       24.27, 12.76, 30.06, 25.89, 48.33, 13.27, 28.17, 12.9 , 28.15,
       11.59,  7.74, 30.14, 12.16,  8.58, 16.27, 10.09, 20.45, 13.28,
       22.12, 24.01, 11.61, 10.77, 15.53, 12.6 , 32.83, 35.83, 29.03,
       27.18, 22.67, 17.82, 18.78])
```

In [ ]:

```
tip["sex"].value_counts()
```

Out[ ]:
```
Male      157
Female     87
Name: sex, dtype: int64
```

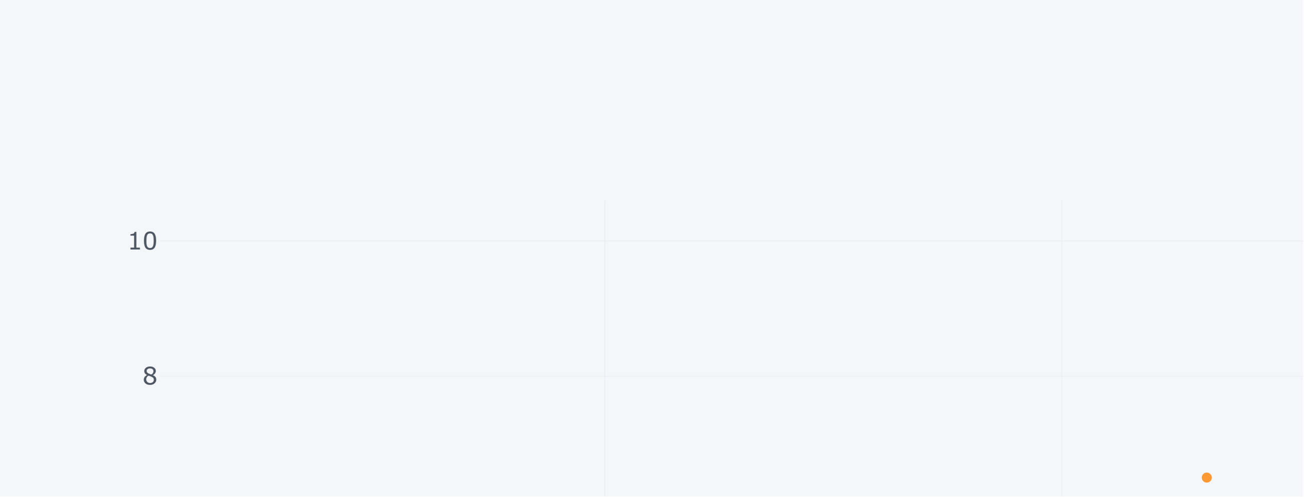
In [ ]:
```
tip
```

Out[ ]:

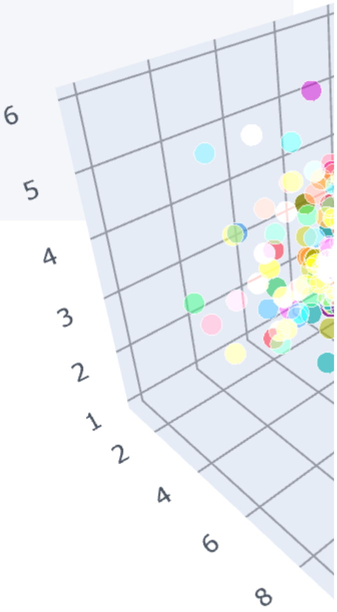
	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...	...	...	...	...	...	...	...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

In [ ]:
```
tip[["total_bill", "tip", "size"]].iplot(x = "total_bill", y ="tip", mode = "markers", size =
```

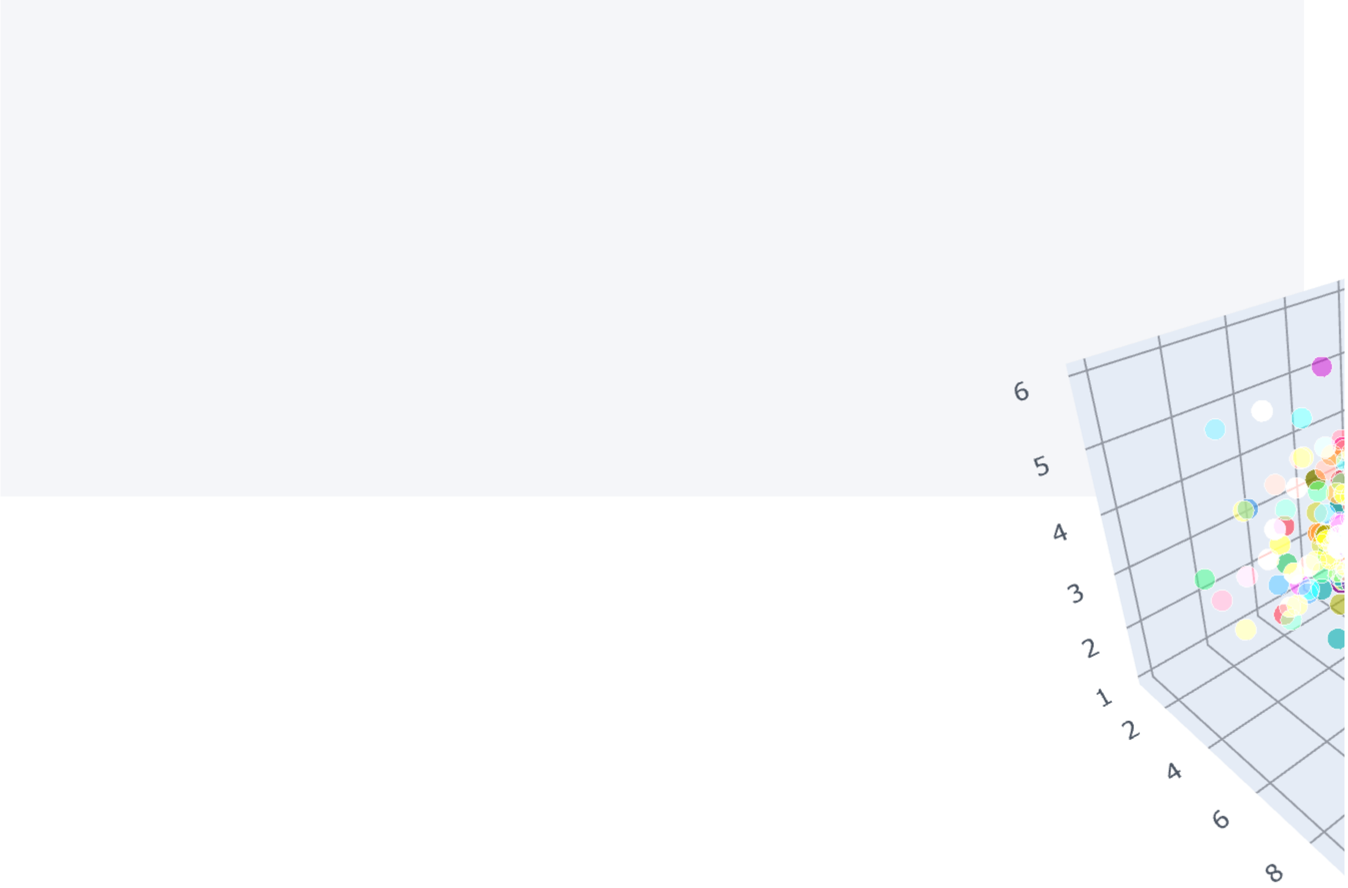


In [ ]:
```
tip.iplot(kind = "scatter3d", x = "total_bill", y ="tip", z = "size")
```



In [ ]:

```
tip[["total_bill", "tip", "size"]].iplot(kind = "scatter3d", x = "total_bill", y ="tip", z =
```



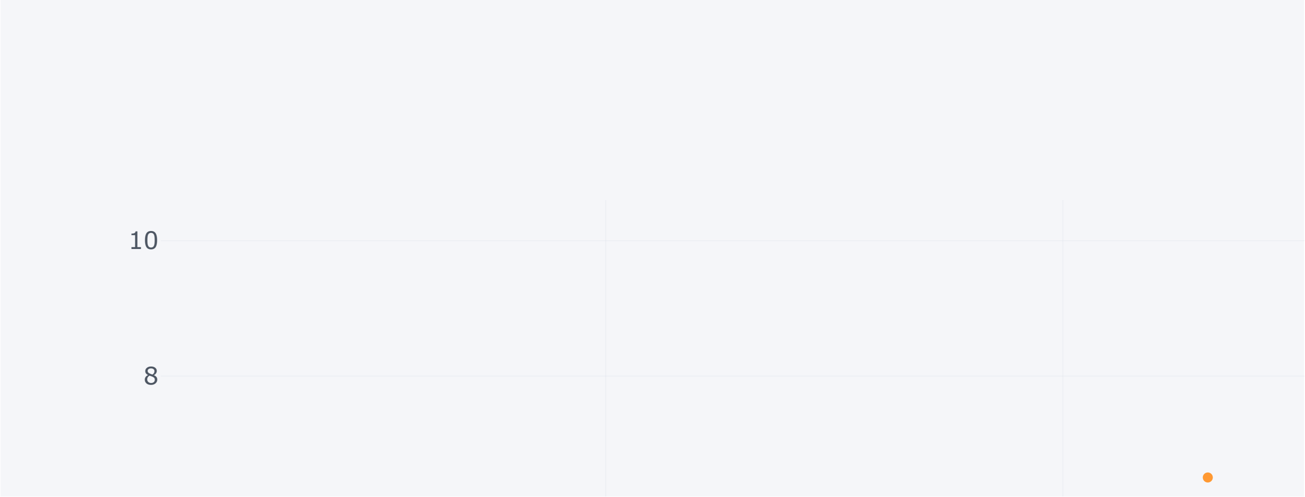
In [ ]:
```
tip["total_bill"]
```

Out[ ]:
```
0       16.99
1       10.34
2       21.01
3       23.68
4       24.59
        ...
239     29.03
240     27.18
241     22.67
242     17.82
243     18.78
Name: total_bill, Length: 244, dtype: float64
```

In [ ]:
```
tip[["total_bill", "tip", "size"]].iplot(kind = "bubble3d", x = "total_bill", y ="tip", z = "
```

```
In [ ]: tip[["total_bill", "tip", "size"]].iplot(kind = "bubble3d", x = "total_bill", y ="tip", z = "
```

```
In [ ]: tip[["total_bill", "tip"]].iplot(x = "total_bill", y ="tip", mode = "markers", size = 5 ,xTit
```



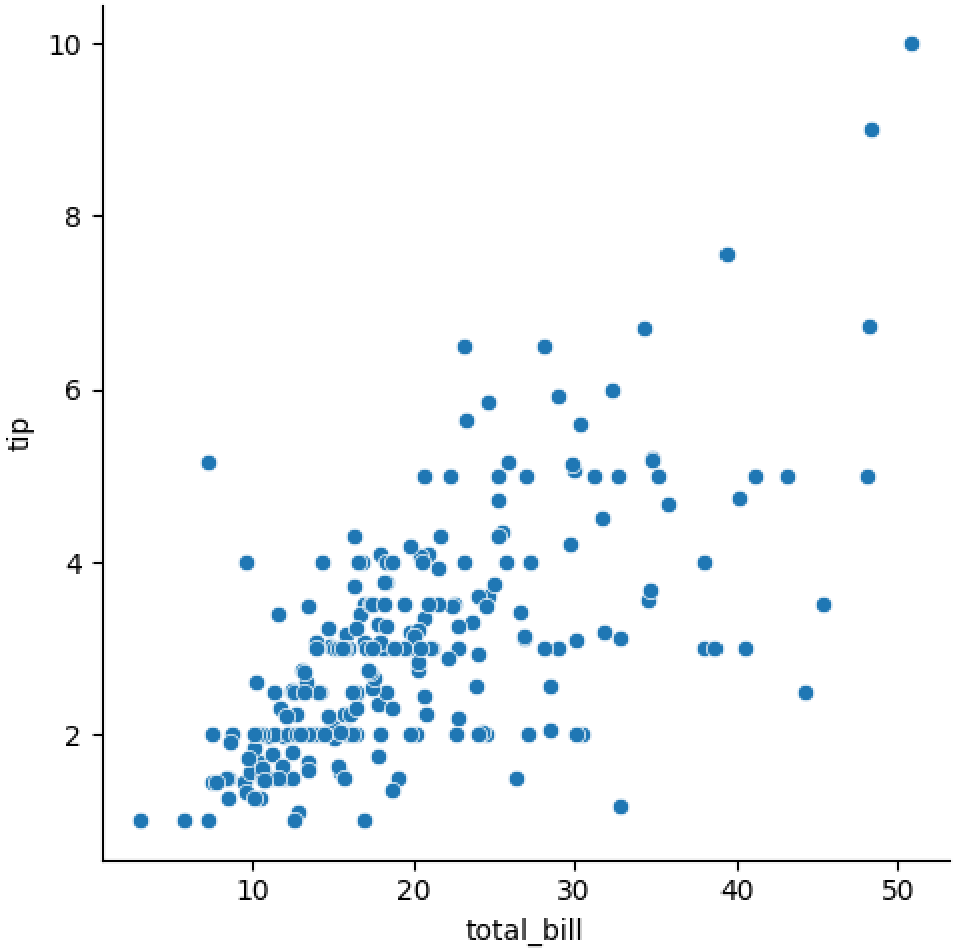
```
In [ ]: tip
```

Out[ ]:

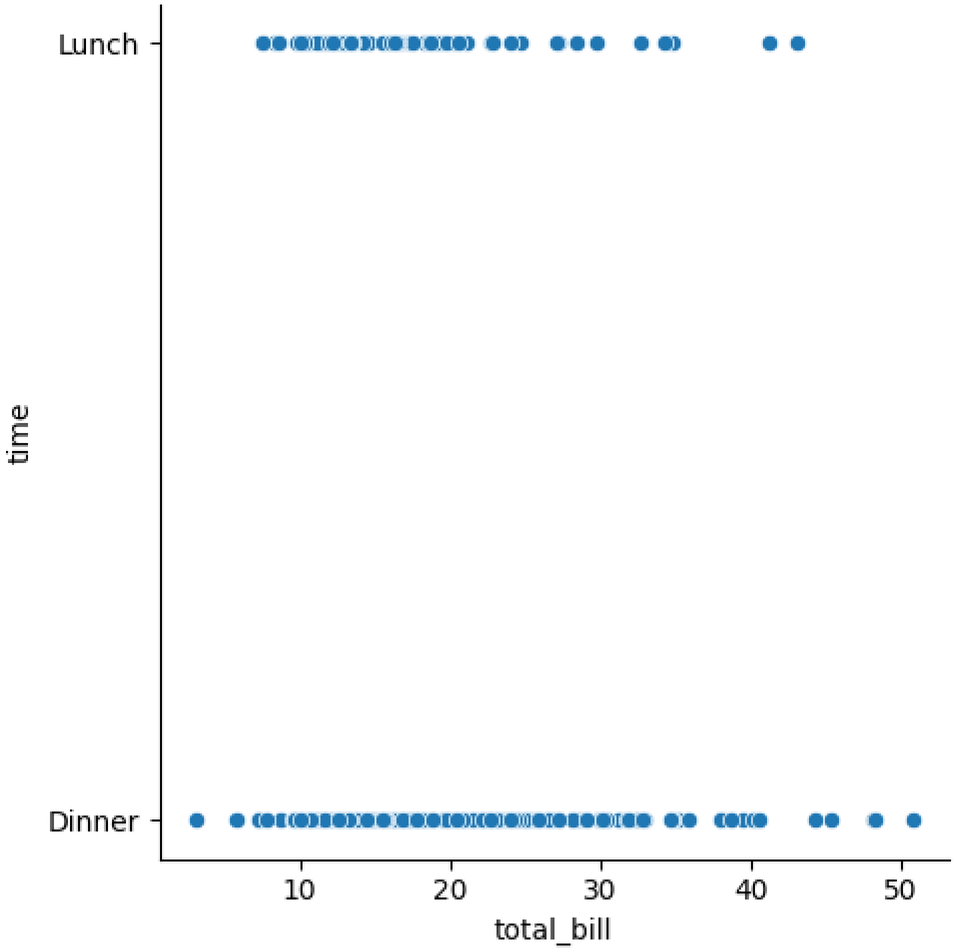
	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...	...	...	...	...	...	...	...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

```
In [ ]: sns.relplot(x = "total_bill", y ="tip", data = tip)

Out[ ]: <seaborn.axisgrid.FacetGrid at 0x1a463d0bad0>
```

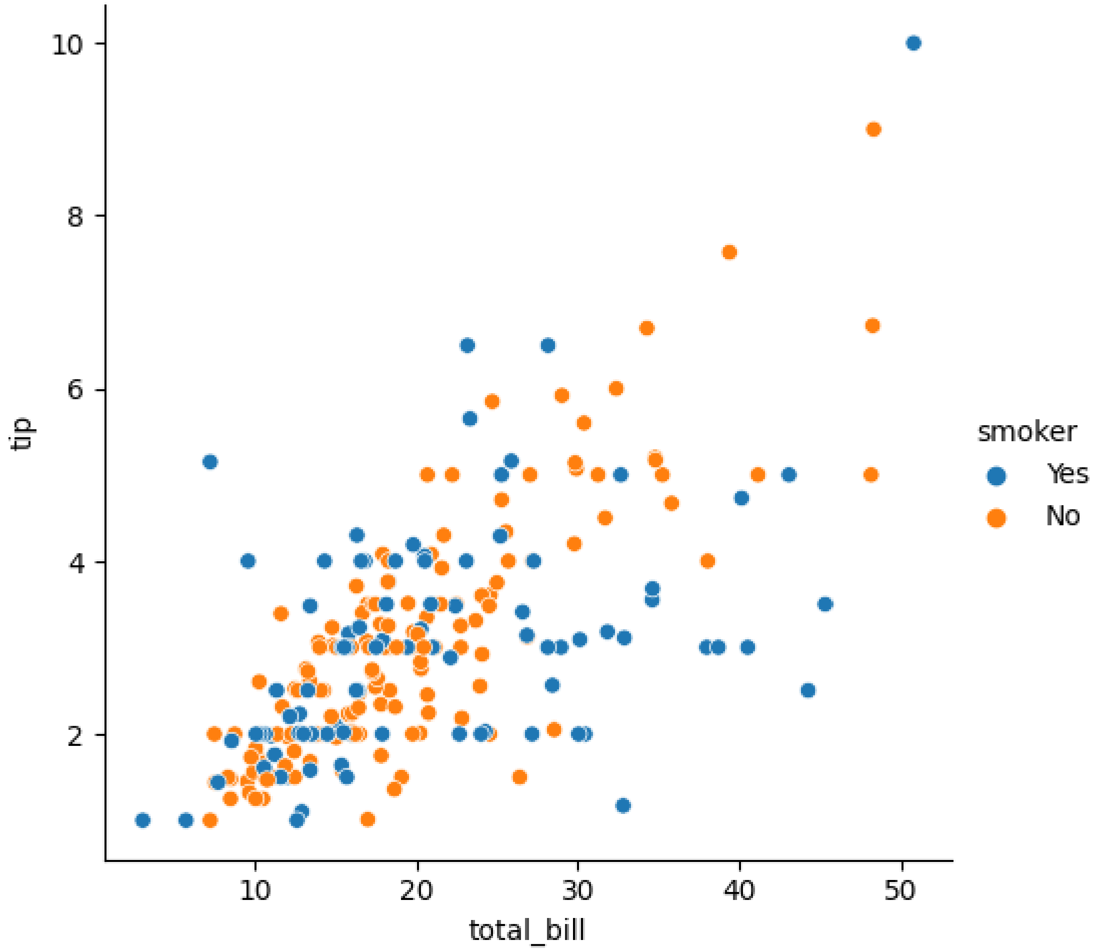


```
In [ ]: sns.relplot(x = "total_bill", y ="time", data = tip)

Out[ ]: <seaborn.axisgrid.FacetGrid at 0x1a463eeb510>
```



```
In [ ]: sns.relplot(x = "total_bill", y ="tip", data = tip, hue = "smoker")
```

Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x1a463d88090>
```



In [ ]:
```
tip
```

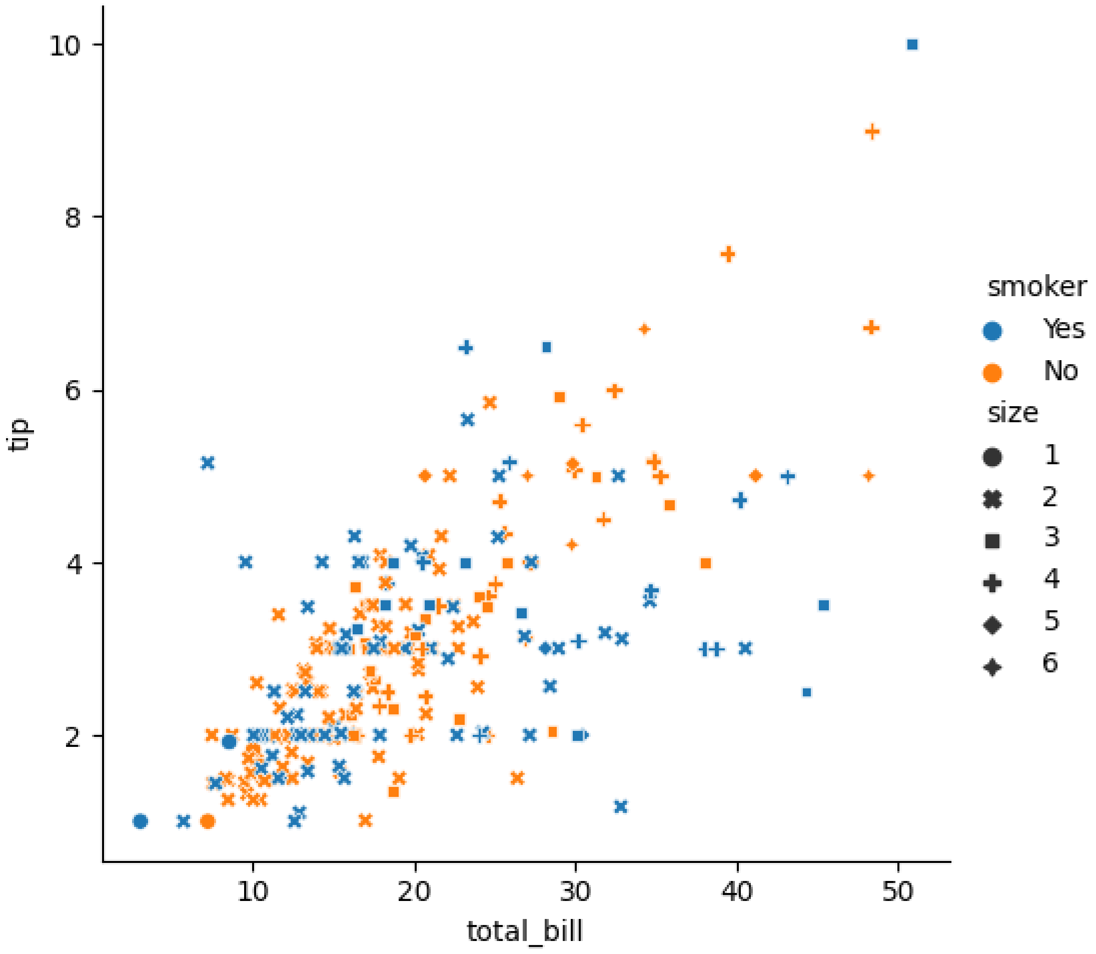
Out[ ]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...	...	...	...	...	...	...	...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2
241	22.67	2.00	Male	Yes	Sat	Dinner	2
242	17.82	1.75	Male	No	Sat	Dinner	2
243	18.78	3.00	Female	No	Thur	Dinner	2

244 rows × 7 columns

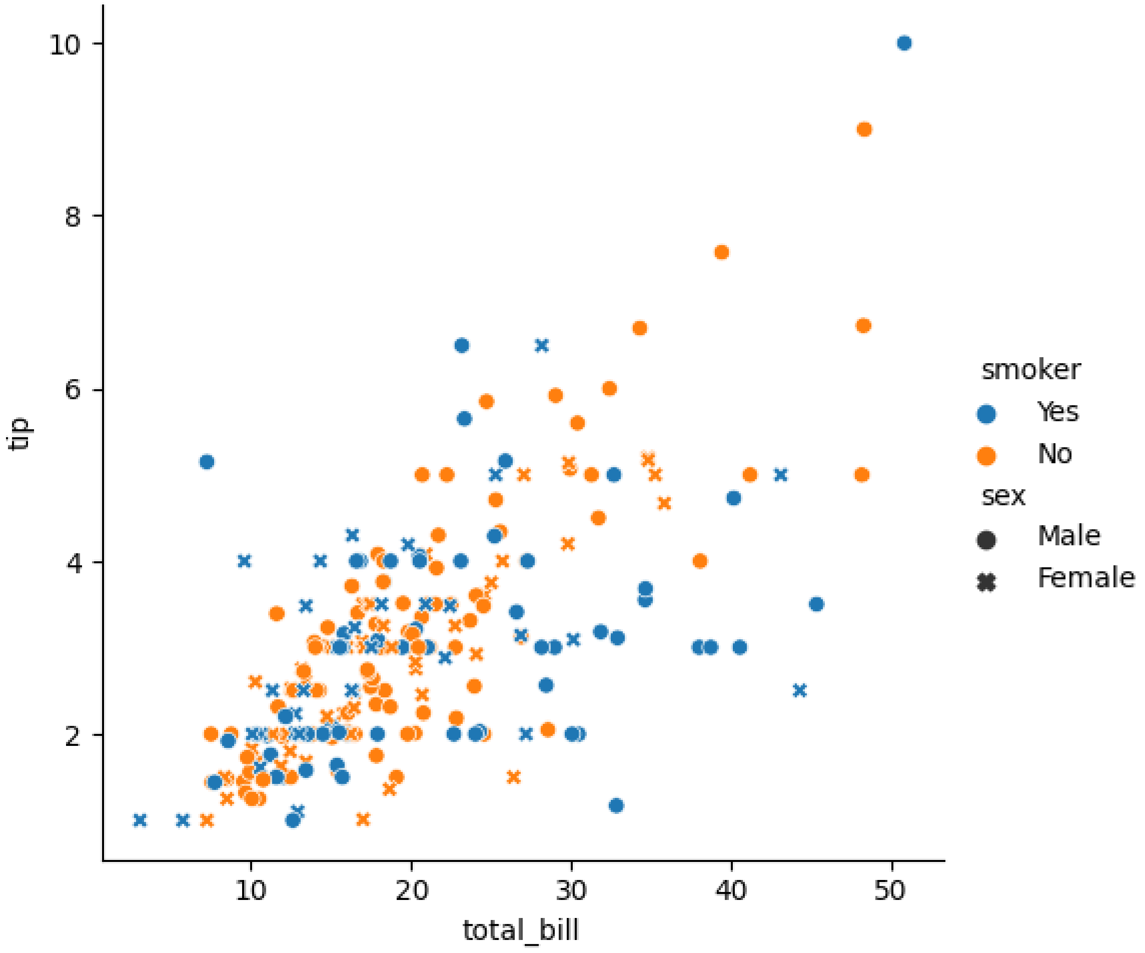
In [ ]:
```
sns.relplot(x = "total_bill", y ="tip", data = tip, hue = "smoker", style = "size")
```

Out[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x1a463f78090>
```



```
In [ ]: sns.relplot(x = "total_bill", y ="tip", data = tip, hue = "smoker", style = "sex")
```

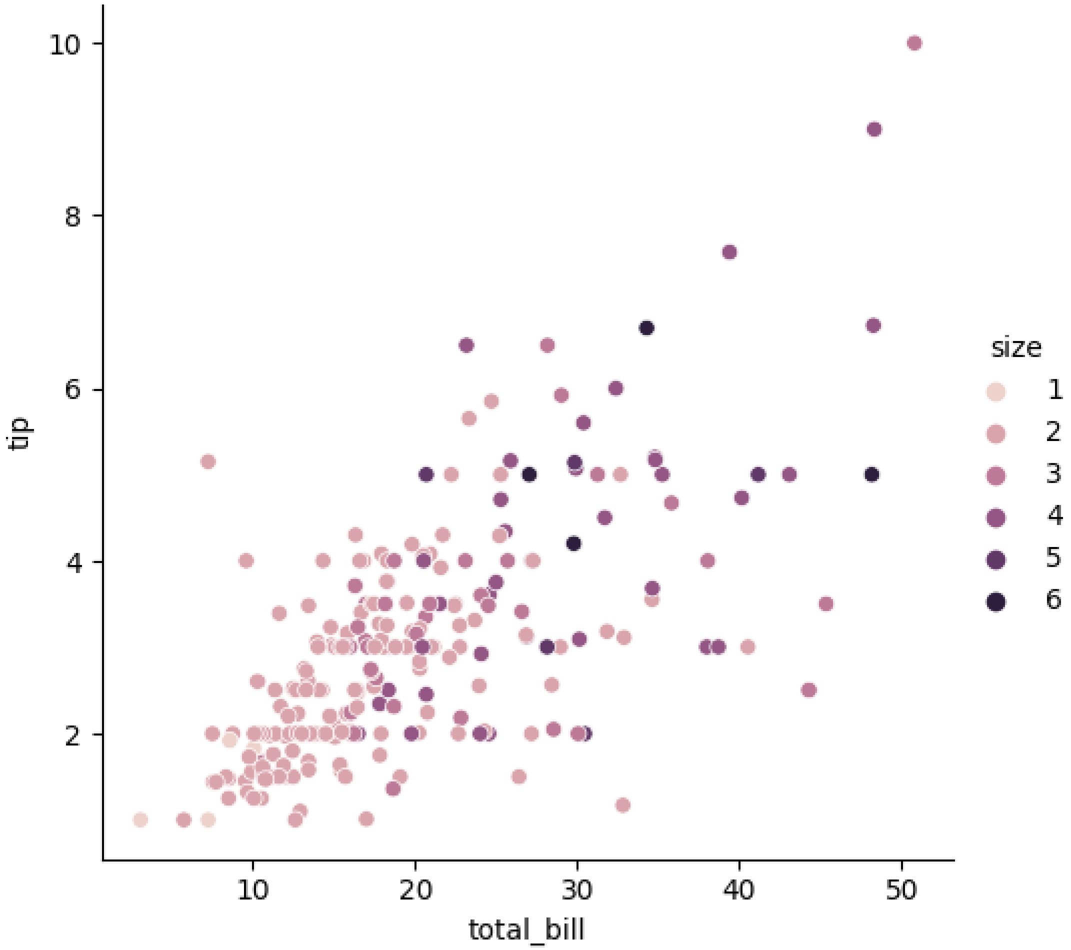
```
Out[ ]: <seaborn.axisgrid.FacetGrid at 0x1a465038190>
```



```
In [ ]: sns.relplot(x = "total_bill", y ="tip", data = tip, hue = "size")
```

Out[ ]:

```
<seaborn.axisgrid.FacetGrid at 0x1a465010c90>
```



In [ ]:

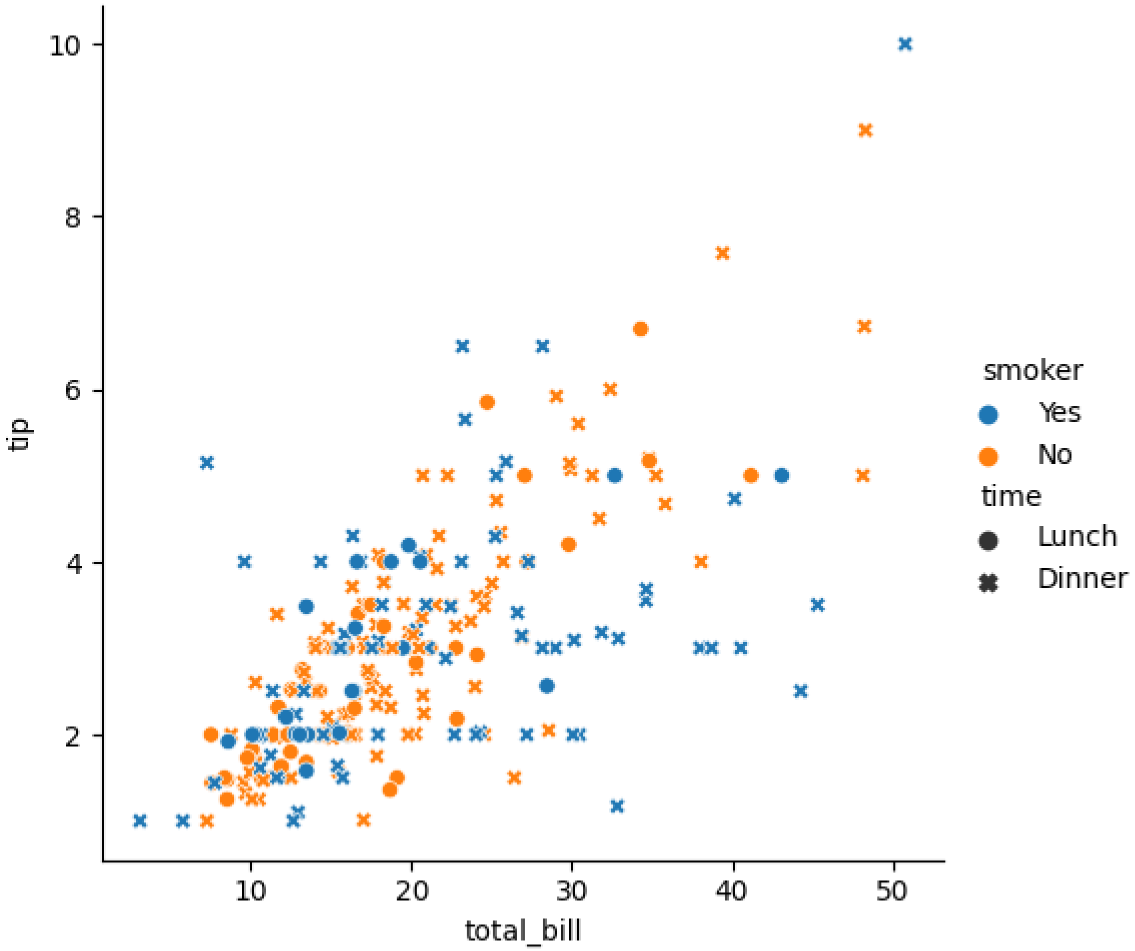
```
### hue differentiates on the basis of color
### style differentiates on the basis of symbol
```

In [ ]:

```
sns.relplot(x = "total_bill", y ="tip", data = tip, hue = "smoker", style = "time")
```

Out[ ]:

```
<seaborn.axisgrid.FacetGrid at 0x1a4655c2e90>
```



```
In [ ]: iris = pd.read_csv("https://gist.githubusercontent.com/netj/8836201/raw/6f9306ad21398ea43cba4
```

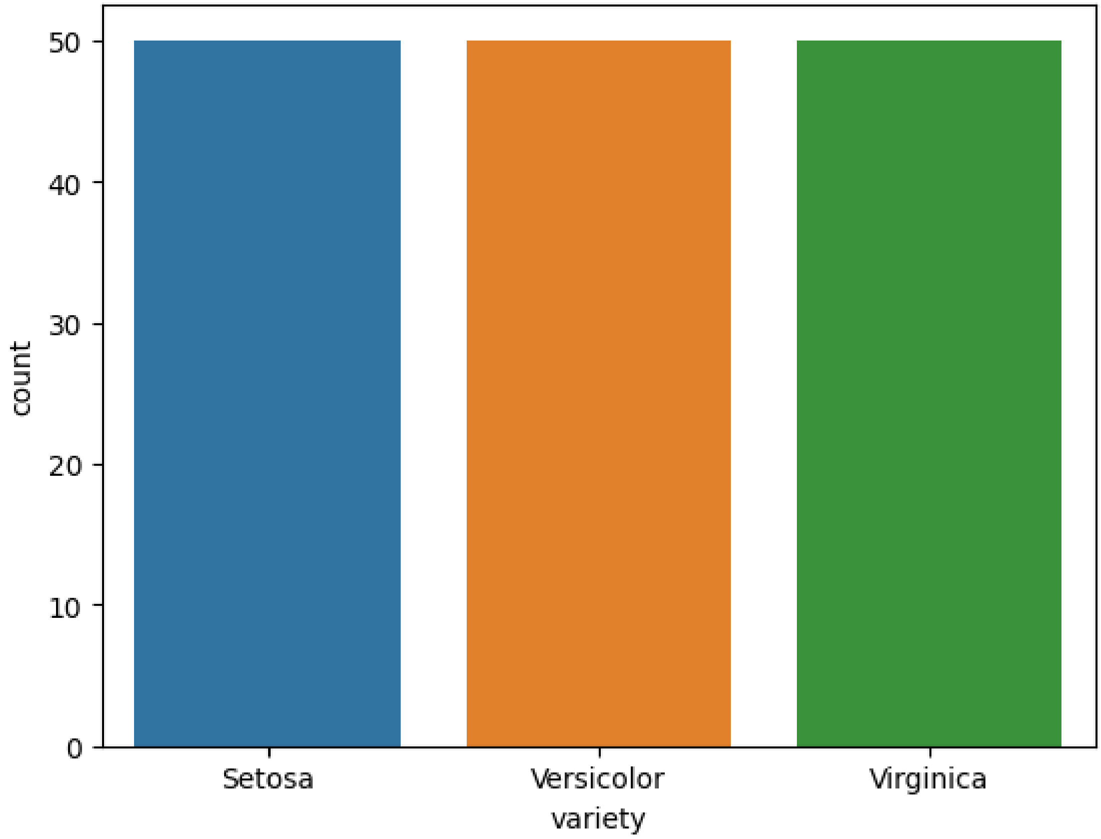
```
In [ ]: iris.head()
```

Out[ ]:

	sepal.length	sepal.width	petal.length	petal.width	variety
0	5.1	3.5	1.4	0.2	Setosa
1	4.9	3.0	1.4	0.2	Setosa
2	4.7	3.2	1.3	0.2	Setosa
3	4.6	3.1	1.5	0.2	Setosa
4	5.0	3.6	1.4	0.2	Setosa

```
In [ ]: sns.countplot(x=iris["variety"])
```

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

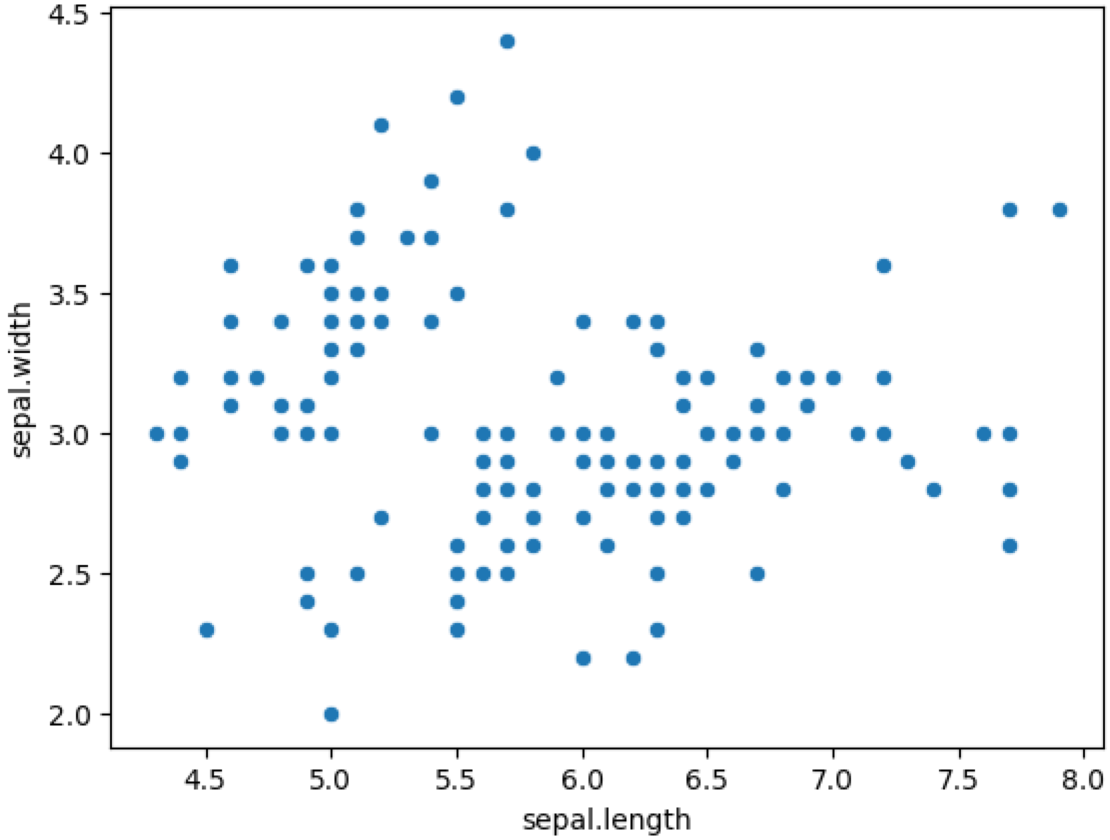


```
In [ ]: iris["variety"].value_counts()
```

```
Out[ ]: Setosa        50
        Versicolor    50
        Virginica     50
        Name: variety, dtype: int64
```

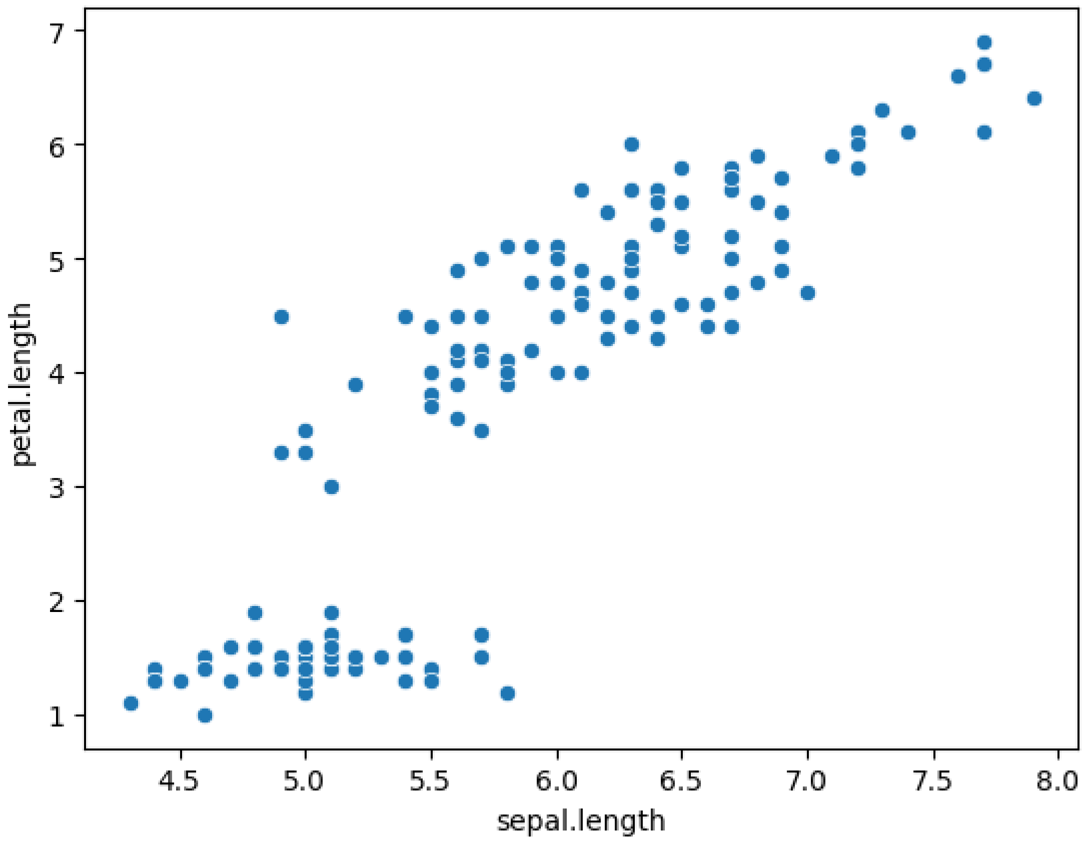
```
In [ ]: sns.scatterplot(x = "sepal.length", y = "sepal.width", data = iris )
```

```
Out[ ]: <Axes: xlabel='sepal.length', ylabel='sepal.width'>
```



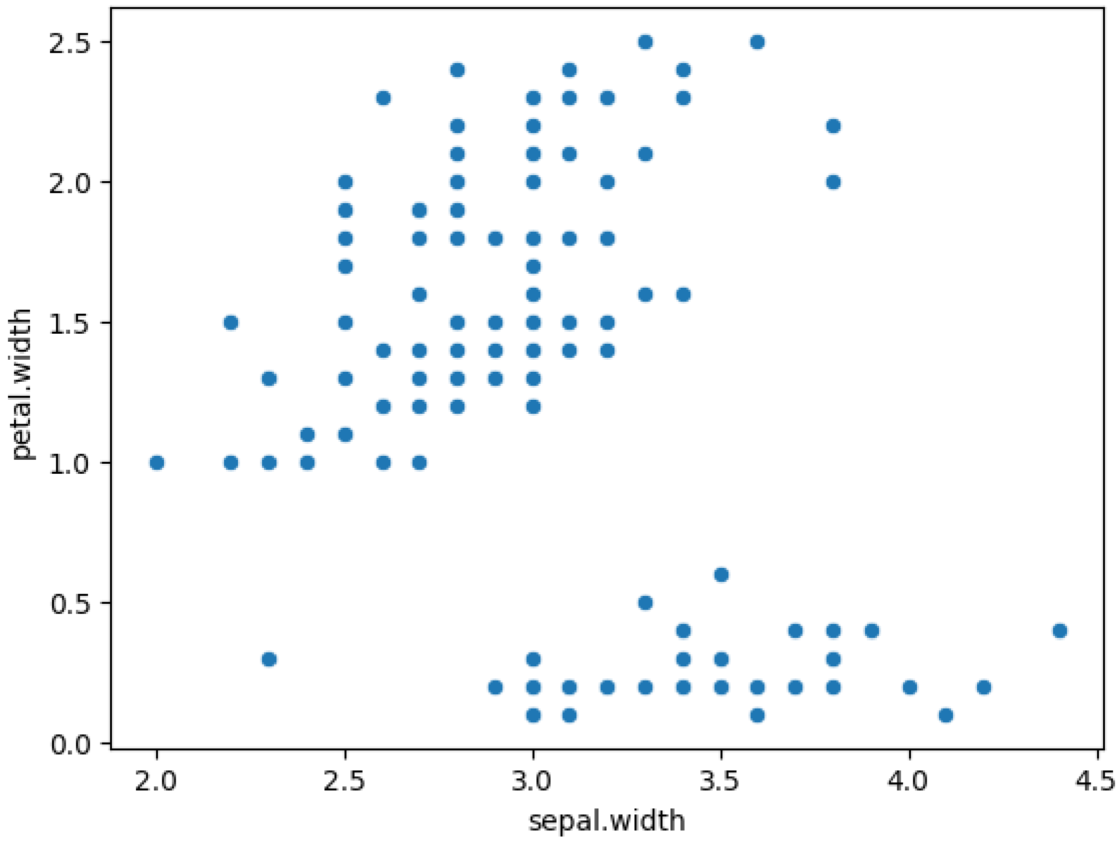
```
In [ ]: sns.scatterplot(x = "sepal.length", y = "petal.length", data = iris )
```

Out[ ]:
```
<Axes: xlabel='sepal.length', ylabel='petal.length'>
```



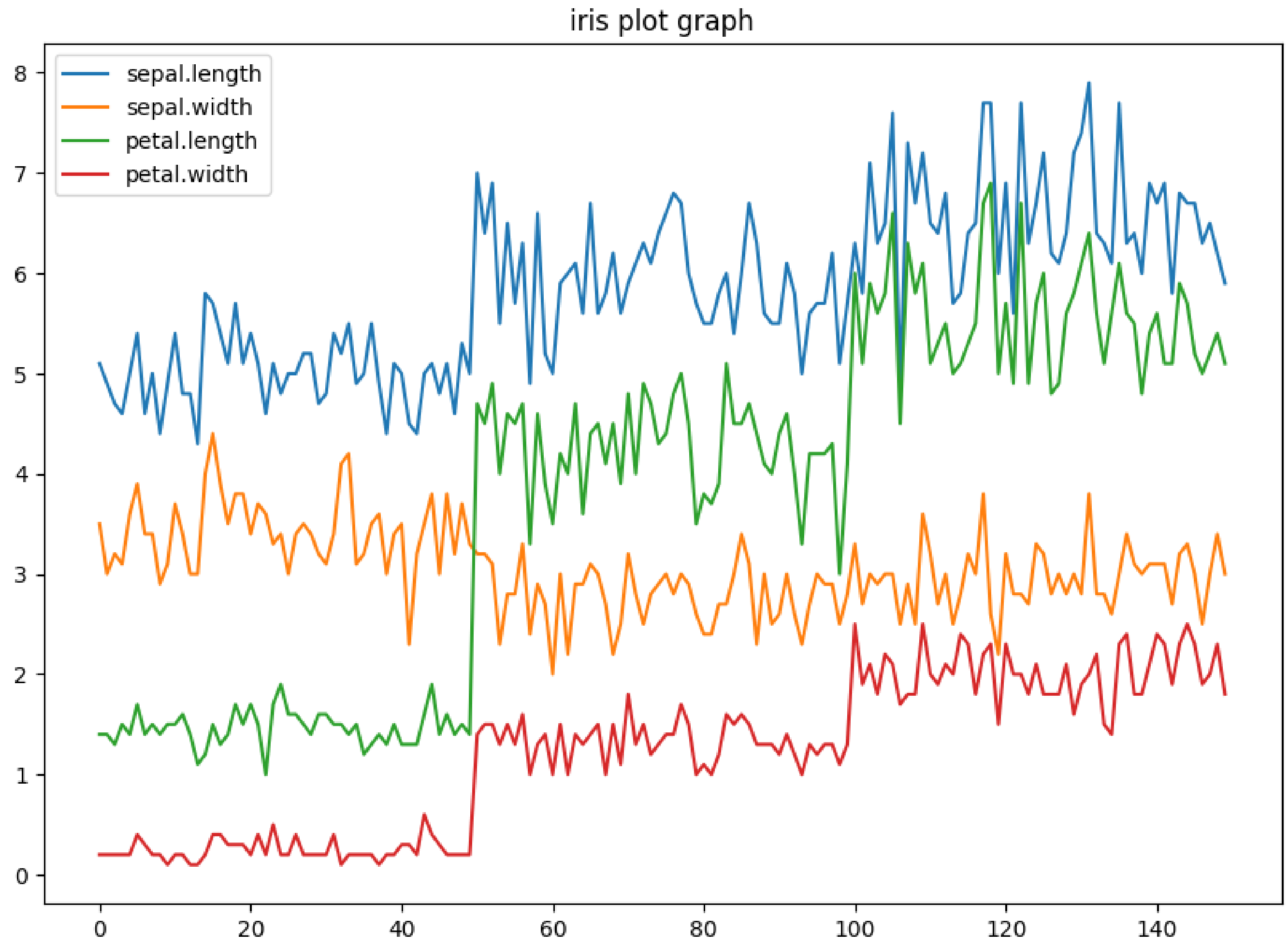
In [ ]:
```
sns.scatterplot(x = "sepal.width", y = "petal.width", data = iris )
```

Out[ ]:
```
<Axes: xlabel='sepal.width', ylabel='petal.width'>
```



In [ ]:
```
iris.plot(figsize=(10,7), title="iris plot graph")
```

Out[ ]:
```
<Axes: title={'center': 'iris plot graph'}>
```



In [ ]:

```
iris
```

Out[ ]:

	sepal.length	sepal.width	petal.length	petal.width	variety
0	5.1	3.5	1.4	0.2	Setosa
1	4.9	3.0	1.4	0.2	Setosa
2	4.7	3.2	1.3	0.2	Setosa
3	4.6	3.1	1.5	0.2	Setosa
4	5.0	3.6	1.4	0.2	Setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Virginica
146	6.3	2.5	5.0	1.9	Virginica
147	6.5	3.0	5.2	2.0	Virginica
148	6.2	3.4	5.4	2.3	Virginica
149	5.9	3.0	5.1	1.8	Virginica

150 rows × 5 columns

In [ ]:

```
iris[["variety"]].head()
```

Out[ ]:

	variety
0	Setosa
1	Setosa
2	Setosa
3	Setosa
4	Setosa

In [ ]:

```
iris.iloc[0]
```

Out[ ]:

```
sepal.length       5.1
sepal.width        3.5
petal.length       1.4
petal.width        0.2
variety         Setosa
Name: 0, dtype: object
```

In [ ]:

```
iris.iloc[0, [0,1,2,3]]
```

Out[ ]:

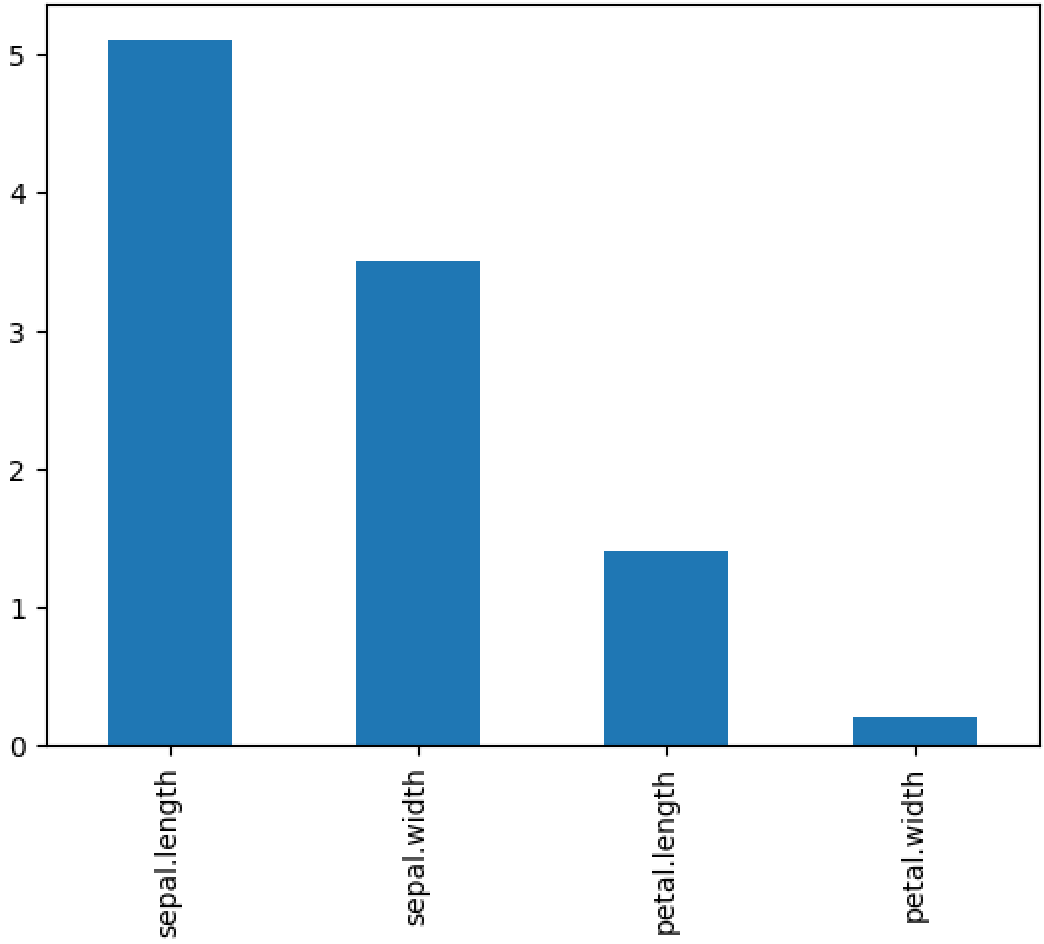
```
sepal.length    5.1
sepal.width     3.5
petal.length    1.4
petal.width     0.2
Name: 0, dtype: object
```

In [ ]:

```
iris.iloc[0, [0,1,2,3]].plot(kind = "bar")
```

Out[ ]:

```
<Axes: >
```

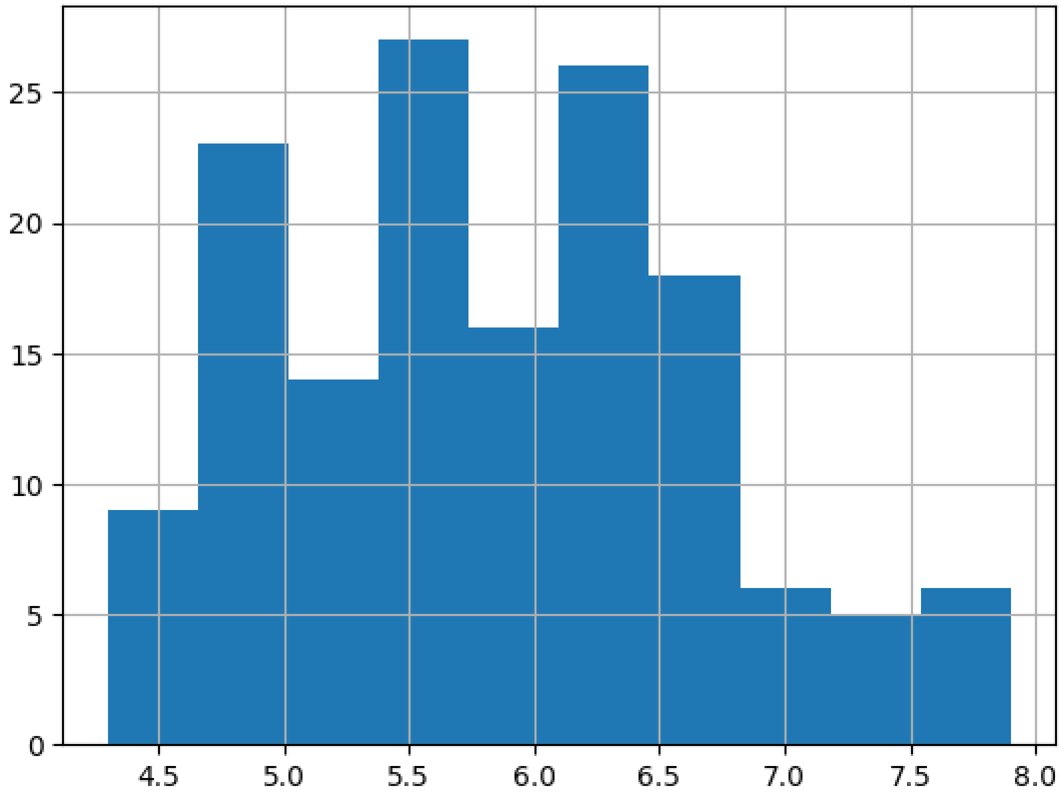


In [ ]:

```
iris["sepal.length"].hist()
```

Out[ ]:

```
<Axes: >
```



```
In [ ]: iris["sepal.length"].unique()
```

```
Out[ ]: array([5.1, 4.9, 4.7, 4.6, 5. , 5.4, 4.4, 4.8, 4.3, 5.8, 5.7, 5.2, 5.5,
               4.5, 5.3, 7. , 6.4, 6.9, 6.5, 6.3, 6.6, 5.9, 6. , 6.1, 5.6, 6.7,
               6.2, 6.8, 7.1, 7.6, 7.3, 7.2, 7.7, 7.4, 7.9])
```

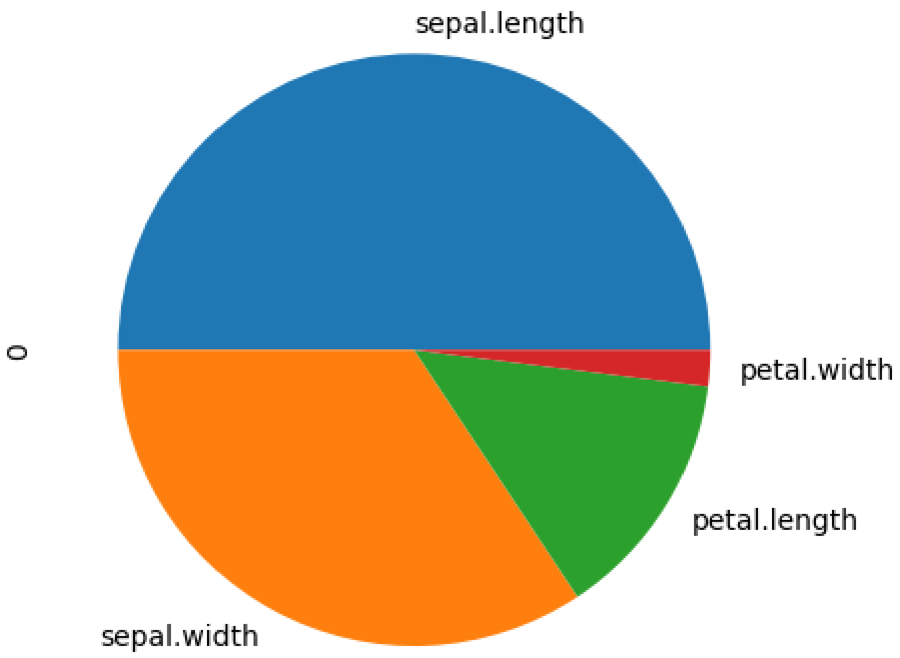
```
In [ ]: iris.iloc[0, [0,1,2,3]]
```

```
Out[ ]: sepal.length    5.1
        sepal.width     3.5
        petal.length    1.4
        petal.width     0.2
        Name: 0, dtype: object
```

```
In [ ]: data = iris.iloc[0, [0,1,2,3]]
```

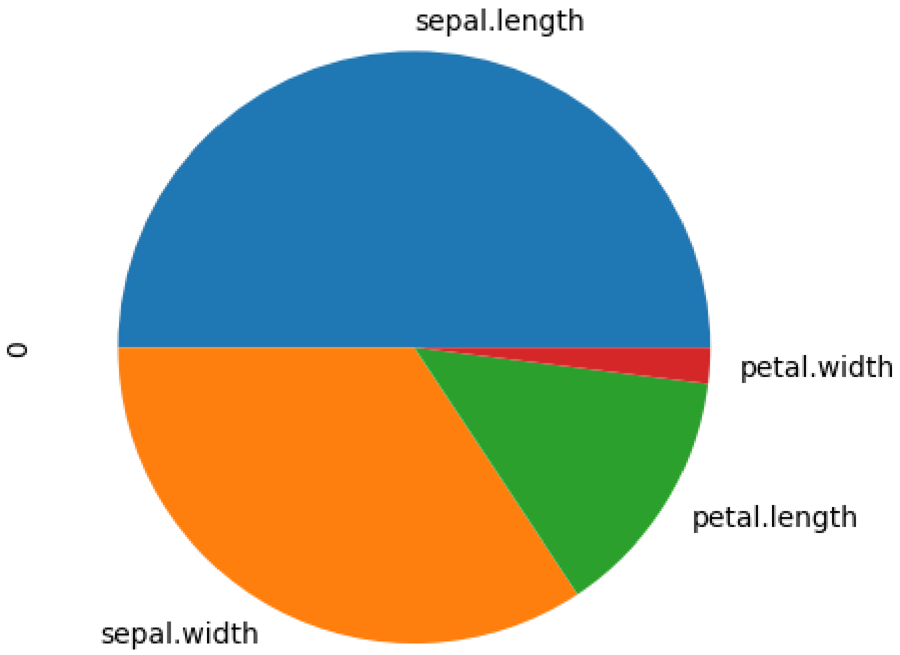
```
In [ ]: data.plot.pie()
```

```
Out[ ]: <Axes: ylabel='0'>
```



In [ ]:

```
a = data.plot.pie()
b = a.get_figure()
b.savefig('test.png')
```



In [ ]:

```
ls
```

```
 Volume in drive D is New Volume
 Volume Serial Number is 5062-553E

 Directory of d:\PYTHON iNeuron\Learning Python Part_2

09-07-2023  17:38    <DIR>          .
05-07-2023  21:44    <DIR>          ..
09-07-2023  18:23             1,166 4.2.0
04-07-2023  20:11             1,173 addresses.csv
04-07-2023  20:57            16,384 airline.xls
04-07-2023  21:10            32,256 airline1.xls
04-07-2023  20:11             1,589 contacts.csv
05-07-2023  20:05           209,820 graph.ipynb
04-07-2023  20:11               277 holiday_schedules.csv
04-07-2023  20:11            18,015 locations.csv
04-07-2023  20:11            84,319 LUSID Excel - Manage Orders.xlsx
04-07-2023  20:11             1,610 mail_addresses.csv
08-07-2023  16:37            32,586 Numpy day1.ipynb
09-07-2023  15:35            27,794 Numpy day2.ipynb
04-07-2023  20:11             2,281 organizations.csv
04-07-2023  22:54           181,126 Pandas day1.ipynb
05-07-2023  18:04           374,246 Pandas day2.ipynb
08-07-2023  15:05           120,238 Pandas day3.ipynb
04-07-2023  20:11             2,092 phones.csv
04-07-2023  22:49            81,549 players.csv
04-07-2023  22:50            78,958 players1.csv
04-07-2023  20:11                60 programs.csv
04-07-2023  20:11               350 regular_schedules.csv
04-07-2023  20:11            19,128 services.csv
04-07-2023  20:11            14,618 taxonomy.csv
09-07-2023  18:23            17,683 test.png
04-07-2023  22:36               390 test1.csv
04-07-2023  22:36             5,360 test2.xlsx
              26 File(s)      1,325,068 bytes
               2 Dir(s)  258,507,784,192 bytes free
```

In [ ]:

```
iris
```

Out[ ]:

	sepal.length	sepal.width	petal.length	petal.width	variety
0	5.1	3.5	1.4	0.2	Setosa
1	4.9	3.0	1.4	0.2	Setosa
2	4.7	3.2	1.3	0.2	Setosa
3	4.6	3.1	1.5	0.2	Setosa
4	5.0	3.6	1.4	0.2	Setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Virginica
146	6.3	2.5	5.0	1.9	Virginica
147	6.5	3.0	5.2	2.0	Virginica
148	6.2	3.4	5.4	2.3	Virginica
149	5.9	3.0	5.1	1.8	Virginica

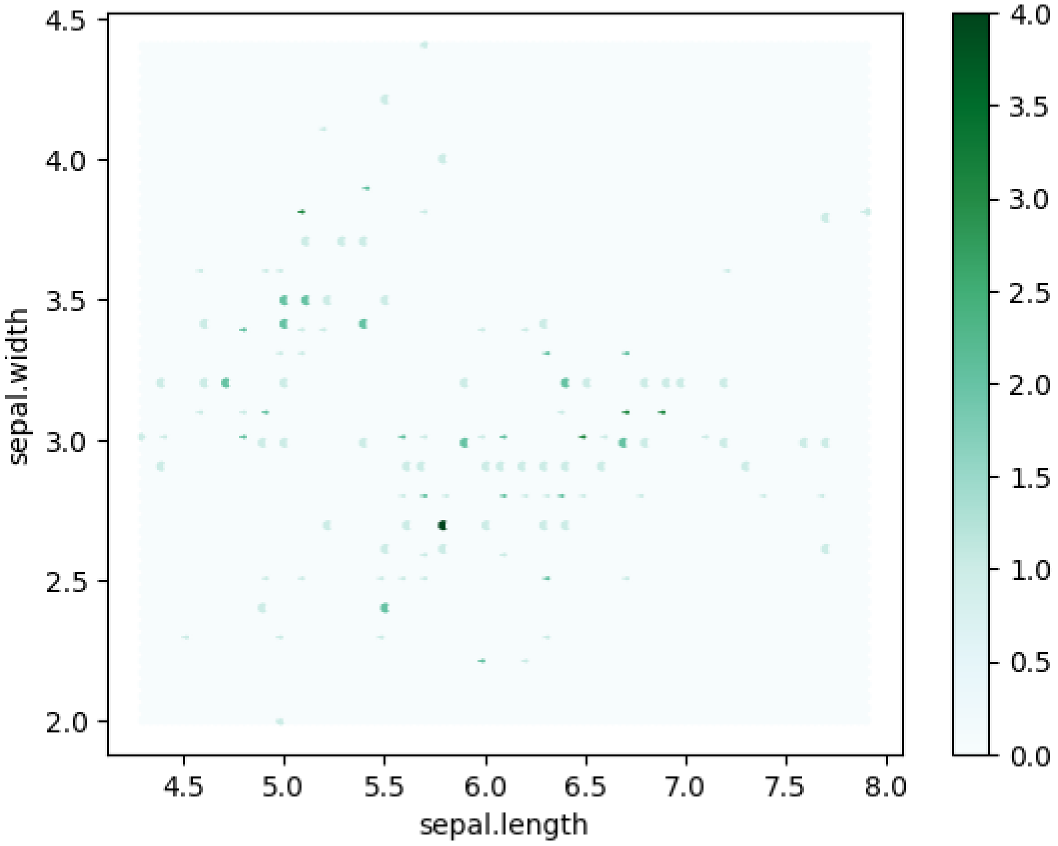
150 rows × 5 columns

In [ ]:

```
iris.plot.hexbin(x = "sepal.length", y = "sepal.width")
```

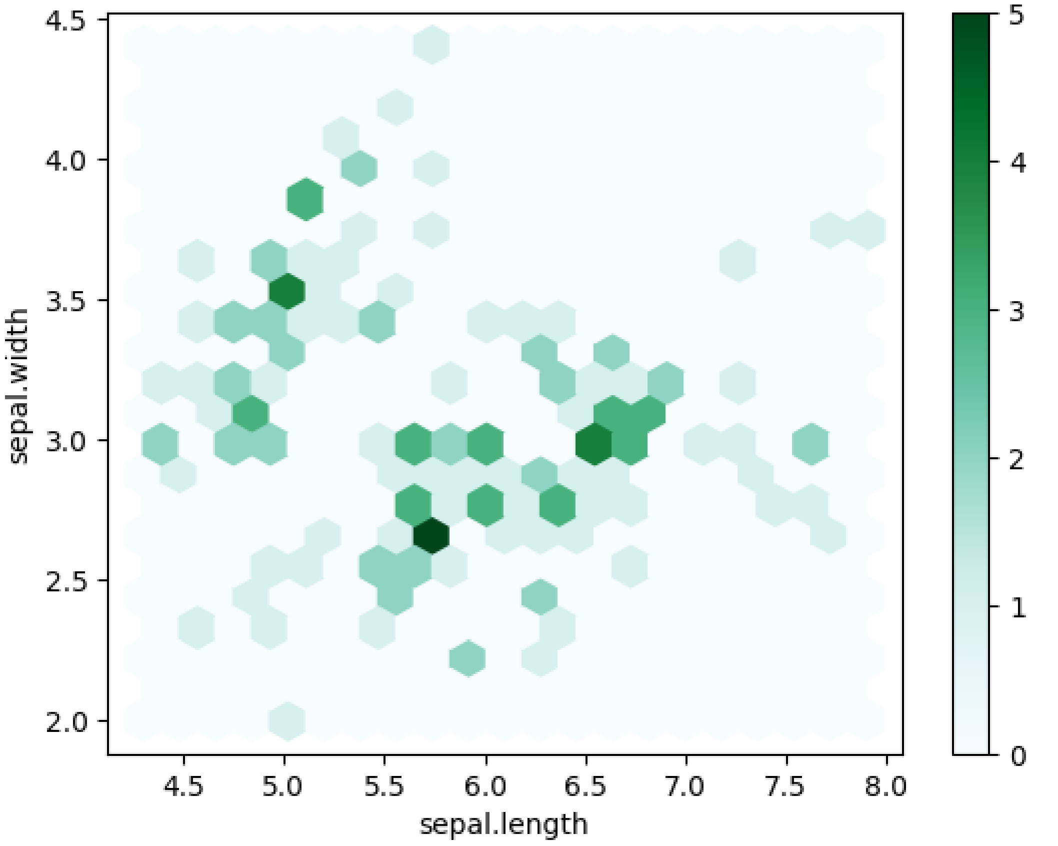
Out[ ]:

```
<Axes: xlabel='sepal.length', ylabel='sepal.width'>
```



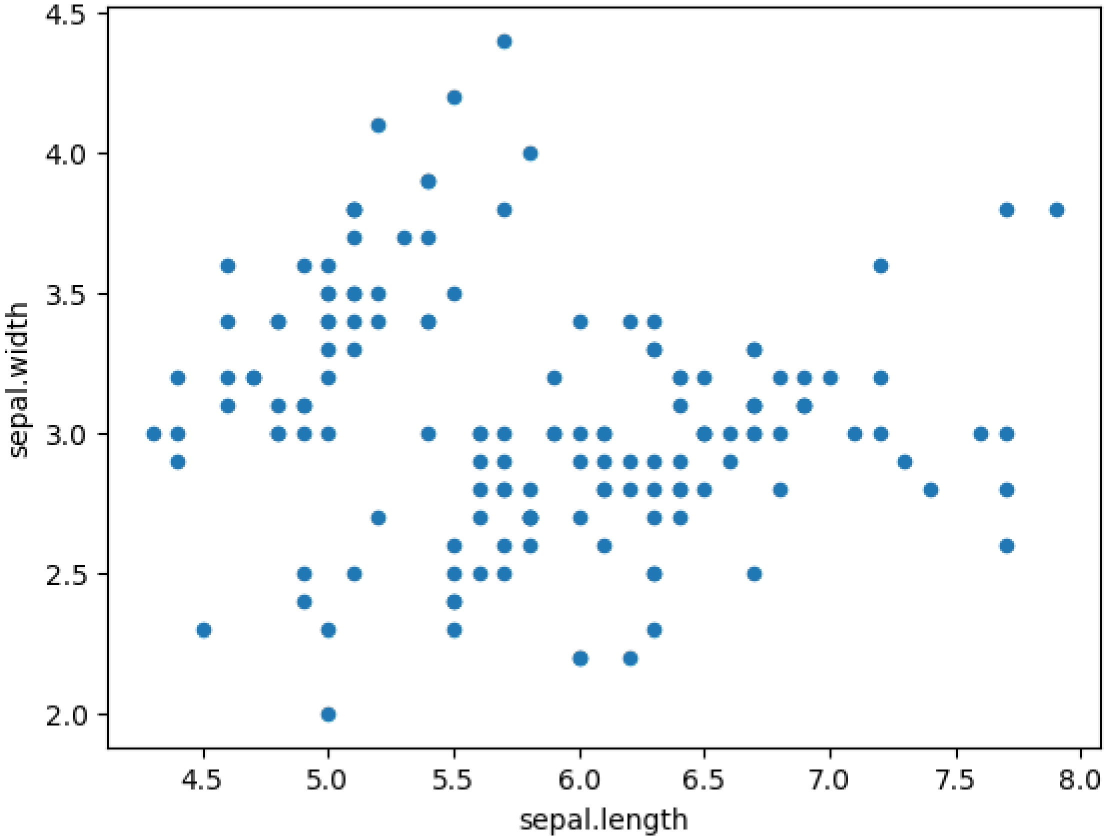
In [ ]:
```
iris.plot.hexbin(x = "sepal.length", y = "sepal.width", gridsize = 20)
```

Out[ ]:
```
<Axes: xlabel='sepal.length', ylabel='sepal.width'>
```



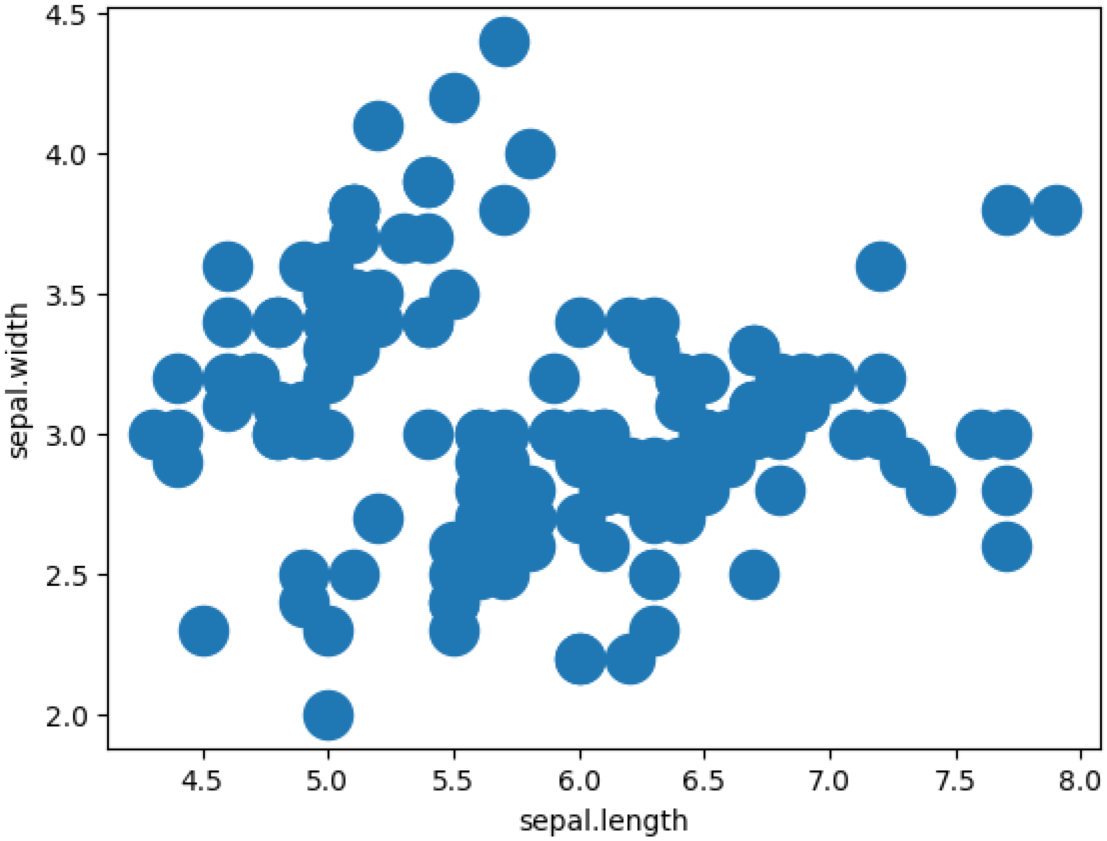
In [ ]:
```
iris.plot.scatter(x = "sepal.length", y="sepal.width" )
```

Out[ ]:
```
<Axes: xlabel='sepal.length', ylabel='sepal.width'>
```

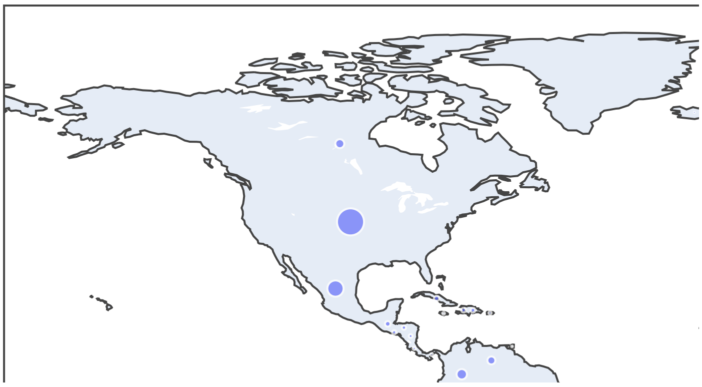


```
In [ ]: iris.plot.scatter(x = "sepal.length", y="sepal.width", s = 300)
```

```
Out[ ]: <Axes: xlabel='sepal.length', ylabel='sepal.width'>
```



```
In [ ]: import plotly.express as px
        df = px.data.gapminder().query("year == 2007")
        fig = px.scatter_geo(df, locations="iso_alpha",
                             size="pop", # size of markers, "pop" is one of the columns of gapminder
                             )
        fig.show()
```



In [ ]:

```python
df = px.data.gapminder()
```

In [ ]:

```python
df
```

Out[ ]:

	country	continent	year	lifeExp	pop	gdpPercap	iso_alpha	iso_num
0	Afghanistan	Asia	1952	28.801	8425333	779.445314	AFG	4
1	Afghanistan	Asia	1957	30.332	9240934	820.853030	AFG	4
2	Afghanistan	Asia	1962	31.997	10267083	853.100710	AFG	4
3	Afghanistan	Asia	1967	34.020	11537966	836.197138	AFG	4
4	Afghanistan	Asia	1972	36.088	13079460	739.981106	AFG	4
...	...	...	...	...	...	...	...	...
1699	Zimbabwe	Africa	1987	62.351	9216418	706.157306	ZWE	716
1700	Zimbabwe	Africa	1992	60.377	10704340	693.420786	ZWE	716
1701	Zimbabwe	Africa	1997	46.809	11404948	792.449960	ZWE	716
1702	Zimbabwe	Africa	2002	39.989	11926563	672.038623	ZWE	716
1703	Zimbabwe	Africa	2007	43.487	12311143	469.709298	ZWE	716

1704 rows × 8 columns

In [ ]:

```python
df["country"].value_counts()
```

Out[ ]:

```
Afghanistan           12
Pakistan              12
New Zealand           12
Nicaragua             12
Niger                 12
                      ..
Eritrea               12
Equatorial Guinea     12
El Salvador           12
Egypt                 12
Zimbabwe              12
Name: country, Length: 142, dtype: int64
```

In [ ]:

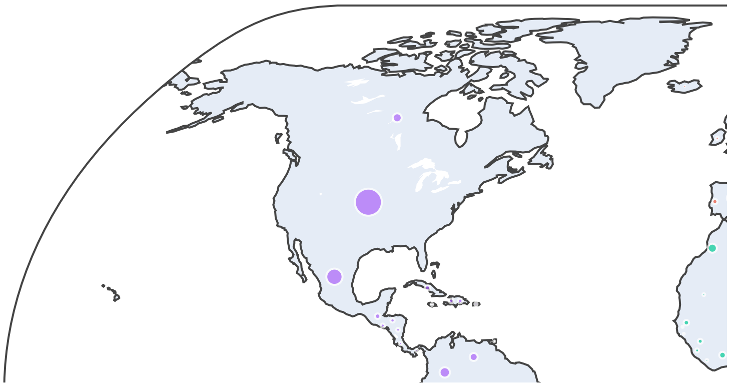
```
df["country"].unique()
```

Out[ ]:

```
array(['Afghanistan', 'Albania', 'Algeria', 'Angola', 'Argentina',
       'Australia', 'Austria', 'Bahrain', 'Bangladesh', 'Belgium',
       'Benin', 'Bolivia', 'Bosnia and Herzegovina', 'Botswana', 'Brazil',
       'Bulgaria', 'Burkina Faso', 'Burundi', 'Cambodia', 'Cameroon',
       'Canada', 'Central African Republic', 'Chad', 'Chile', 'China',
       'Colombia', 'Comoros', 'Congo, Dem. Rep.', 'Congo, Rep.',
       'Costa Rica', "Cote d'Ivoire", 'Croatia', 'Cuba', 'Czech Republic',
       'Denmark', 'Djibouti', 'Dominican Republic', 'Ecuador', 'Egypt',
       'El Salvador', 'Equatorial Guinea', 'Eritrea', 'Ethiopia',
       'Finland', 'France', 'Gabon', 'Gambia', 'Germany', 'Ghana',
       'Greece', 'Guatemala', 'Guinea', 'Guinea-Bissau', 'Haiti',
       'Honduras', 'Hong Kong, China', 'Hungary', 'Iceland', 'India',
       'Indonesia', 'Iran', 'Iraq', 'Ireland', 'Israel', 'Italy',
       'Jamaica', 'Japan', 'Jordan', 'Kenya', 'Korea, Dem. Rep.',
       'Korea, Rep.', 'Kuwait', 'Lebanon', 'Lesotho', 'Liberia', 'Libya',
       'Madagascar', 'Malawi', 'Malaysia', 'Mali', 'Mauritania',
       'Mauritius', 'Mexico', 'Mongolia', 'Montenegro', 'Morocco',
       'Mozambique', 'Myanmar', 'Namibia', 'Nepal', 'Netherlands',
       'New Zealand', 'Nicaragua', 'Niger', 'Nigeria', 'Norway', 'Oman',
       'Pakistan', 'Panama', 'Paraguay', 'Peru', 'Philippines', 'Poland',
       'Portugal', 'Puerto Rico', 'Reunion', 'Romania', 'Rwanda',
       'Sao Tome and Principe', 'Saudi Arabia', 'Senegal', 'Serbia',
       'Sierra Leone', 'Singapore', 'Slovak Republic', 'Slovenia',
       'Somalia', 'South Africa', 'Spain', 'Sri Lanka', 'Sudan',
       'Swaziland', 'Sweden', 'Switzerland', 'Syria', 'Taiwan',
       'Tanzania', 'Thailand', 'Togo', 'Trinidad and Tobago', 'Tunisia',
       'Turkey', 'Uganda', 'United Kingdom', 'United States', 'Uruguay',
       'Venezuela', 'Vietnam', 'West Bank and Gaza', 'Yemen, Rep.',
       'Zambia', 'Zimbabwe'], dtype=object)
```

In [ ]:

```
import plotly.express as px
df = px.data.gapminder().query("year == 2007")
fig = px.scatter_geo(df, locations="iso_alpha",
                     color="continent", # which column to use to set the color of markers
                     hover_name="country", # column added to hover information
                     size="pop", # size of markers
                     projection="natural earth")
fig.show()
```



```
In [ ]: pip install geopandas
```

```
Requirement already satisfied: geopandas in c:\python 3.11.12\lib\site-packages (0.13.2)
Requirement already satisfied: fiona>=1.8.19 in c:\python 3.11.12\lib\site-packages (from geo
pandas) (1.9.4.post1)
Requirement already satisfied: packaging in c:\python 3.11.12\lib\site-packages (from geopand
as) (23.1)
Requirement already satisfied: pandas>=1.1.0 in c:\python 3.11.12\lib\site-packages (from geo
pandas) (1.5.3)
Requirement already satisfied: pyproj>=3.0.1 in c:\python 3.11.12\lib\site-packages (from geo
pandas) (3.6.0)
Requirement already satisfied: shapely>=1.7.1 in c:\python 3.11.12\lib\site-packages (from ge
opandas) (2.0.1)
Requirement already satisfied: attrs>=19.2.0 in c:\python 3.11.12\lib\site-packages (from fio
na>=1.8.19->geopandas) (22.2.0)
Requirement already satisfied: certifi in c:\python 3.11.12\lib\site-packages (from fiona>=1.
8.19->geopandas) (2022.12.7)
Requirement already satisfied: click~=8.0 in c:\python 3.11.12\lib\site-packages (from fiona>
=1.8.19->geopandas) (8.1.3)
Requirement already satisfied: click-plugins>=1.0 in c:\python 3.11.12\lib\site-packages (fro
m fiona>=1.8.19->geopandas) (1.1.1)
Requirement already satisfied: cligj>=0.5 in c:\python 3.11.12\lib\site-packages (from fiona>
=1.8.19->geopandas) (0.7.2)
Requirement already satisfied: six in c:\python 3.11.12\lib\site-packages (from fiona>=1.8.19
->geopandas) (1.16.0)
Requirement already satisfied: python-dateutil>=2.8.1 in c:\python 3.11.12\lib\site-packages
(from pandas>=1.1.0->geopandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\python 3.11.12\lib\site-packages (from pand
as>=1.1.0->geopandas) (2023.3)
Requirement already satisfied: numpy>=1.21.0 in c:\python 3.11.12\lib\site-packages (from pan
das>=1.1.0->geopandas) (1.24.2)
Requirement already satisfied: colorama in c:\python 3.11.12\lib\site-packages (from click~=
8.0->fiona>=1.8.19->geopandas) (0.4.6)
Note: you may need to restart the kernel to use updated packages.
```

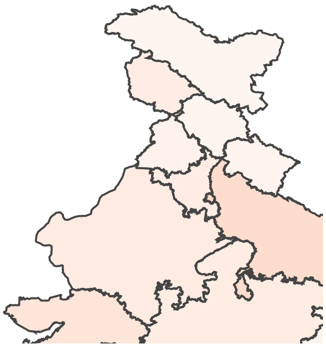
In [ ]:

```python
import plotly.express as px
import geopandas as gpd

geo_df = gpd.read_file(gpd.datasets.get_path('naturalearth_cities'))

px.set_mapbox_access_token(open(".mapbox_token").read())
fig = px.scatter_geo(geo_df,
                    lat=geo_df.geometry.y,
                    lon=geo_df.geometry.x,
                    hover_name="name")
fig.show()
```

```
C:\Users\psure\AppData\Local\Temp\ipykernel_14884\478443800.py:4: FutureWarning:

The geopandas.dataset module is deprecated and will be removed in GeoPandas 1.0. You can get
the original 'naturalearth_cities' data from https://www.naturalearthdata.com/downloads/110m-
cultural-vectors/.


---------------------------------------------------------------------------
FileNotFoundError                         Traceback (most recent call last)
Cell In[77], line 6
      2 import geopandas as gpd
      4 geo_df = gpd.read_file(gpd.datasets.get_path('naturalearth_cities'))
----> 6 px.set_mapbox_access_token(open(".mapbox_token").read())
      7 fig = px.scatter_geo(geo_df,
      8                     lat=geo_df.geometry.y,
      9                     lon=geo_df.geometry.x,
     10                     hover_name="name")
     11 fig.show()

File ~\AppData\Roaming\Python\Python311\site-packages\IPython\core\interactiveshell.py:284, i
n _modified_open(file, *args, **kwargs)
    277 if file in {0, 1, 2}:
    278     raise ValueError(
    279         f"IPython won't let you open fd={file} by default "
    280         "as it is likely to crash IPython. If you know what you are doing, "
    281         "you can use builtins' open."
    282     )
--> 284 return io_open(file, *args, **kwargs)

FileNotFoundError: [Errno 2] No such file or directory: '.mapbox_token'
```

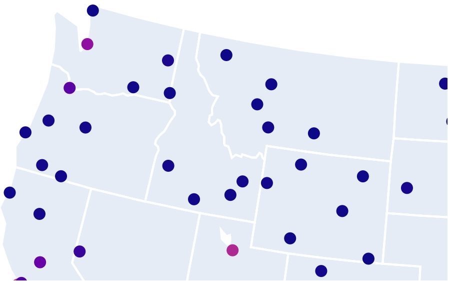
In [ ]:

```python
import pandas as pd
import plotly.express as px

df = pd.read_csv("https://gist.githubusercontent.com/jbrobst/56c13bbbf9d97d187fea01ca62ea5112

fig = px.choropleth(
    df,
    geojson="https://gist.githubusercontent.com/jbrobst/56c13bbbf9d97d187fea01ca62ea5112/raw/
    featureidkey='properties.ST_NM',
    locations='state',
    color='active cases',
    color_continuous_scale='Reds'
)

fig.update_geos(fitbounds="locations", visible=False)

fig.show()
```



```
In [ ]: import plotly.graph_objects as go

        import pandas as pd

        df = pd.read_csv('https://raw.githubusercontent.com/plotly/datasets/master/2011_february_us_a
        df['text'] = df['airport'] + '' + df['city'] + ', ' + df['state'] + '' + 'Arrivals: ' + df['c

        fig = go.Figure(data=go.Scattergeo(
                lon = df['long'],
                lat = df['lat'],
                text = df['text'],
                mode = 'markers',
                marker_color = df['cnt'],
                ))

        fig.update_layout(
                title = 'Most trafficked US airports<br>(Hover for airport names)',
                geo_scope='usa',
            )
        fig.show()
```

Most trafficked US airports
(Hover for airport names)



```
In [ ]: df = pd.read_csv("https://raw.githubusercontent.com/plotly/datasets/master/2011_february_us_a
```

```
In [ ]: df
```

Out[ ]:

	iata	airport	city	state	country	lat	long	cnt
0	ORD	Chicago O'Hare International	Chicago	IL	USA	41.979595	-87.904464	25129
1	ATL	William B Hartsfield-Atlanta Intl	Atlanta	GA	USA	33.640444	-84.426944	21925
2	DFW	Dallas-Fort Worth International	Dallas-Fort Worth	TX	USA	32.895951	-97.037200	20662
3	PHX	Phoenix Sky Harbor International	Phoenix	AZ	USA	33.434167	-112.008056	17290
4	DEN	Denver Intl	Denver	CO	USA	39.858408	-104.667002	13781
...	...	...	...	...	...	...	...	...
216	EAU	Chippewa Valley Regional	Eau Claire	WI	USA	44.865257	-91.485072	48
217	DBQ	Dubuque Municipal	Dubuque	IA	USA	42.402959	-90.709167	48
218	RST	Rochester International	Rochester	MN	USA	43.908826	-92.497987	37
219	UTM	Tunica Municipal Airport	Tunica	MS	USA	34.681499	-90.348816	32
220	BIL	Billings Logan Intl	Billings	MT	USA	45.807662	-108.542861	23

221 rows × 8 columns

```
In [ ]: df.shape

Out[ ]: (221, 8)
```

```
In [ ]:
```