In [1]:
```
import cufflinks as cf
import numpy as np
import pandas as pd
import seaborn as sns
```

In [2]:
```
cf.go_offline()
```

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

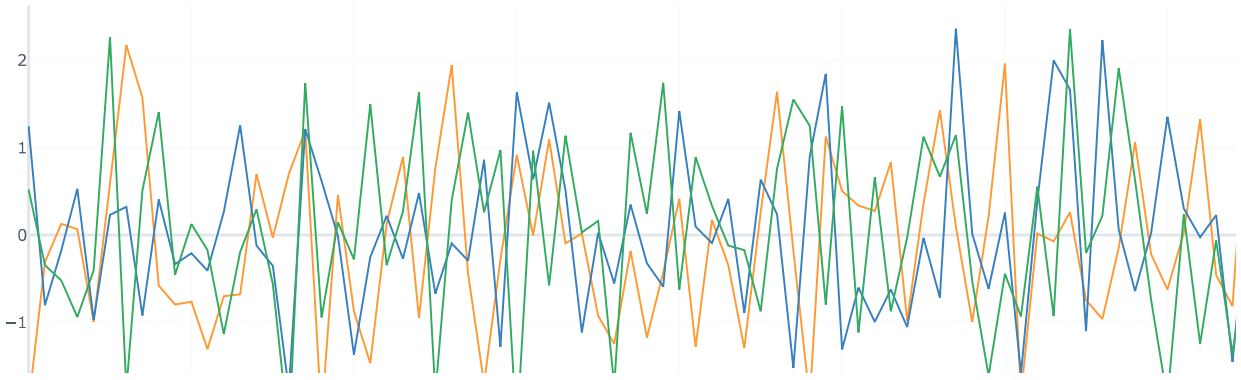
In [4]:
```
df
```

Out[4]:

	A	B	C
0	-1.939455	1.249011	0.523576
1	-0.305927	-0.801938	-0.342264
2	0.130835	-0.175576	-0.520188
3	0.068013	0.528111	-0.936422
4	-0.991147	-0.969794	-0.403826
...	...	...	...
95	-0.432124	-0.383162	-0.225902
96	0.444702	-1.078026	0.581067
97	0.930641	0.439261	0.091143
98	-1.105109	-0.483037	1.191540
99	-1.017864	0.091499	-0.829480

100 rows × 3 columns

In [5]:
```
df.iplot()
```



In [6]:
```
df1 = pd.DataFrame(np.random.randint(3,100,(100,1)))
```

In [7]:
```
df1
```

Out[7]:

	0
0	33
1	58

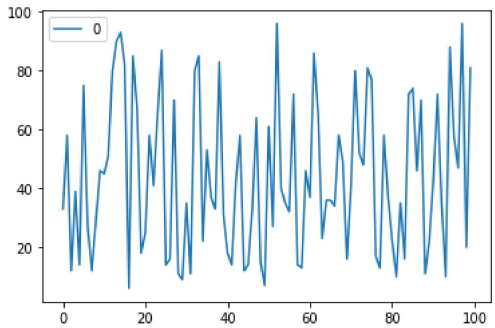
	0
2	12
3	39
4	14
...	...
95	58
96	47
97	96
98	20
99	81

100 rows × 1 columns

In [8]:
```
df1.iplot()
```

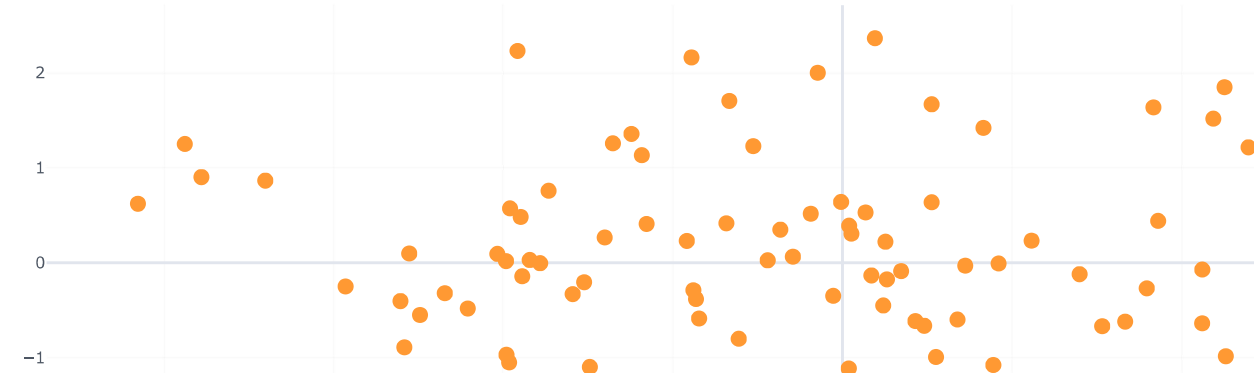
In [9]:
```
df1.plot()
```

Out[9]: <AxesSubplot:>



In [10]:
```
df.iplot(x = 'A', y = 'B')
```

In [11]:
```
df.iplot(x = 'A', y = 'B', mode = 'markers')
```



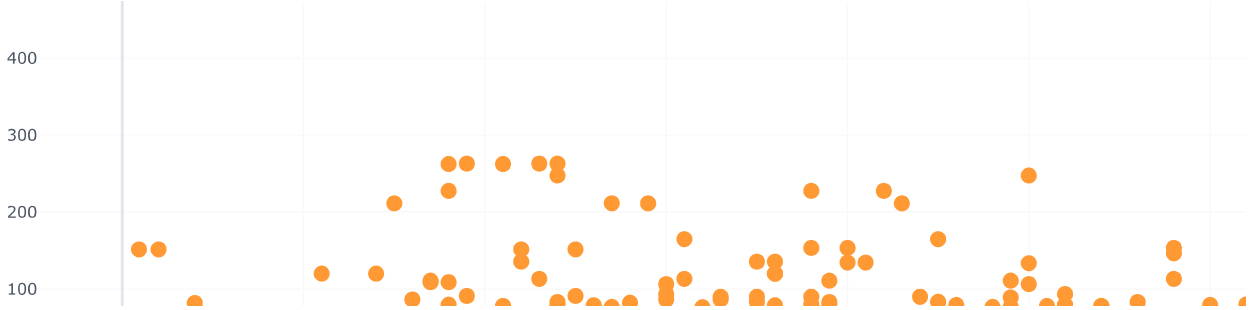
In [12]:
```
df2 = sns.load_dataset('titanic')
```

In [13]:
```
df2.head()
```

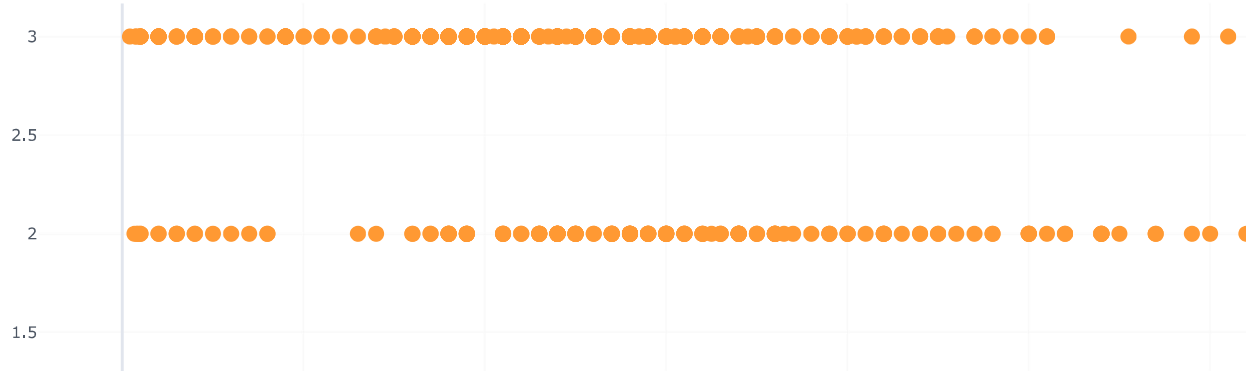
Out[13]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adult_male	deck	embark_town	alive	alone
0	0	3	male	22.0	1	0	7.2500	S	Third	man	True	NaN	Southampton	no	False
1	1	1	female	38.0	1	0	71.2833	C	First	woman	False	C	Cherbourg	yes	False
2	1	3	female	26.0	0	0	7.9250	S	Third	woman	False	NaN	Southampton	yes	True
3	1	1	female	35.0	1	0	53.1000	S	First	woman	False	C	Southampton	yes	False
4	0	3	male	35.0	0	0	8.0500	S	Third	man	True	NaN	Southampton	no	True

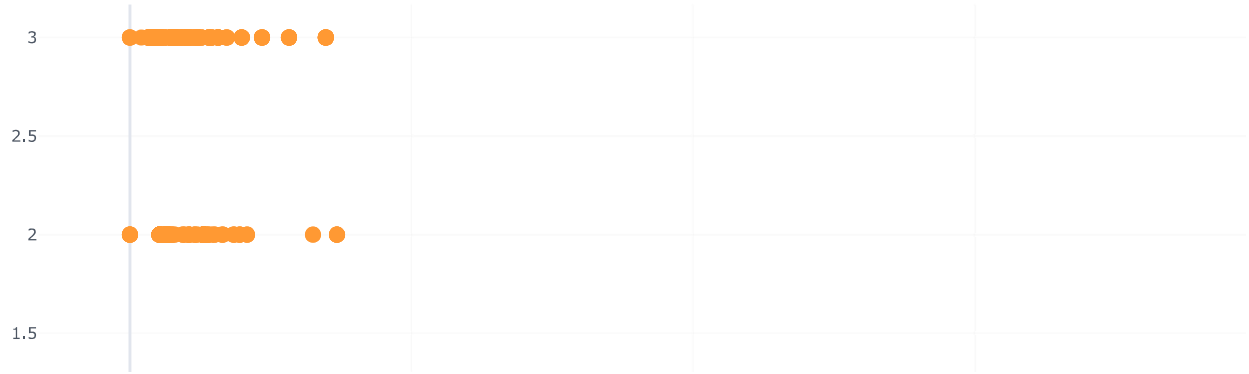
In [14]:
```
df2.iplot(x = 'age', y = 'fare', mode = 'markers')
```



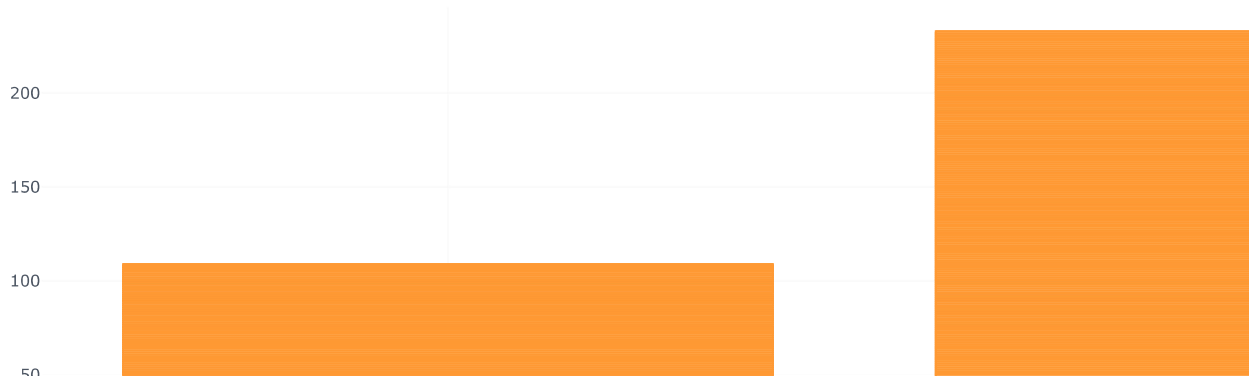
In [15]:
```
df2.iplot(x = 'age', y = 'pclass', mode = 'markers')
```



In [16]:
```
df2.iplot(x = 'fare', y = 'pclass', mode = 'markers')
```

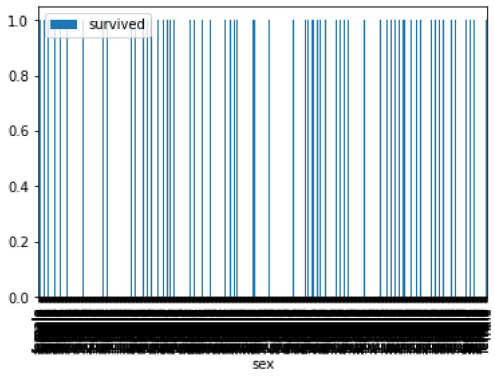


In [17]:
```
df2.iplot(kind = 'bar', x = 'sex', y = 'survived')
```



In [18]:
```
df2.plot(kind = 'bar', x = 'sex', y = 'survived')
```

Out[18]:
```
<AxesSubplot:xlabel='sex'>
```



In [19]:
```
import matplotlib.pyplot as plt
```

In [20]:
```
dfi =sns.load_dataset('iris')
```

In [21]:
```
dfi
```

Out[21]:

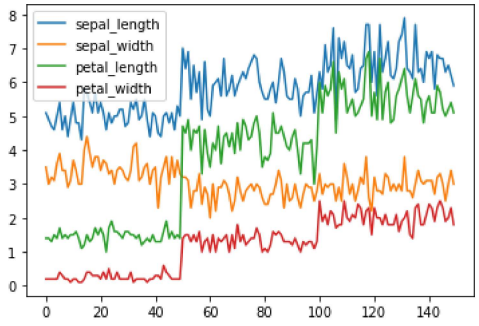
	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	virginica

	sepal_length	sepal_width	petal_length	petal_width	species
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

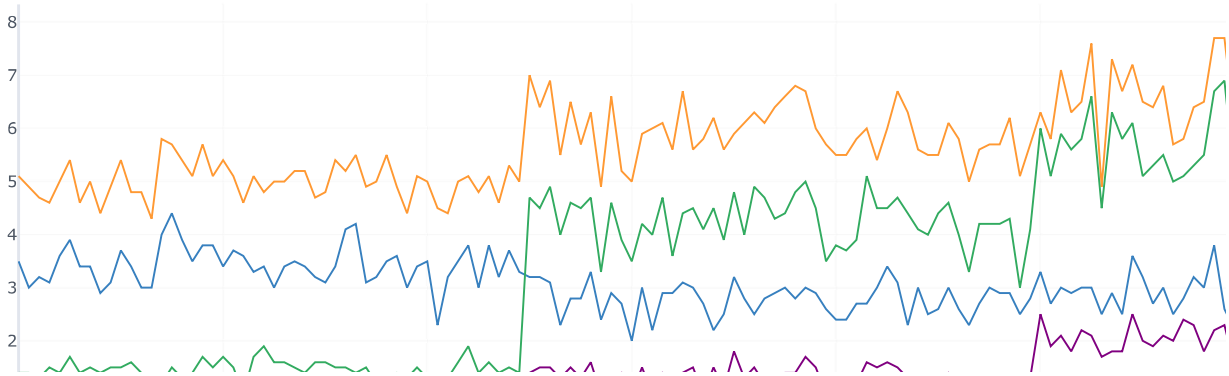
150 rows × 5 columns

In [22]:
```
dfi.plot()
```

Out[22]:
```
<AxesSubplot:>
```

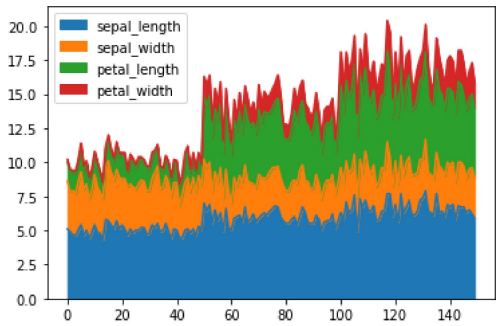


In [23]:
```
dfi.iplot()
```



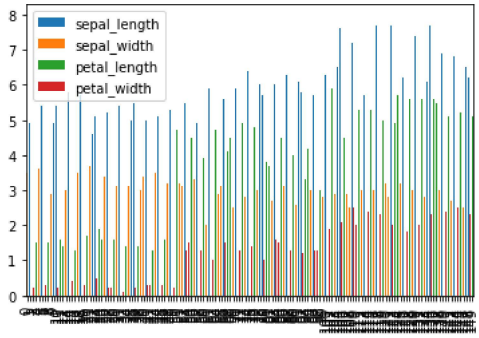
In [24]:
```
dfi.plot(kind = 'area')
```

Out[24]:
```
<AxesSubplot:>
```

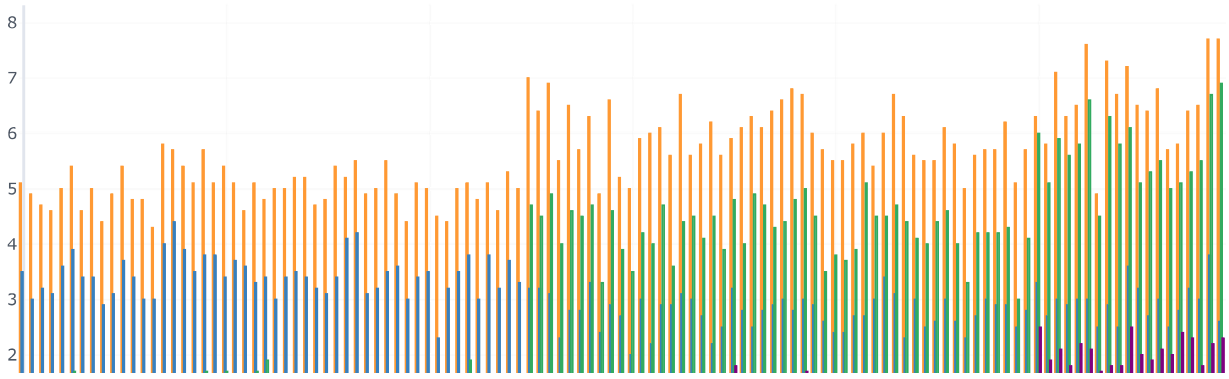


In [25]:
```
dfi.plot(kind = 'bar')
```

Out[25]:
```
<AxesSubplot:>
```

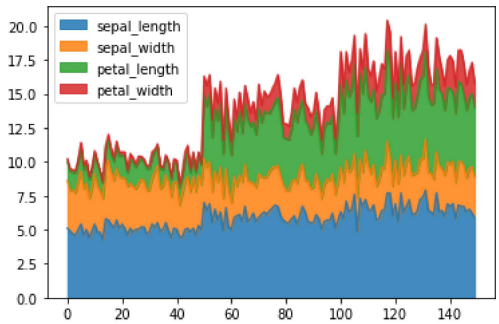


In [26]:
```
dfi.iplot(kind = 'bar')
```



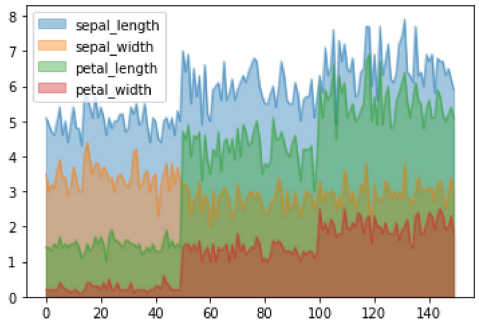
In [27]:
```
dfi.plot(kind = 'area', alpha = 0.85)
```

Out[27]:
```
<AxesSubplot:>
```



In [28]:
```
dfi.plot(kind = 'area', alpha = 0.4, stacked = False)
```

Out[28]:
```
<AxesSubplot:>
```



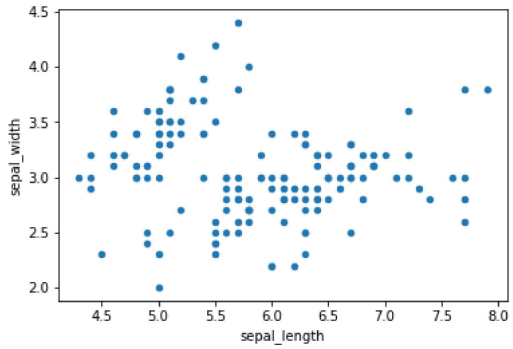
In [29]:
```
dfi.head()
```

Out[29]:

	sepal_length	sepal_width	petal_length	petal_width	species
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

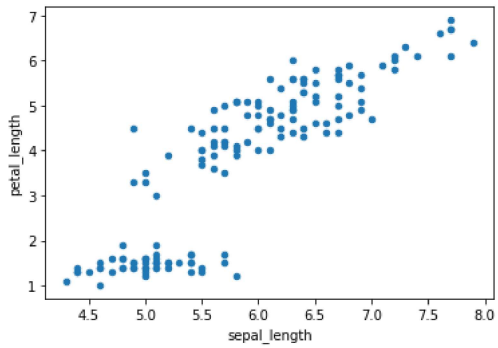
In [30]:
```
dfi.plot.scatter(x = 'sepal_length', y = 'sepal_width')
```

Out[30]:
```
<AxesSubplot:xlabel='sepal_length', ylabel='sepal_width'>
```



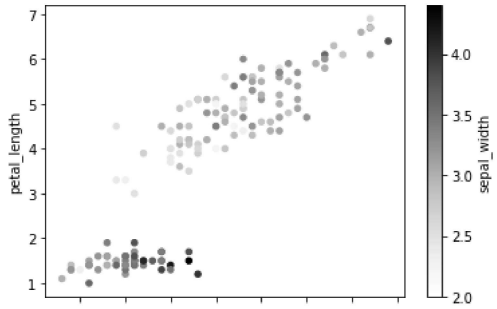
In [31]:
```
dfi.plot.scatter(x = 'sepal_length', y = 'petal_length')
```

Out[31]:
```
<AxesSubplot:xlabel='sepal_length', ylabel='petal_length'>
```



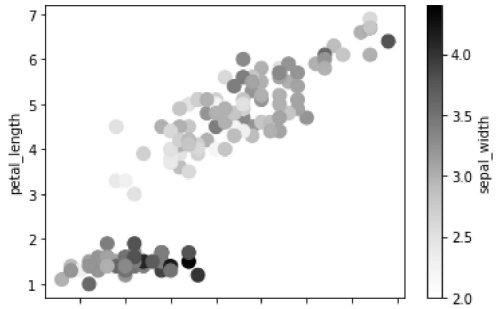
In [32]:
```
dfi.plot.scatter(x = 'sepal_length', y = 'petal_length', c = 'sepal_width' )
```

Out[32]:
```
<AxesSubplot:xlabel='sepal_length', ylabel='petal_length'>
```



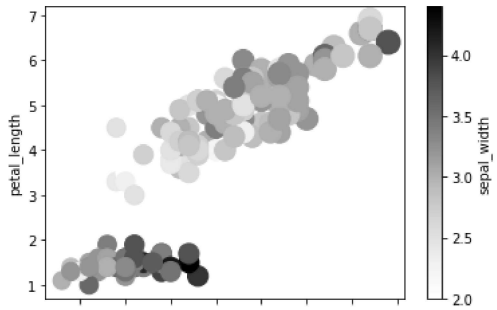
In [33]:
```
dfi.plot.scatter(x = 'sepal_length', y = 'petal_length', c = 'sepal_width', s = 100 )
```

Out[33]:
```
<AxesSubplot:xlabel='sepal_length', ylabel='petal_length'>
```



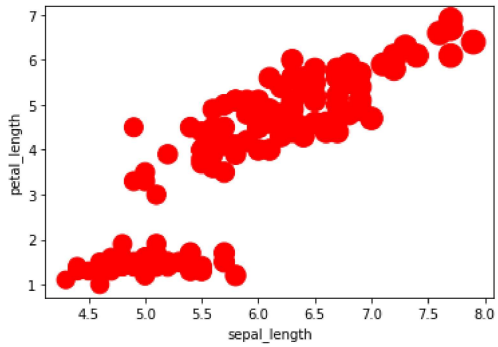
In [34]:
```
dfi.plot.scatter(x = 'sepal_length', y = 'petal_length', c = 'sepal_width', s = dfi['sepal_length']*40 )
```

Out[34]:
```
<AxesSubplot:xlabel='sepal_length', ylabel='petal_length'>
```



In [35]:
```
dfi.plot.scatter(x = 'sepal_length', y = 'petal_length', c = 'red', s = dfi['sepal_length']*40 )
```

Out[35]:
```
<AxesSubplot:xlabel='sepal_length', ylabel='petal_length'>
```

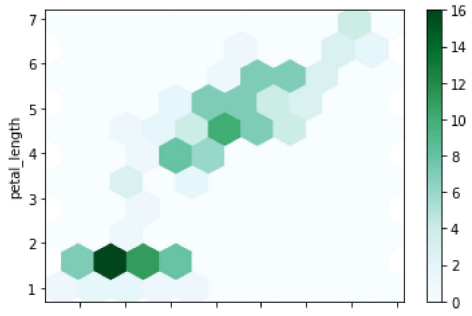


In [36]:
```
dfi.plot.hexbin(x = 'sepal_length', y = 'petal_length', gridsize = 10, cmap = 'viridis')
```

Out[36]:
```
<AxesSubplot:xlabel='sepal_length', ylabel='petal_length'>
```

In [37]:
```
dfi.plot.hexbin(x = 'sepal_length', y = 'petal_length', gridsize = 10)
```

Out[37]:
```
<AxesSubplot:xlabel='sepal_length', ylabel='petal_length'>
```



In [38]:
```
# 3d plot
from mpl_toolkits import mplot3d
```

In [39]:
```
x = np.linspace(-1, 6, 30)
```

In [40]:
```
x
```

Out[40]:
```
array([-1.        , -0.75862069, -0.51724138, -0.27586207, -0.03448276,
        0.20689655,  0.44827586,  0.68965517,  0.93103448,  1.17241379,
        1.4137931 ,  1.65517241,  1.89655172,  2.13793103,  2.37931034,
        2.62068966,  2.86206897,  3.10344828,  3.34482759,  3.5862069 ,
        3.82758621,  4.06896552,  4.31034483,  4.55172414,  4.79310345,
        5.03448276,  5.27586207,  5.51724138,  5.75862069,  6.        ])
```

In [41]:
```
y = np.linspace(-1, 6, 30)
```

In [42]:
```
y
```

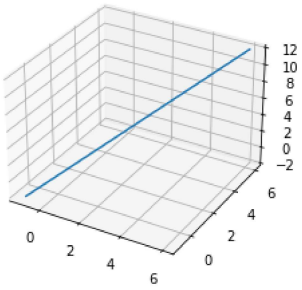
Out[42]:
```
array([-1.        , -0.75862069, -0.51724138, -0.27586207, -0.03448276,
        0.20689655,  0.44827586,  0.68965517,  0.93103448,  1.17241379,
        1.4137931 ,  1.65517241,  1.89655172,  2.13793103,  2.37931034,
        2.62068966,  2.86206897,  3.10344828,  3.34482759,  3.5862069 ,
        3.82758621,  4.06896552,  4.31034483,  4.55172414,  4.79310345,
        5.03448276,  5.27586207,  5.51724138,  5.75862069,  6.        ])
```

In [43]:
```
def sin_fun(x,y):
    return np.sin(np.sqrt(x**2 + y**2))
```

In [44]:
```
z = x + y
```

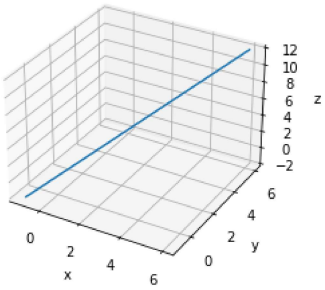
In [45]:
```
ax = plt.axes(projection = '3d')
ax.plot3D (x,y,z)
```

Out[45]:
```
[<mpl_toolkits.mplot3d.art3d.Line3D at 0x2114e3b3ee0>]
```



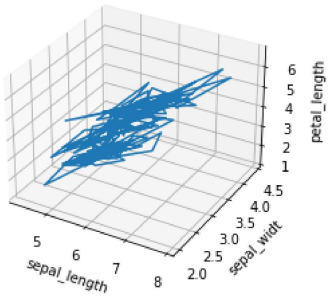
In [46]:
```
ax = plt.axes(projection = '3d')
ax.plot3D (x,y,z)
ax.set_xlabel('x')
ax.set_ylabel('y')
ax.set_zlabel('z')
```

Out[46]:
```
Text(0.5, 0, 'z')
```



In [47]:
```
ax = plt.axes(projection = '3d')
ax.plot3D (dfi['sepal_length'],dfi['sepal_width'],dfi['petal_length'])
ax.set_xlabel('sepal_length')
ax.set_ylabel('sepal_widt')
ax.set_zlabel('petal_length')
```

Out[47]:
```
Text(0.5, 0, 'petal_length')
```



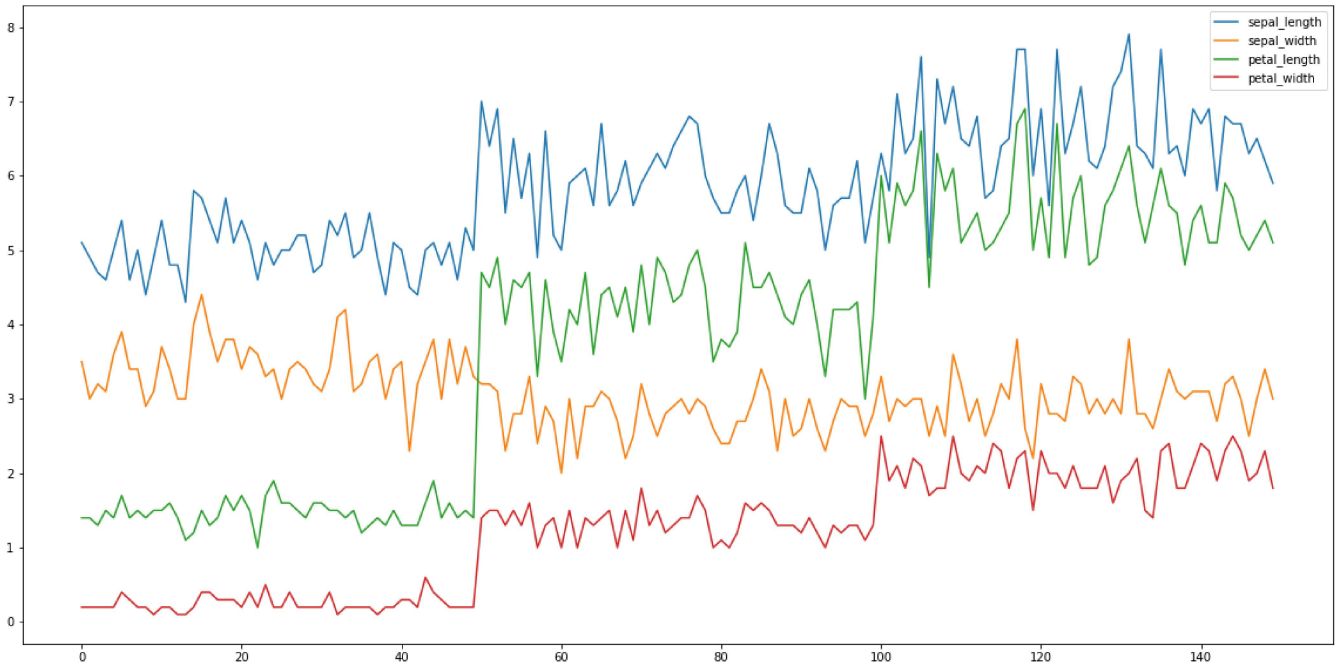
In [48]:
```
dfi.head()
```

Out[48]:

	sepal_length	sepal_width	petal_length	petal_width	species
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

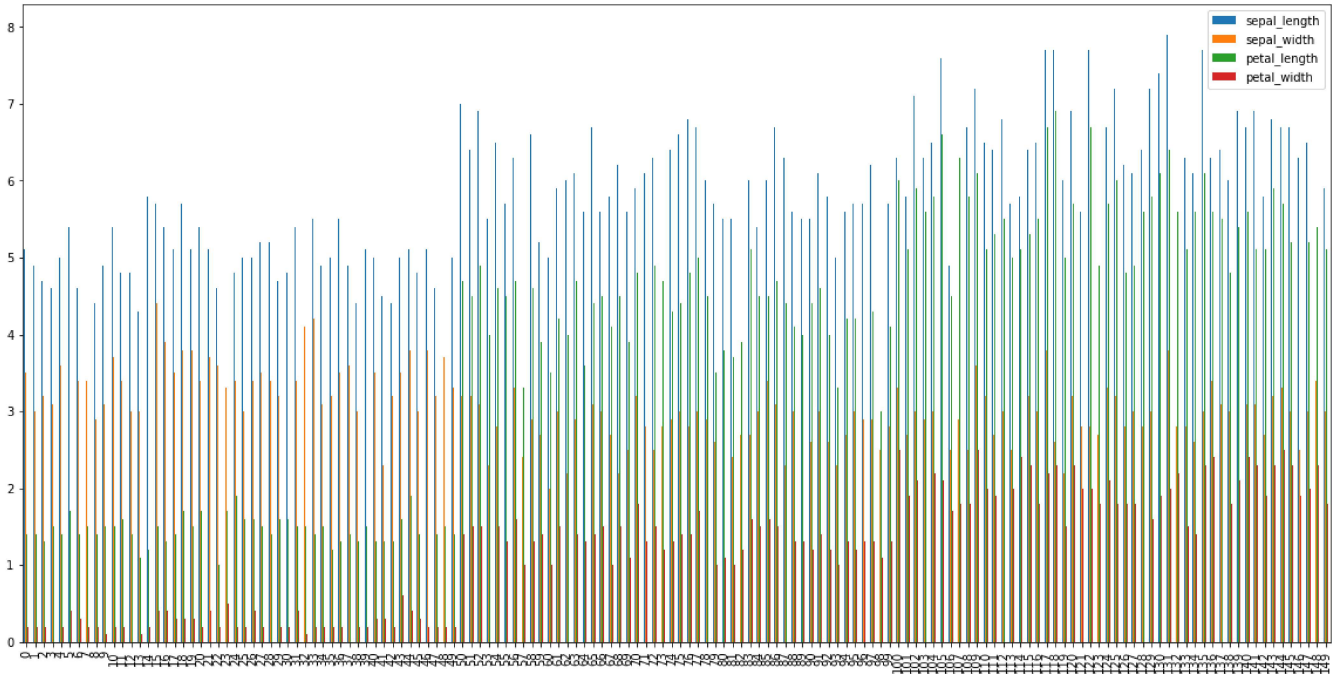
In [49]:
```
dfi.plot(figsize = (20,10))
```

Out[49]:
```
<AxesSubplot:>
```



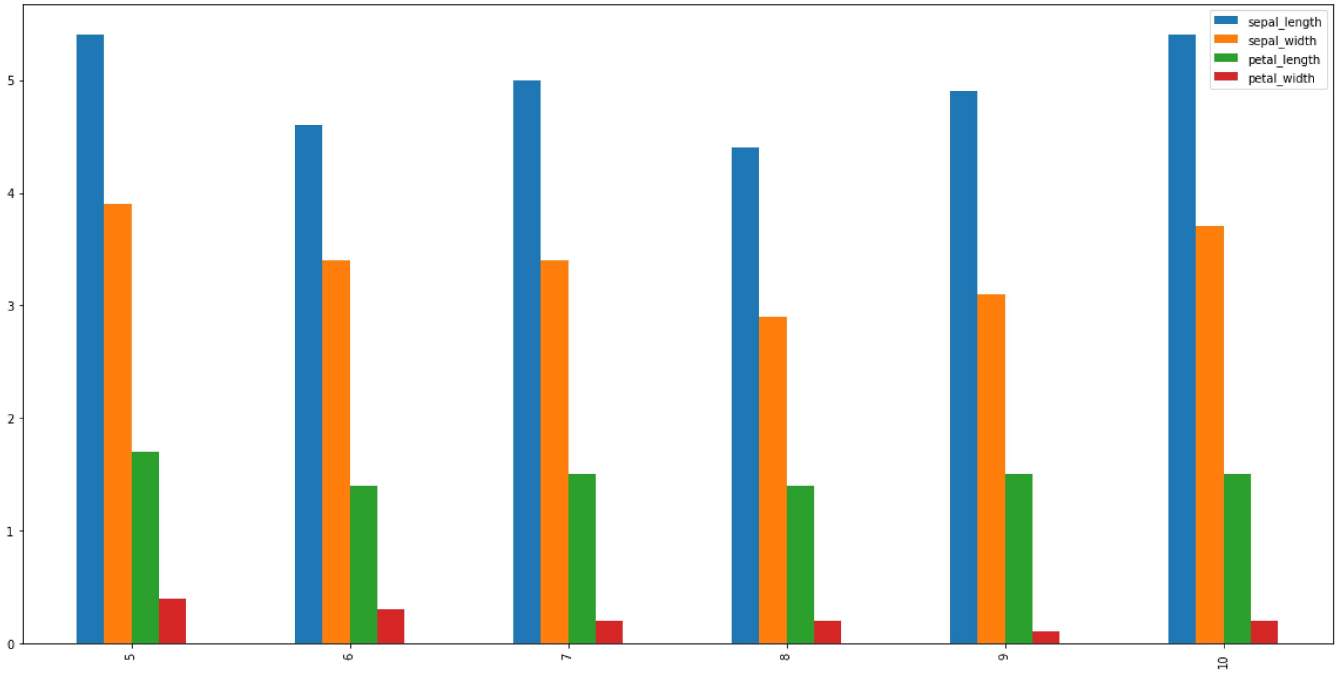
In [50]:
```
dfi.plot(kind = 'bar', figsize = (20,10))
```

Out[50]:
```
<AxesSubplot:>
```



In [51]:
```
# graph on few columns
dfi.iloc[5:11].plot(kind = 'bar', figsize = (20,10))
```

Out[51]:
```
<AxesSubplot:>
```



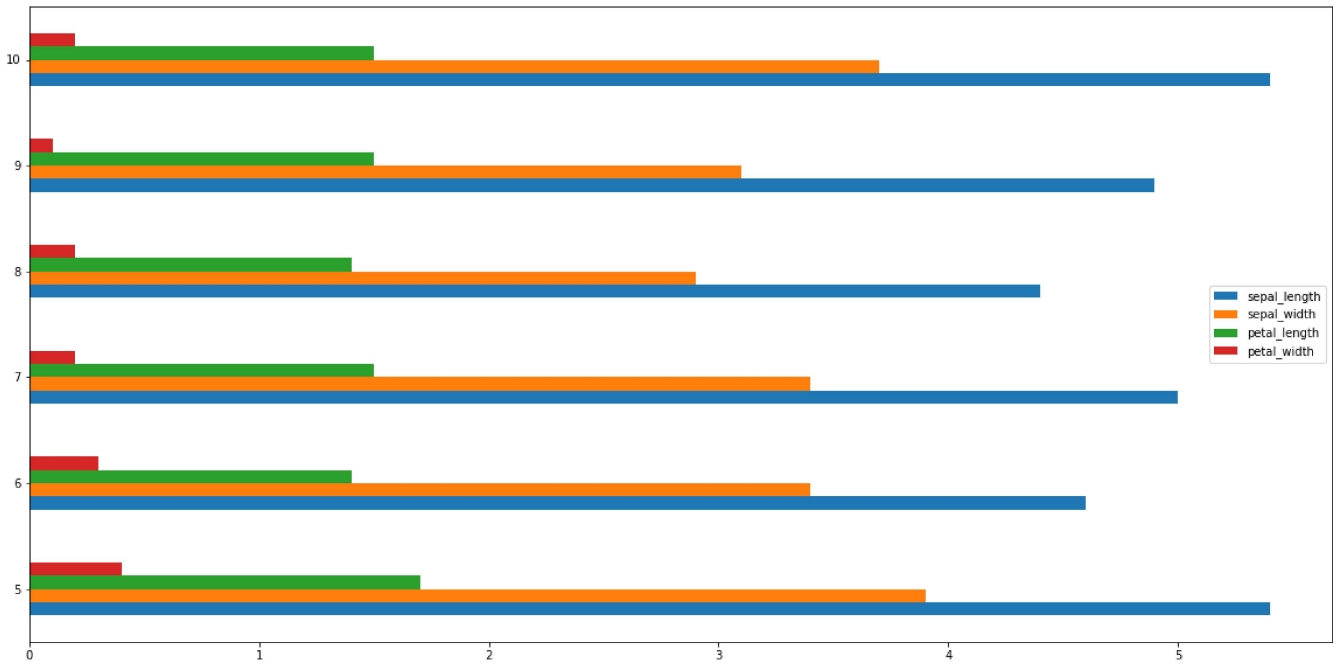
In [52]:
```
dfi.iloc[5:11]
```

Out[52]:

	sepal_length	sepal_width	petal_length	petal_width	species
5	5.4	3.9	1.7	0.4	setosa
6	4.6	3.4	1.4	0.3	setosa
7	5.0	3.4	1.5	0.2	setosa
8	4.4	2.9	1.4	0.2	setosa
9	4.9	3.1	1.5	0.1	setosa
10	5.4	3.7	1.5	0.2	setosa

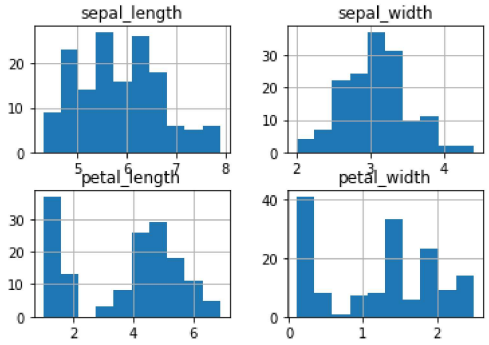
In [53]:
```
# horizental bar
dfi.iloc[5:11].plot(kind = 'barh', figsize = (20,10))
```

Out[53]:
```
<AxesSubplot:>
```



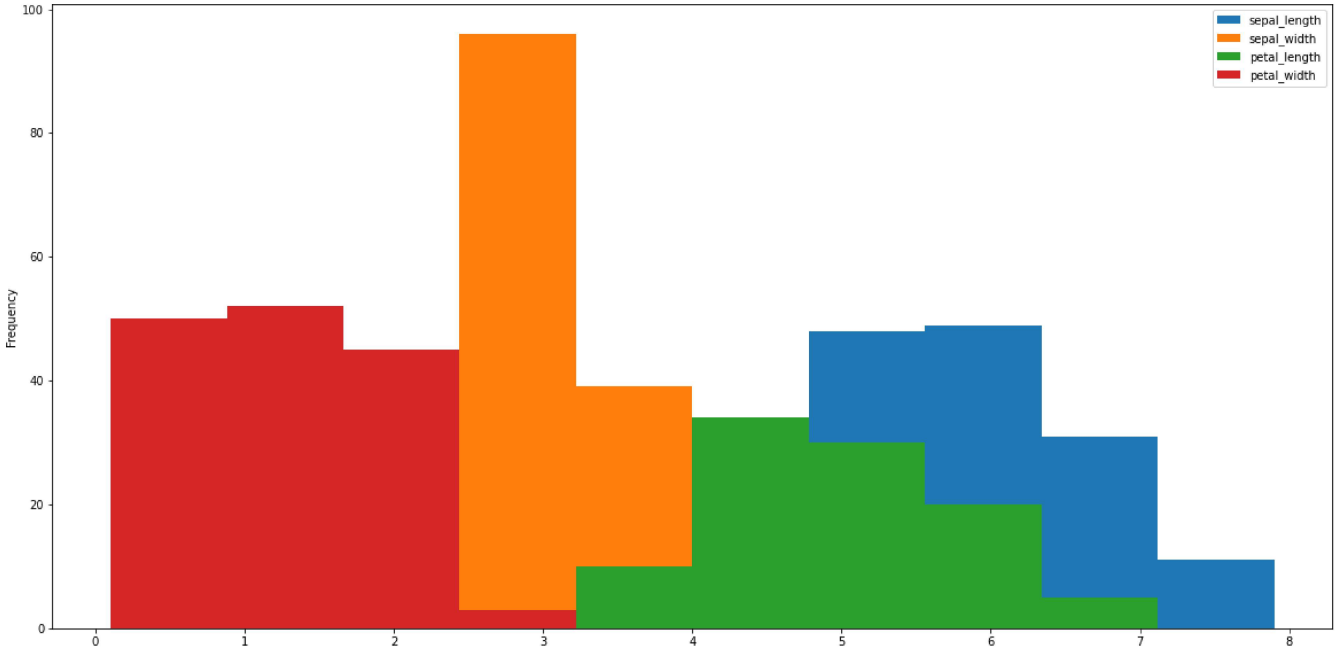
In [54]:
```
dfi.hist()
```

Out[54]:
```
array([[<AxesSubplot:title={'center':'sepal_length'}>,
        <AxesSubplot:title={'center':'sepal_width'}>],
       [<AxesSubplot:title={'center':'petal_length'}>,
        <AxesSubplot:title={'center':'petal_width'}>]], dtype=object)
```



In [55]:
```
# histogram
dfi.plot(kind = 'hist', figsize = (20,10))
```

Out[55]:
```
<AxesSubplot:ylabel='Frequency'>
```



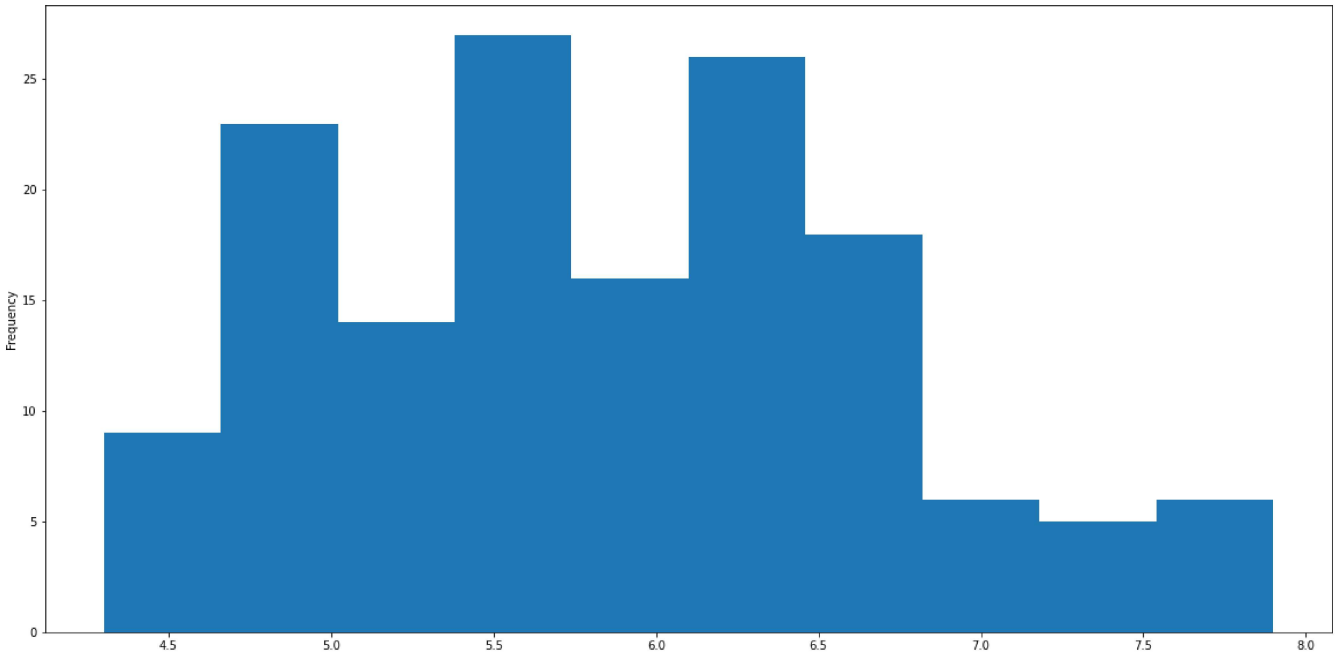
In [56]:
```
dfi.head()
```

Out[56]:

	sepal_length	sepal_width	petal_length	petal_width	species
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

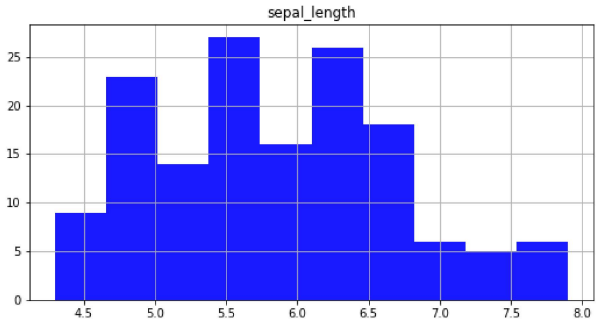
In [57]:
```
dfi['sepal_length'].plot(kind = 'hist', figsize = (20,10))
```

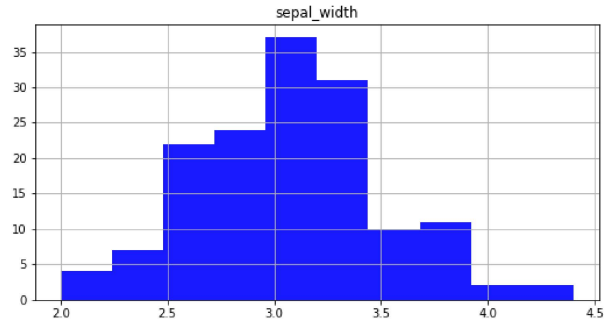
Out[57]:
```
<AxesSubplot:ylabel='Frequency'>
```

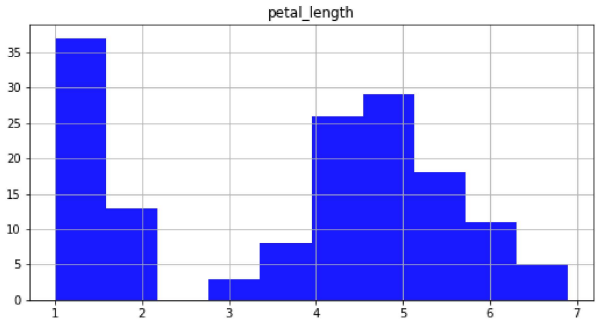


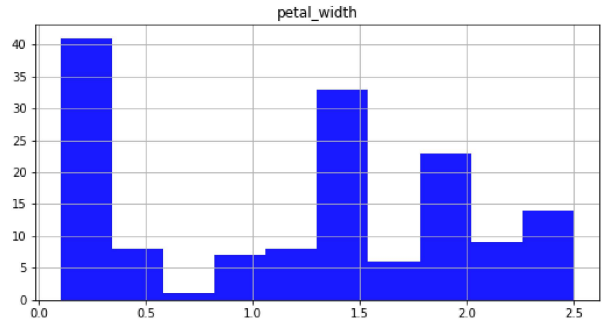
In [58]:
```
dfi.hist(figsize = (20,10), color = 'b', alpha = 0.9)
```

Out[58]:
```
array([[<AxesSubplot:title={'center':'sepal_length'}>,
        <AxesSubplot:title={'center':'sepal_width'}>],
       [<AxesSubplot:title={'center':'petal_length'}>,
        <AxesSubplot:title={'center':'petal_width'}>]], dtype=object)
```

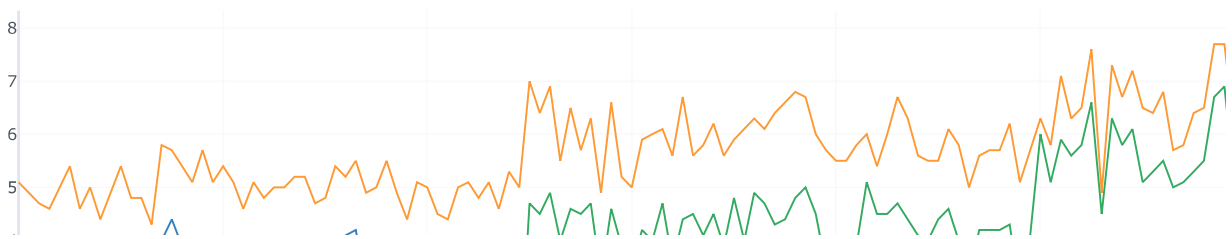


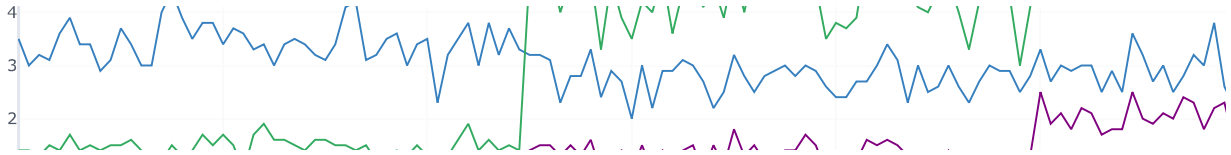




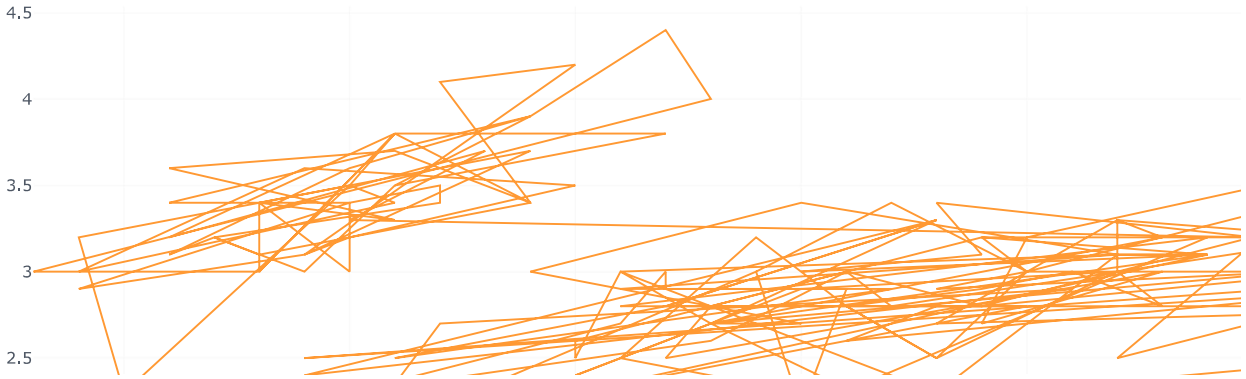


In [59]:
```
dfi.iplot()
```





In [60]:
```
dfi.iplot(x = 'sepal_length', y = 'sepal_width', kind = 'scatter' )
```

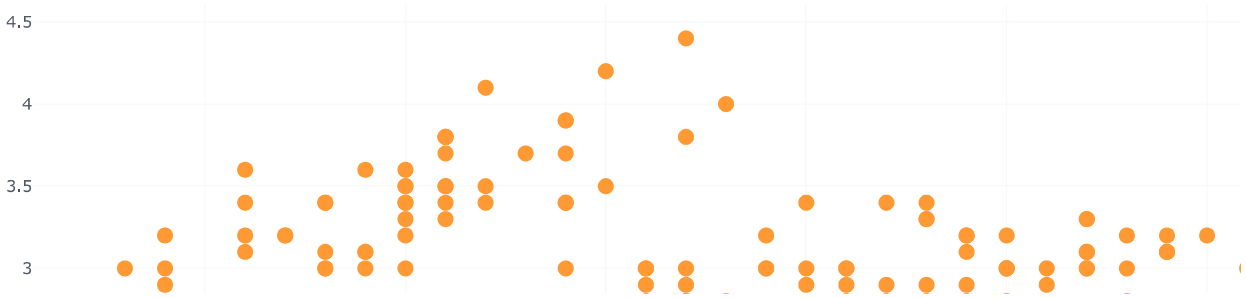


In [61]:
```
dfi.head()
```

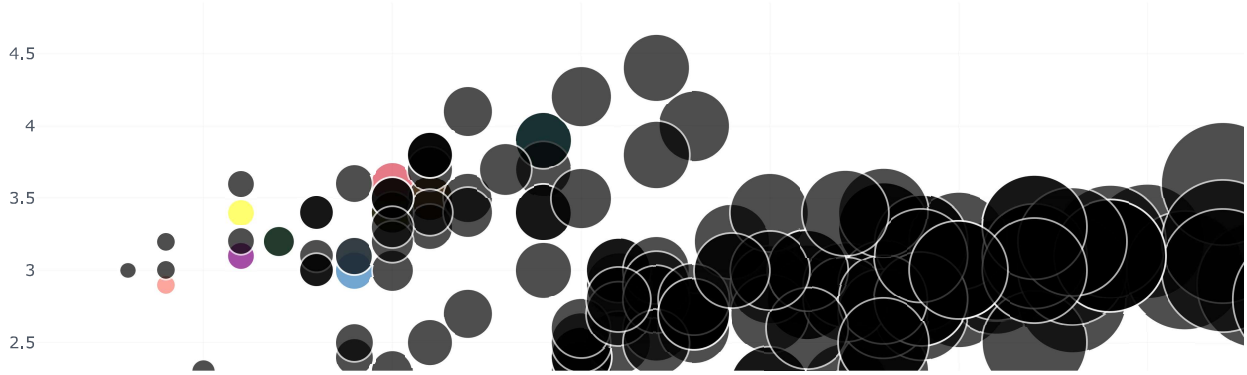
Out[61]:

	sepal_length	sepal_width	petal_length	petal_width	species
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

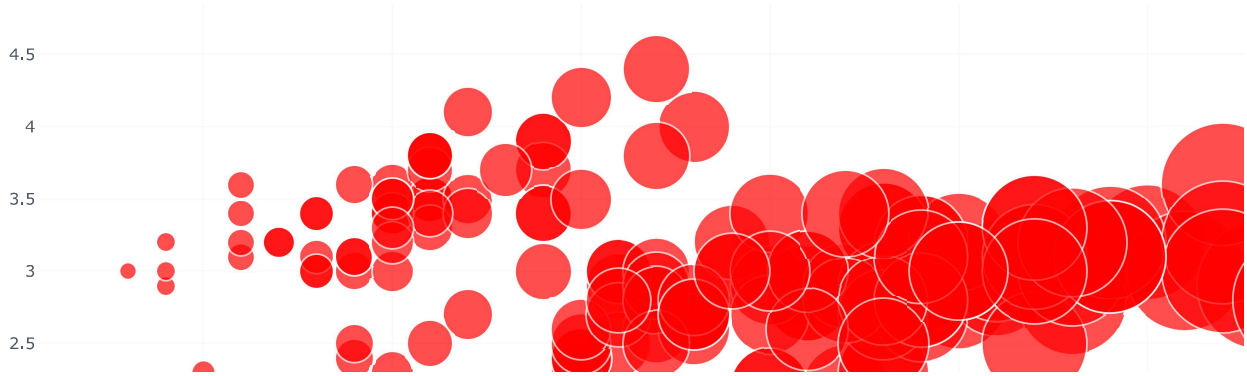
In [62]:
```
dfi.iplot(x = 'sepal_length', y = 'sepal_width', mode = 'markers' )
```



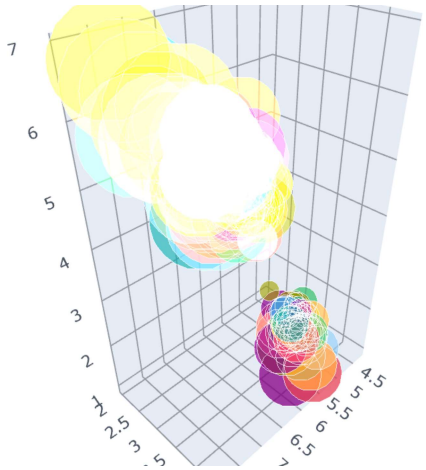
In [63]:
```
dfi.iplot(x = 'sepal_length', y = 'sepal_width', size = 'sepal_length',  kind = 'bubble' )
```



In [64]:
```
dfi.iplot(x = 'sepal_length', y = 'sepal_width', size = 'sepal_length',  kind = 'bubble', color = '#ff0000' )
```



In [65]:
```
dfi.iplot(x = 'sepal_length', y = 'sepal_width', z = 'petal_length',  size = 'sepal_length',  kind = 'bubble3d',  )
```



In [67]:
```
df2 = sns.load_dataset('tips')
```

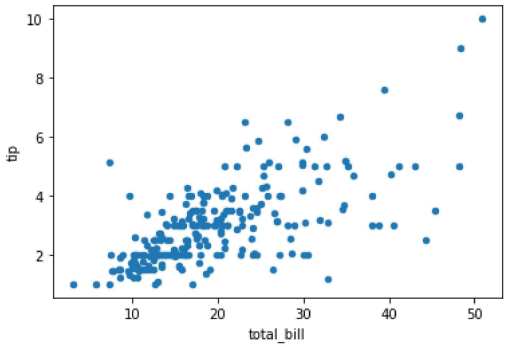
In [68]:
```
df2.head()
```

Out[68]:

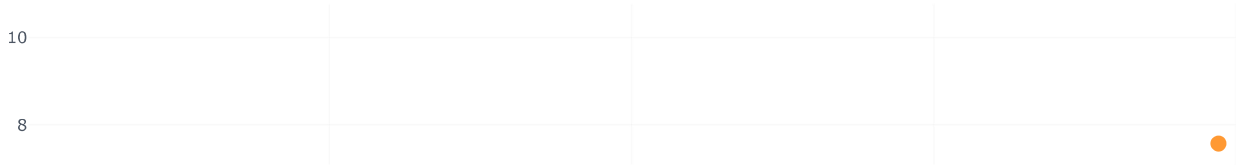
	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

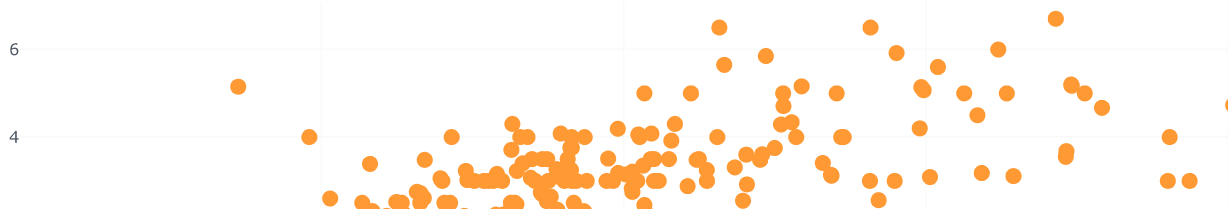
In [70]:
```
df2.plot(x = 'total_bill', y = 'tip', kind = 'scatter' )
```

Out[70]:
```
<AxesSubplot:xlabel='total_bill', ylabel='tip'>
```



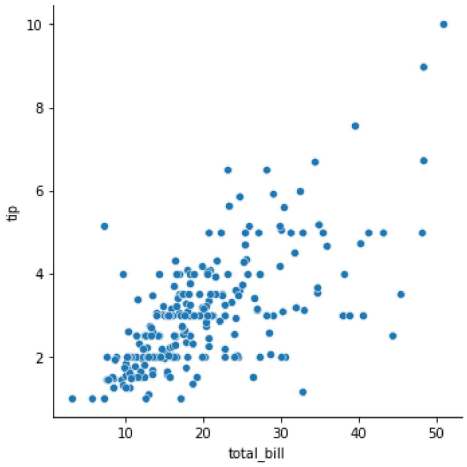
In [73]:
```
df2.iplot(x = 'total_bill', y = 'tip', kind = 'scatter', mode = 'markers' )
```





In [76]:
```
sns.relplot(x = 'total_bill', y = 'tip', data = df2)
```

Out[76]:
```
<seaborn.axisgrid.FacetGrid at 0x21152c1e730>
```



In [77]:
```
df2
```

Out[77]:

	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

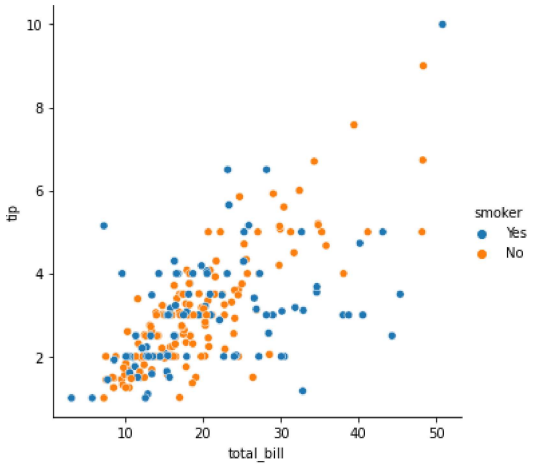
244 rows × 7 columns

In [80]:
```
df2['smoker'].value_counts()
```

Out[80]:
```
No     151
Yes     93
Name: smoker, dtype: int64
```

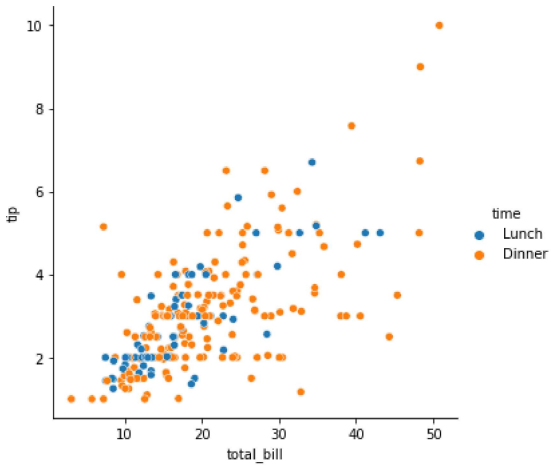
In [81]:
```
sns.relplot(x = 'total_bill', y = 'tip', data = df2, hue = 'smoker')
```

Out[81]:
```
<seaborn.axisgrid.FacetGrid at 0x21152c34310>
```



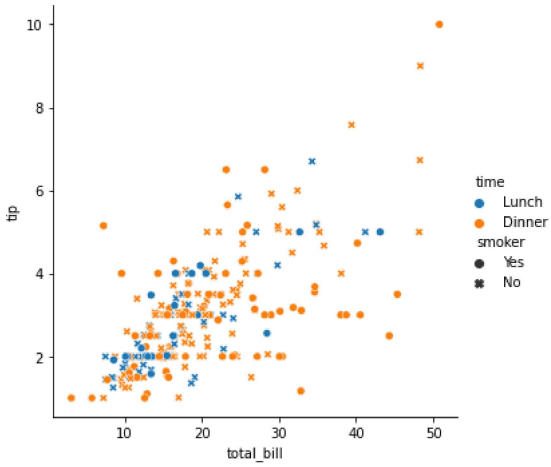
In [82]:
```
sns.relplot(x = 'total_bill', y = 'tip', data = df2, hue = 'time')
```

Out[82]:
```
<seaborn.axisgrid.FacetGrid at 0x2114fdfebb0>
```



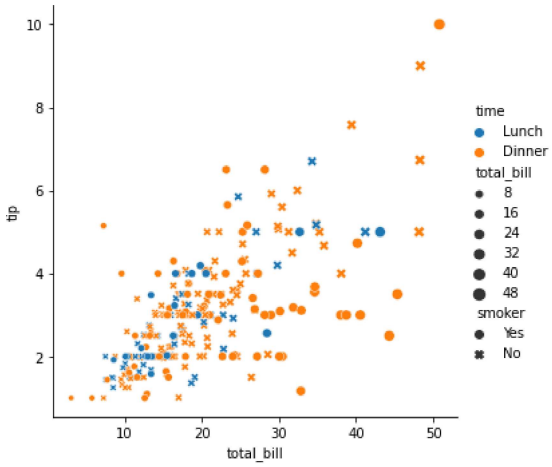
In [83]:
```
sns.relplot(x = 'total_bill', y = 'tip', data = df2, hue = 'time', style = 'smoker')
```

Out[83]:
```
<seaborn.axisgrid.FacetGrid at 0x21152cc9fa0>
```



In [88]:
```
sns.relplot(x = 'total_bill', y = 'tip', size = 'total_bill', data = df2, hue = 'time', style = 'smoker' )
```

Out[88]:
```
<seaborn.axisgrid.FacetGrid at 0x21153107220>
```



In [89]:
```
df2
```

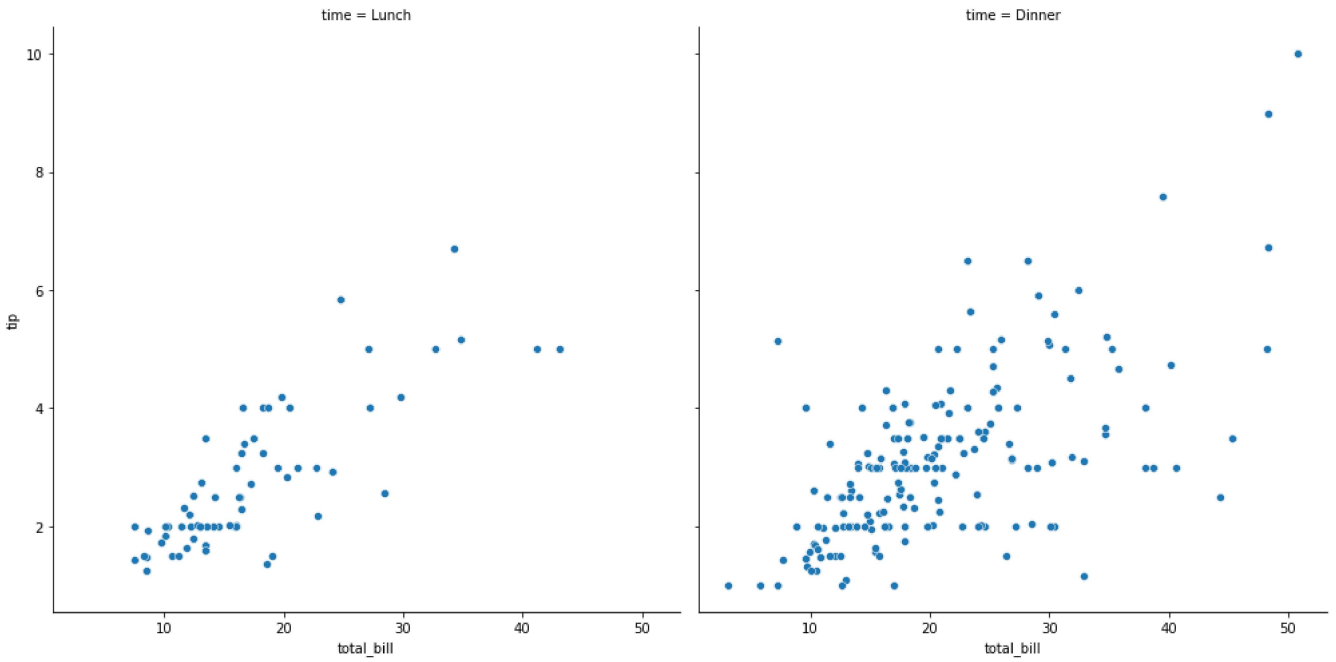
Out[89]:

	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 [101…
```
sns.relplot(x = 'total_bill', y = 'tip', data = df2, col = 'time', height = 7, aspect = 1 )
```

Out[101…
```
<seaborn.axisgrid.FacetGrid at 0x2115a62e670>
```



In [102…
```
dfi
```

Out[102...

	sepal_length	sepal_width	petal_length	petal_width	species
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

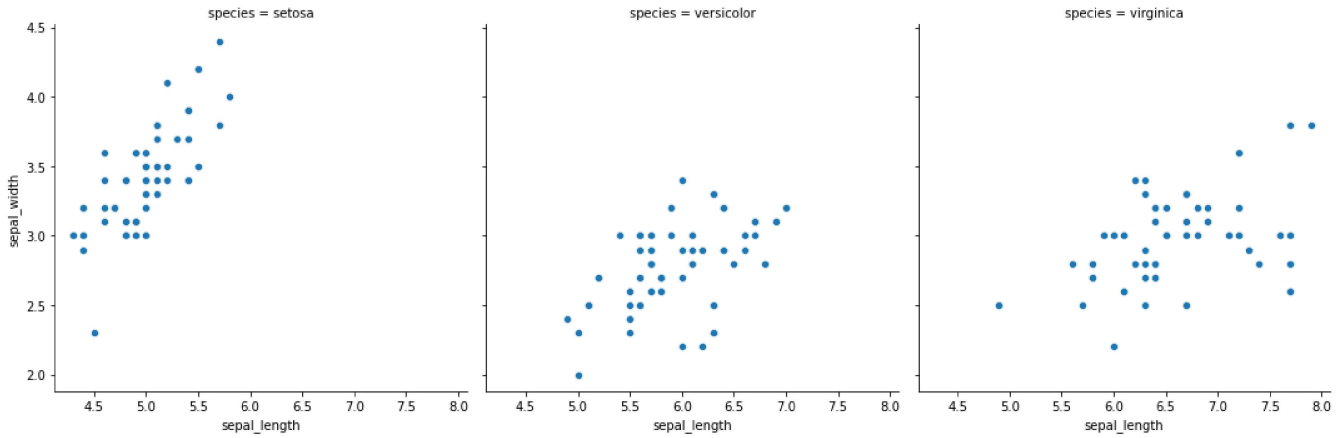
150 rows × 5 columns

In [104...

```
sns.relplot(x = 'sepal_length', y = 'sepal_width', data = dfi, col = 'species')
```

Out[104...

```
<seaborn.axisgrid.FacetGrid at 0x211542a00a0>
```

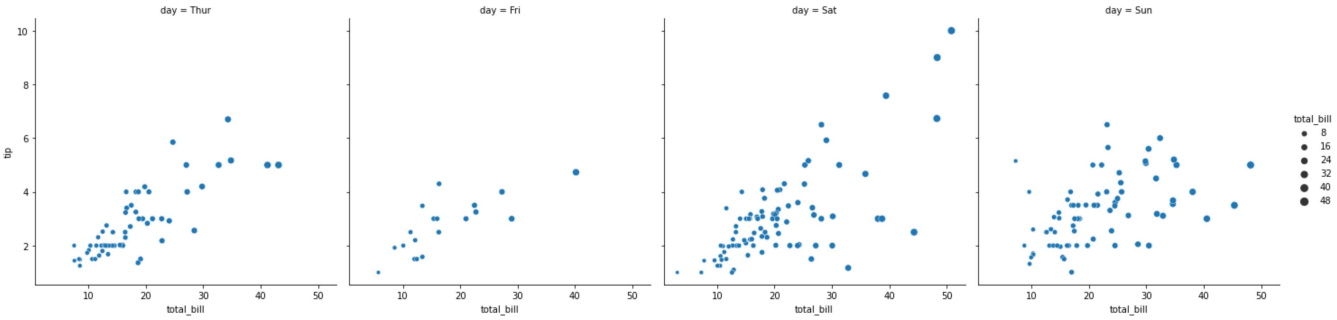


In [115...

```
sns.relplot(x = 'total_bill', y = 'tip', size = 'total_bill', data = df2, col ='day')
```

Out[115...

```
<seaborn.axisgrid.FacetGrid at 0x21160482730>
```

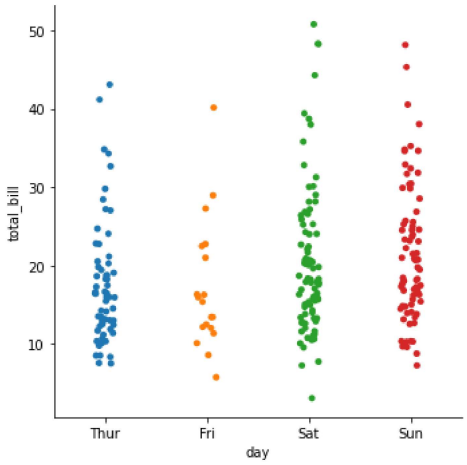


In [116...

```
sns.catplot(x = 'day', y = 'total_bill', data = df2 )
```

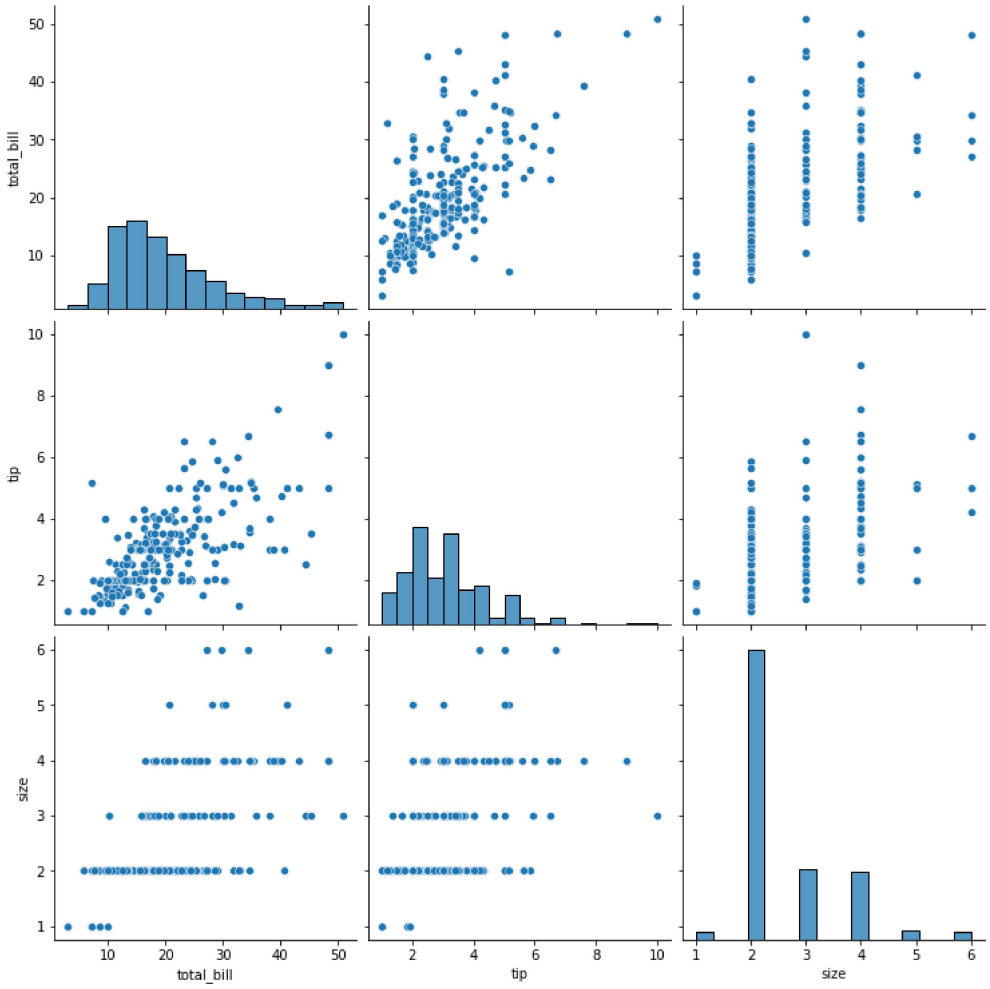
Out[116...

```
<seaborn.axisgrid.FacetGrid at 0x211604e93d0>
```



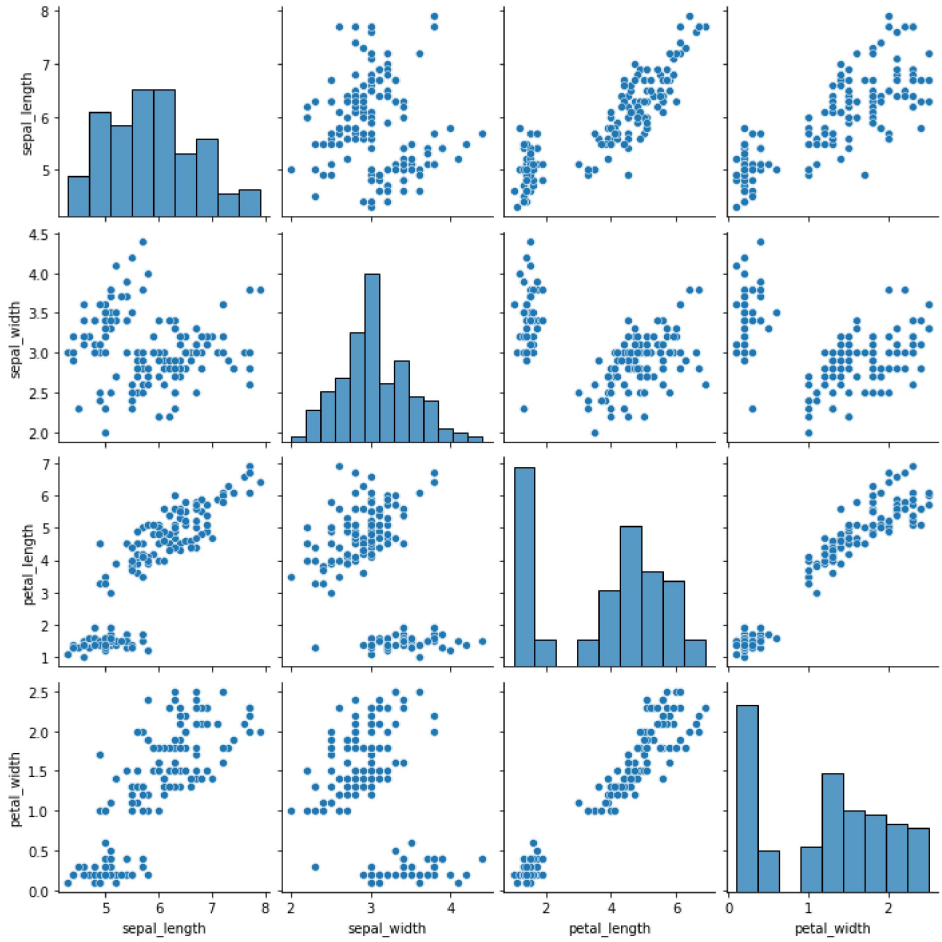
In [121…
```
sns.pairplot(df2, height=3.5,aspect=1)
```

Out[121…
```
<seaborn.axisgrid.PairGrid at 0x2116815d670>
```



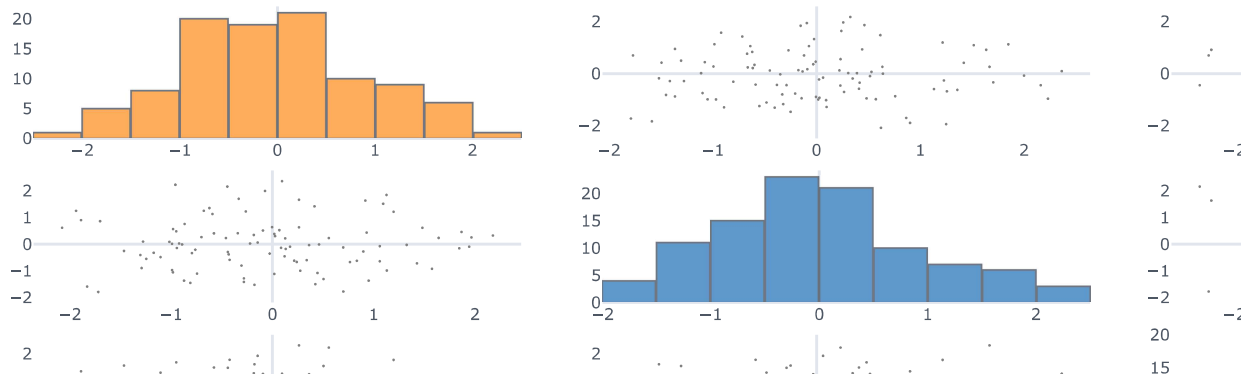
In [122…
```
sns.pairplot(dfi)
```

Out[122…
```
<seaborn.axisgrid.PairGrid at 0x211681bb7c0>
```



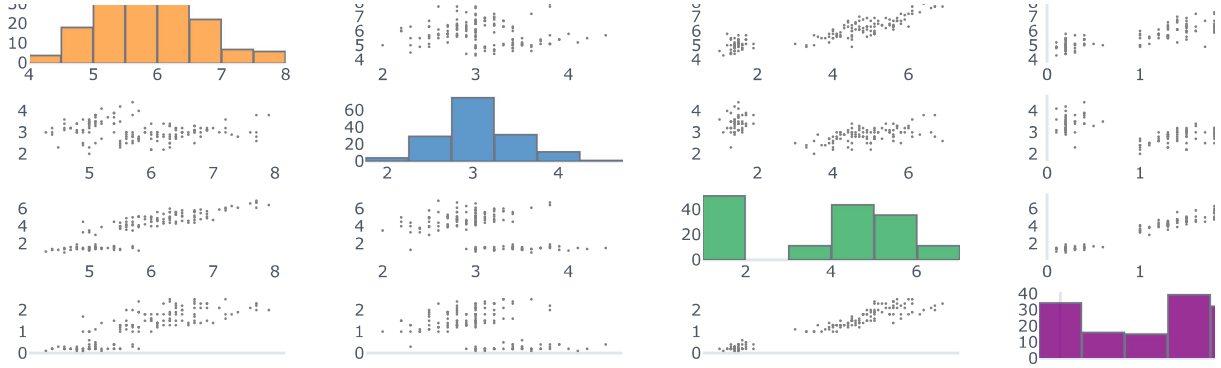
In [123…

```
df.scatter_matrix()
```



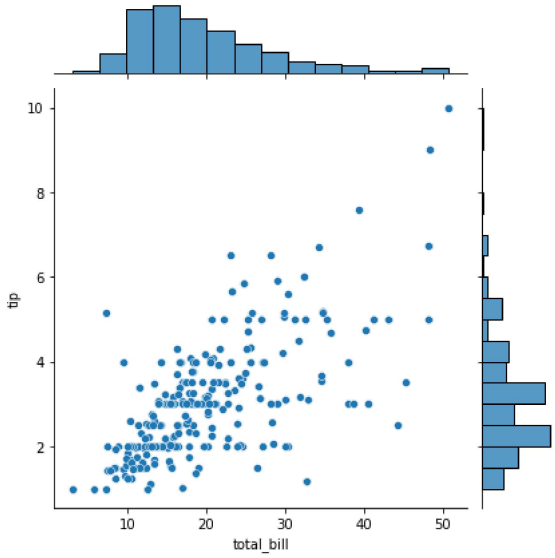
In [125…

```
dfi.scatter_matrix()
```



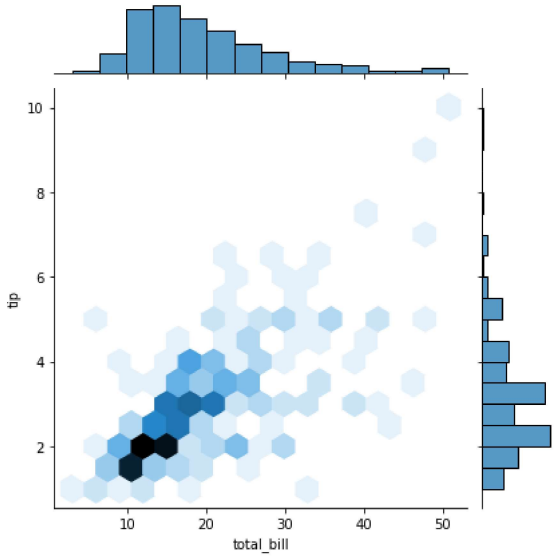
In [127…
```
sns.jointplot(x = 'total_bill', y = 'tip', data = df2)
```

Out[127…
```
<seaborn.axisgrid.JointGrid at 0x2116ae02070>
```



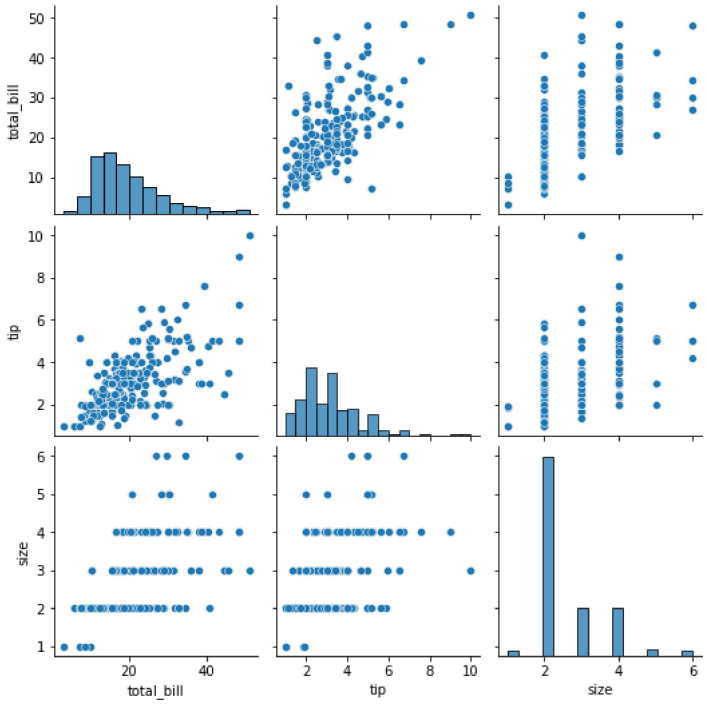
In [128…
```
sns.jointplot(x = 'total_bill', y = 'tip', data = df2, kind = 'hex')
```

Out[128…
```
<seaborn.axisgrid.JointGrid at 0x2116afaaf40>
```



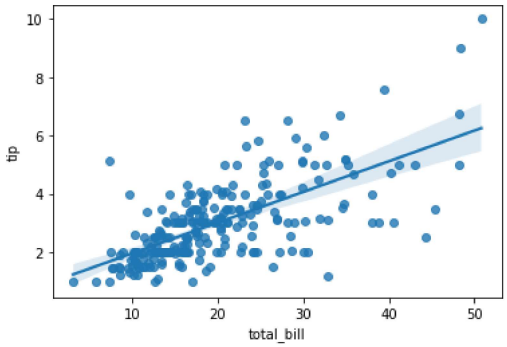
In [130…
```
sns.pairplot(df2)
```

Out[130…
```
<seaborn.axisgrid.PairGrid at 0x2116c8a9130>
```

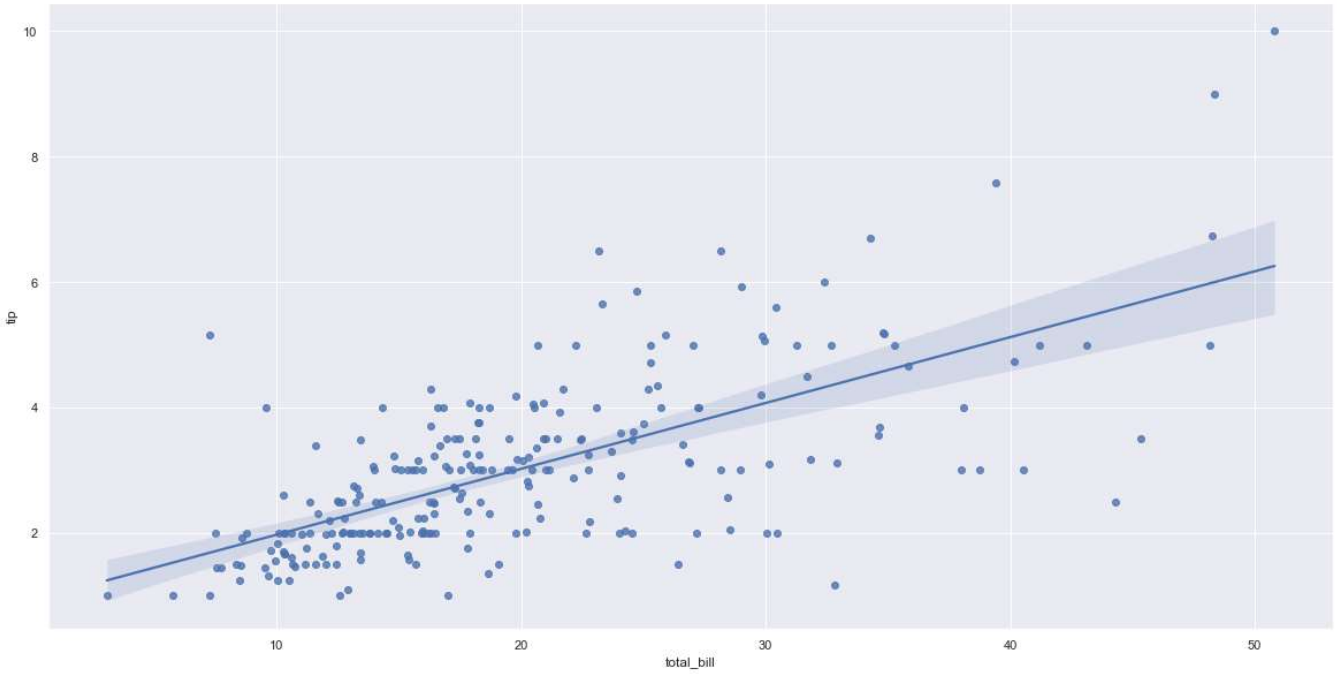


In [132…
```
sns.regplot(x = 'total_bill', y = 'tip', data = df2)
```

Out[132…
```
<AxesSubplot:xlabel='total_bill', ylabel='tip'>
```



In [139…
```
sns.regplot(x = 'total_bill', y = 'tip', data = df2)
sns.set(rc={'figure.figsize':(20,10)})
```

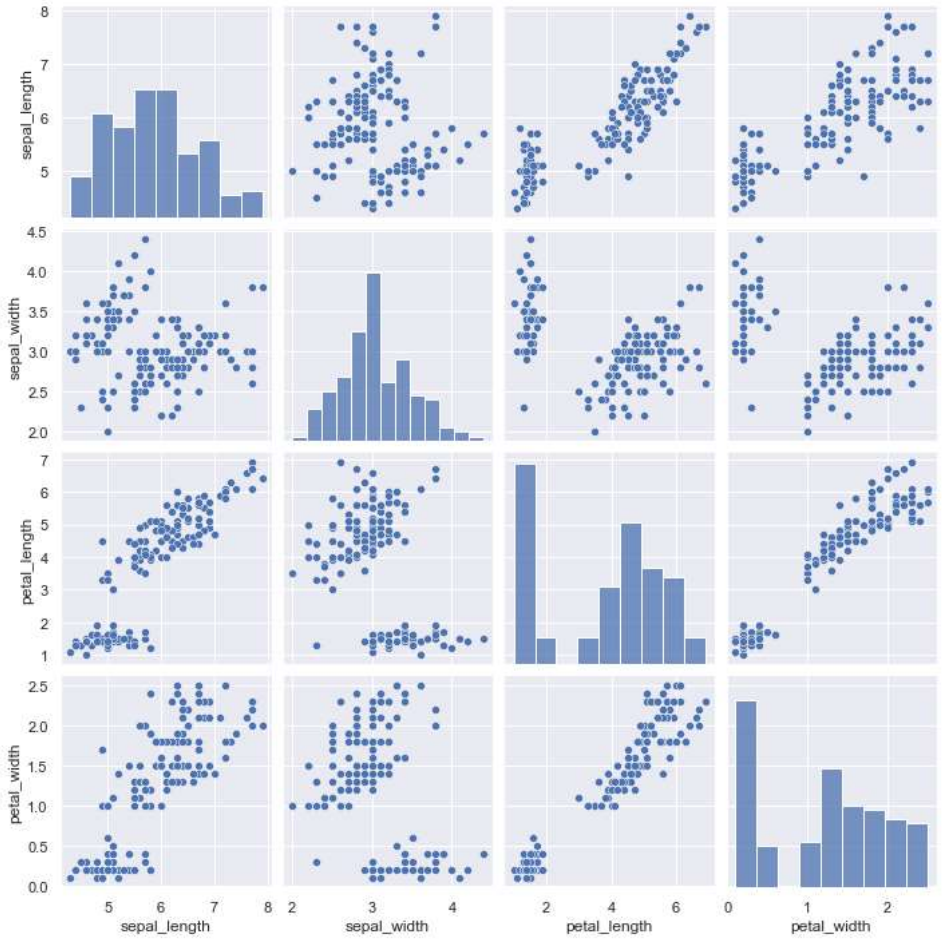


In [140…

```
sns.pairplot(dfi)
```

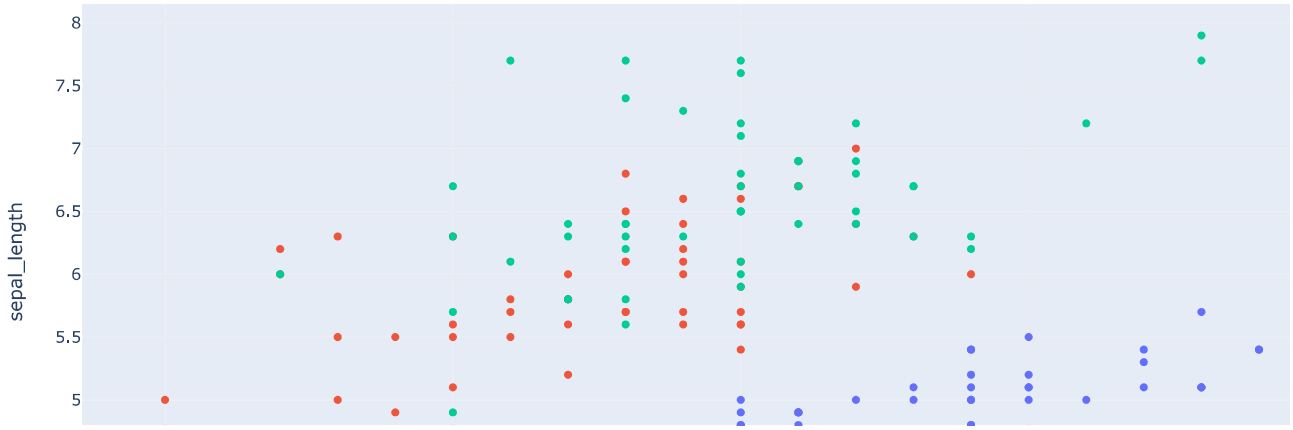
Out[140…

```
<seaborn.axisgrid.PairGrid at 0x2116d5c58e0>
```



In [147…

```
import plotly.express as px
df = px.data.iris()
fig = px.scatter(df, x="sepal_width", y="sepal_length", color="species")
fig.show()
```



In [142…

```
df
```

Out[142…

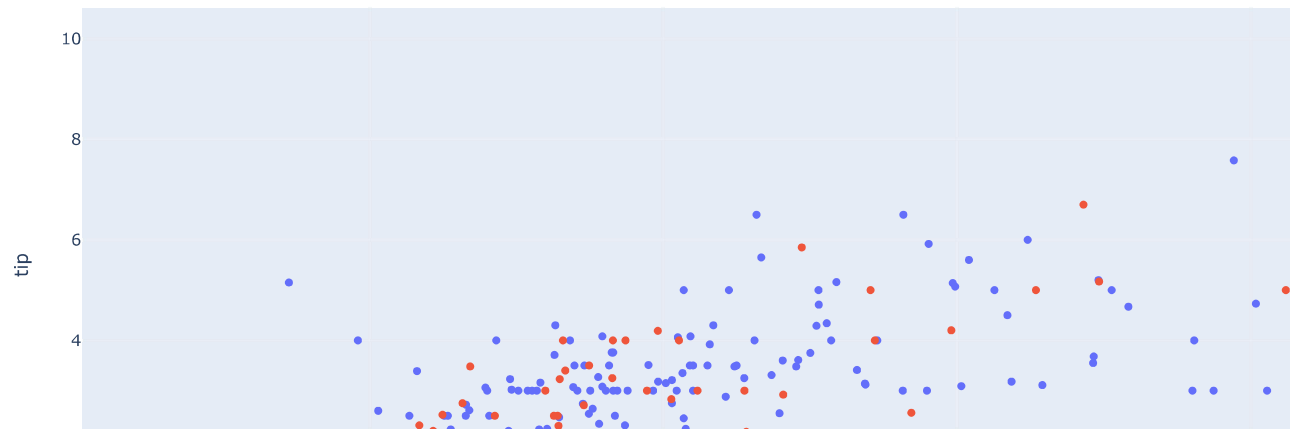
	sepal_length	sepal_width	petal_length	petal_width	species	species_id
0	5.1	3.5	1.4	0.2	setosa	1
1	4.9	3.0	1.4	0.2	setosa	1
2	4.7	3.2	1.3	0.2	setosa	1
3	4.6	3.1	1.5	0.2	setosa	1
4	5.0	3.6	1.4	0.2	setosa	1
...	...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	virginica	3
146	6.3	2.5	5.0	1.9	virginica	3
147	6.5	3.0	5.2	2.0	virginica	3
148	6.2	3.4	5.4	2.3	virginica	3
149	5.9	3.0	5.1	1.8	virginica	3

150 rows × 6 columns

In [150…

```
import plotly.express as px

fig = px.scatter(df2, x="total_bill", y="tip", color="time")
fig.show()
```



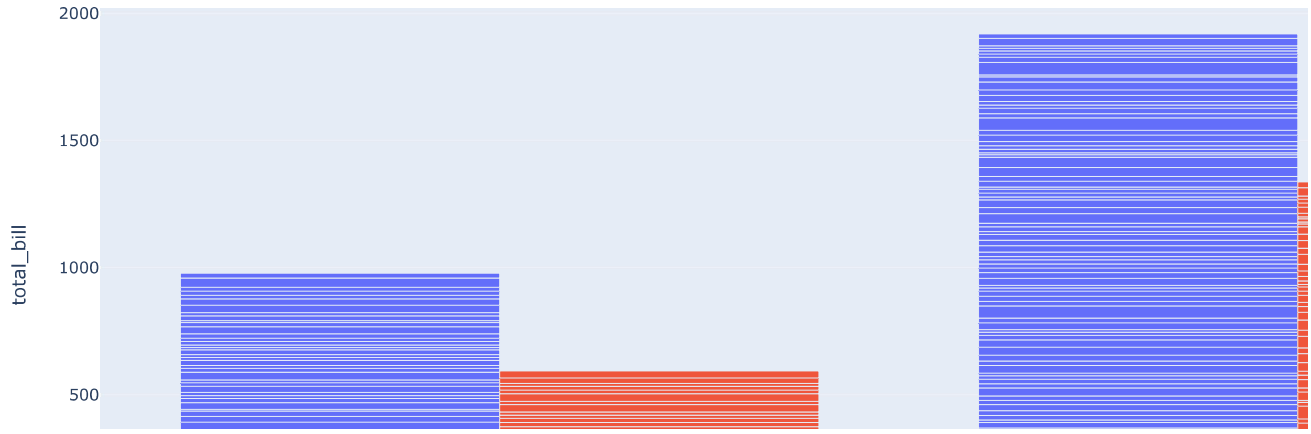
In [149…
```
df2
```

Out[149…

	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 [151…
```
fig = px.bar(df2, x="sex", y="total_bill", color="smoker", barmode="group")
fig.show()
```



In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]: