

```
In [75]:
```

```
import numpy as np
import pandas as pd
from numpy import linalg as la
```

```
In [76]:
```

```
d=pd.read_csv(r"C:\Users\user\Downloads\8_BreastCancerPrediction - 8_BreastCancerPredic  
d
```

```
Out[76]:
```

	<b>id</b>	<b>diagnosis</b>	<b>radius_mean</b>	<b>texture_mean</b>	<b>perimeter_mean</b>	<b>area_mean</b>	<b>smoothness_mean</b>	<b>compactness_mean</b>	<b>concavity_mean</b>	<b>concave points_mean</b>	<b>symmetry_mean</b>	<b>fractal_dimension_mean</b>	<b>radius_se</b>	<b>texture_se</b>	<b>perimeter_se</b>	<b>area_se</b>	<b>smoothness_se</b>	<b>compactness_se</b>	<b>concavity_se</b>	<b>concave points_se</b>	<b>symmetry_se</b>	<b>fractal_dimension_se</b>	<b>radius_worst</b>	<b>texture_worst</b>	<b>perimeter_worst</b>	<b>area_worst</b>	<b>smoothness_worst</b>	<b>compactness_worst</b>	<b>concavity_worst</b>	<b>concave points_worst</b>	<b>symmetry_worst</b>	<b>fractal_dimension_worst</b>
<b>0</b>	842302	M	17.99	10.38	122.80	1001.0	0.11840	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
<b>1</b>	842517	M	20.57	17.77	132.90	1326.0	0.08474	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
<b>2</b>	84300903	M	19.69	21.25	130.00	1203.0	0.10960	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
<b>3</b>	84348301	M	11.42	20.38	77.58	386.1	0.14250	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000			
<b>4</b>	84358402	M	20.29	14.34	135.10	1297.0	0.10030	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000			
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...			
<b>564</b>	926424	M	21.56	22.39	142.00	1479.0	0.11100	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
<b>565</b>	926682	M	20.13	28.25	131.20	1261.0	0.09780	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
<b>566</b>	926954	M	16.60	28.08	108.30	858.1	0.08455	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
<b>567</b>	927241	M	20.60	29.33	140.10	1265.0	0.11780	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000			
<b>568</b>	92751	B	7.76	24.54	47.92	181.0	0.05263	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		

569 rows × 32 columns



```
In [77]:
```

```
d.head()
```

```
Out[77]:
```

	<b>id</b>	<b>diagnosis</b>	<b>radius_mean</b>	<b>texture_mean</b>	<b>perimeter_mean</b>	<b>area_mean</b>	<b>smoothness_mean</b>	<b>compactness_mean</b>	<b>concavity_mean</b>	<b>concave points_mean</b>	<b>symmetry_mean</b>	<b>fractal_dimension_mean</b>	<b>radius_se</b>	<b>texture_se</b>	<b>perimeter_se</b>	<b>area_se</b>	<b>smoothness_se</b>	<b>compactness_se</b>	<b>concavity_se</b>	<b>concave points_se</b>	<b>symmetry_se</b>	<b>fractal_dimension_se</b>	<b>radius_worst</b>	<b>texture_worst</b>	<b>perimeter_worst</b>	<b>area_worst</b>	<b>smoothness_worst</b>	<b>compactness_worst</b>	<b>concavity_worst</b>	<b>concave points_worst</b>	<b>symmetry_worst</b>	<b>fractal_dimension_worst</b>
<b>0</b>	842302	M	17.99	10.38	122.80	1001.0	0.11840	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
<b>1</b>	842517	M	20.57	17.77	132.90	1326.0	0.08474	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
<b>2</b>	84300903	M	19.69	21.25	130.00	1203.0	0.10960	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
<b>3</b>	84348301	M	11.42	20.38	77.58	386.1	0.14250	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000		
<b>4</b>	84358402	M	20.29	14.34	135.10	1297.0	0.10030	0.12030	0.08510	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	

5 rows × 32 columns



```
In [78]:
```

```
d.tail()
```

Out[78]:

**id** **diagnosis** **radius\_mean** **texture\_mean** **perimeter\_mean** **area\_mean** **smoothness\_mean** **concave\_point\_mean**

<b>564</b>	926424	M	21.56	22.39	142.00	1479.0	0.11100
<b>565</b>	926682	M	20.13	28.25	131.20	1261.0	0.09780
<b>566</b>	926954	M	16.60	28.08	108.30	858.1	0.08455
<b>567</b>	927241	M	20.60	29.33	140.10	1265.0	0.11780
<b>568</b>	92751	B	7.76	24.54	47.92	181.0	0.05263

5 rows × 32 columns

In [80]:

```
np.shape(d)
```

Out[80]: (569, 32)

In [81]:

```
np.size(d)
```

Out[81]: 18208

In [82]:

d.describe()

Out[82]:

**id** **radius mean** **texture mean** **perimeter mean** **area mean** **smoothness mean** **comp**

<b>count</b>	5.690000e+02	569.000000	569.000000	569.000000	569.000000	569.000000
<b>mean</b>	3.037183e+07	14.127292	19.289649	91.969033	654.889104	0.096360
<b>std</b>	1.250206e+08	3.524049	4.301036	24.298981	351.914129	0.014064
<b>min</b>	8.670000e+03	6.981000	9.710000	43.790000	143.500000	0.052630
<b>25%</b>	8.692180e+05	11.700000	16.170000	75.170000	420.300000	0.086370
<b>50%</b>	9.060240e+05	13.370000	18.840000	86.240000	551.100000	0.095870
<b>75%</b>	8.813129e+06	15.780000	21.800000	104.100000	782.700000	0.105300
<b>max</b>	9.113205e+08	28.110000	39.280000	188.500000	2501.000000	0.163400

8 rows × 31 columns

In [6]:

`d.isna()`

Out[6]:

**id** **diagnosis** **radius mean** **texture mean** **perimeter mean** **area mean** **smoothness mean** **compl**

	<b>id</b>	<b>diagnosis</b>	<b>radius_mean</b>	<b>texture_mean</b>	<b>perimeter_mean</b>	<b>area_mean</b>	<b>smoothness_mean</b>	<b>comp</b>
<b>2</b>	False	False	False	False	False	False	False	False
<b>3</b>	False	False	False	False	False	False	False	False
<b>4</b>	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...
<b>564</b>	False	False	False	False	False	False	False	False
<b>565</b>	False	False	False	False	False	False	False	False
<b>566</b>	False	False	False	False	False	False	False	False
<b>567</b>	False	False	False	False	False	False	False	False
<b>568</b>	False	False	False	False	False	False	False	False

569 rows × 32 columns

In [7]:

```
d.dropna()
```

Out[7]:

	<b>id</b>	<b>diagnosis</b>	<b>radius_mean</b>	<b>texture_mean</b>	<b>perimeter_mean</b>	<b>area_mean</b>	<b>smoothness_mean</b>	<b>comp</b>
<b>0</b>	842302	M	17.99	10.38	122.80	1001.0	0.11840	0.11840
<b>1</b>	842517	M	20.57	17.77	132.90	1326.0	0.08474	0.08474
<b>2</b>	84300903	M	19.69	21.25	130.00	1203.0	0.10960	0.10960
<b>3</b>	84348301	M	11.42	20.38	77.58	386.1	0.14250	0.14250
<b>4</b>	84358402	M	20.29	14.34	135.10	1297.0	0.10030	0.10030
...	...	...	...	...	...	...	...	...
<b>564</b>	926424	M	21.56	22.39	142.00	1479.0	0.11100	0.11100
<b>565</b>	926682	M	20.13	28.25	131.20	1261.0	0.09780	0.09780
<b>566</b>	926954	M	16.60	28.08	108.30	858.1	0.08455	0.08455
<b>567</b>	927241	M	20.60	29.33	140.10	1265.0	0.11780	0.11780
<b>568</b>	92751	B	7.76	24.54	47.92	181.0	0.05263	0.05263

569 rows × 32 columns

## Visualization

In [10]:

```
d=d[['perimeter_mean','area_mean']]
d
```

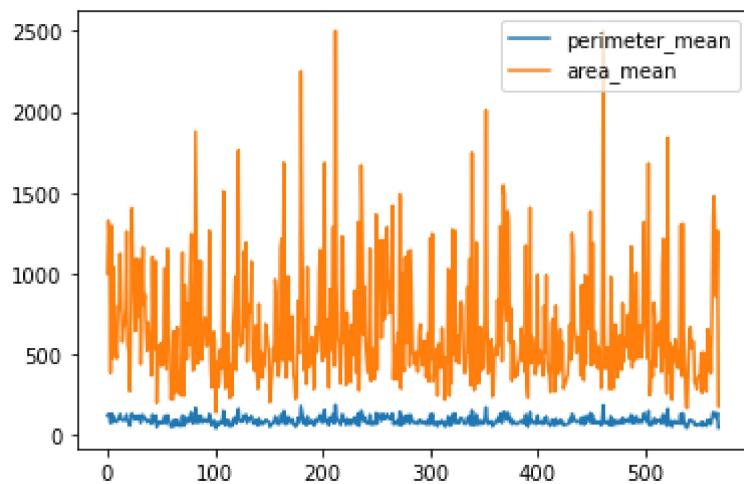
```
Out[10]:
```

	perimeter_mean	area_mean
<b>0</b>	122.80	1001.0
<b>1</b>	132.90	1326.0
<b>2</b>	130.00	1203.0
<b>3</b>	77.58	386.1
<b>4</b>	135.10	1297.0
...	...	...
<b>564</b>	142.00	1479.0
<b>565</b>	131.20	1261.0
<b>566</b>	108.30	858.1
<b>567</b>	140.10	1265.0
<b>568</b>	47.92	181.0

569 rows × 2 columns

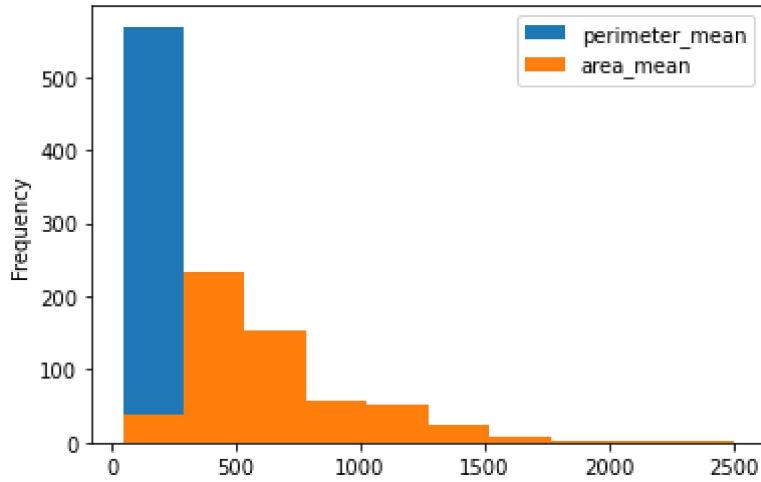
```
In [11]: d.plot.line()
```

```
Out[11]: <AxesSubplot:
```



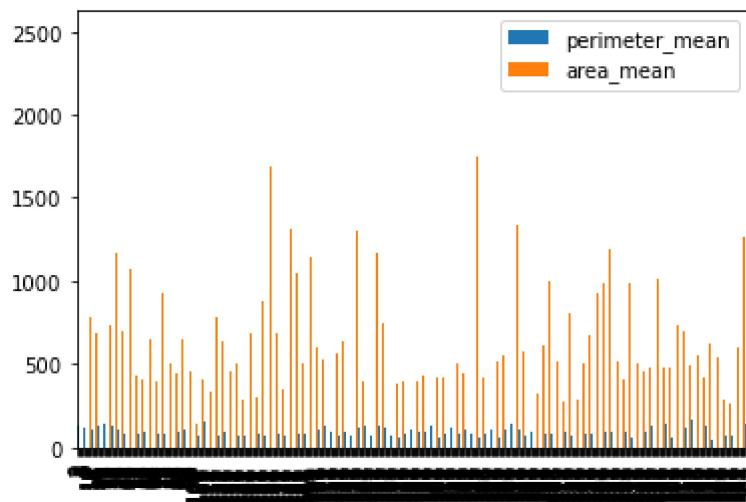
```
In [12]: d.plot.hist()
```

```
Out[12]: <AxesSubplot:ylabel='Frequency'>
```



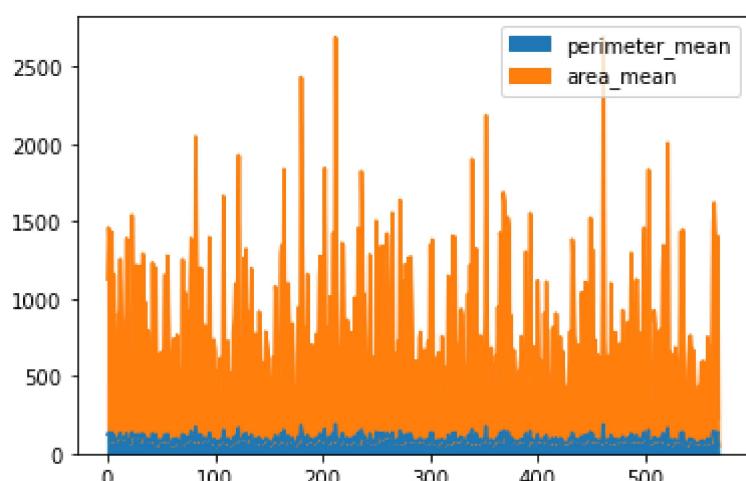
```
In [13]: d.plot.bar()
```

```
Out[13]: <AxesSubplot:>
```



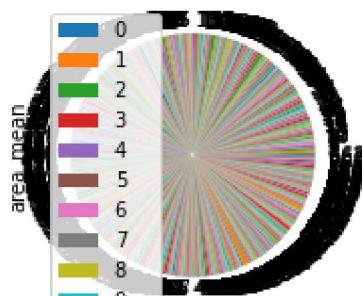
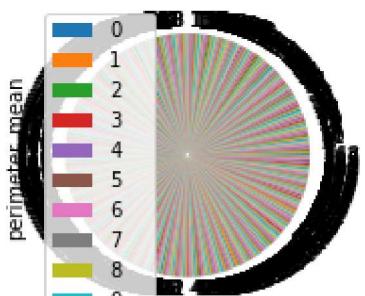
```
In [14]: d.plot.area()
```

```
Out[14]: <AxesSubplot:>
```



```
In [16]: d.plot.pie(subplots =True)
```

```
Out[16]: array([<AxesSubplot:ylabel='perimeter_mean'>,
   <AxesSubplot:ylabel='area_mean'>], dtype=object)
```

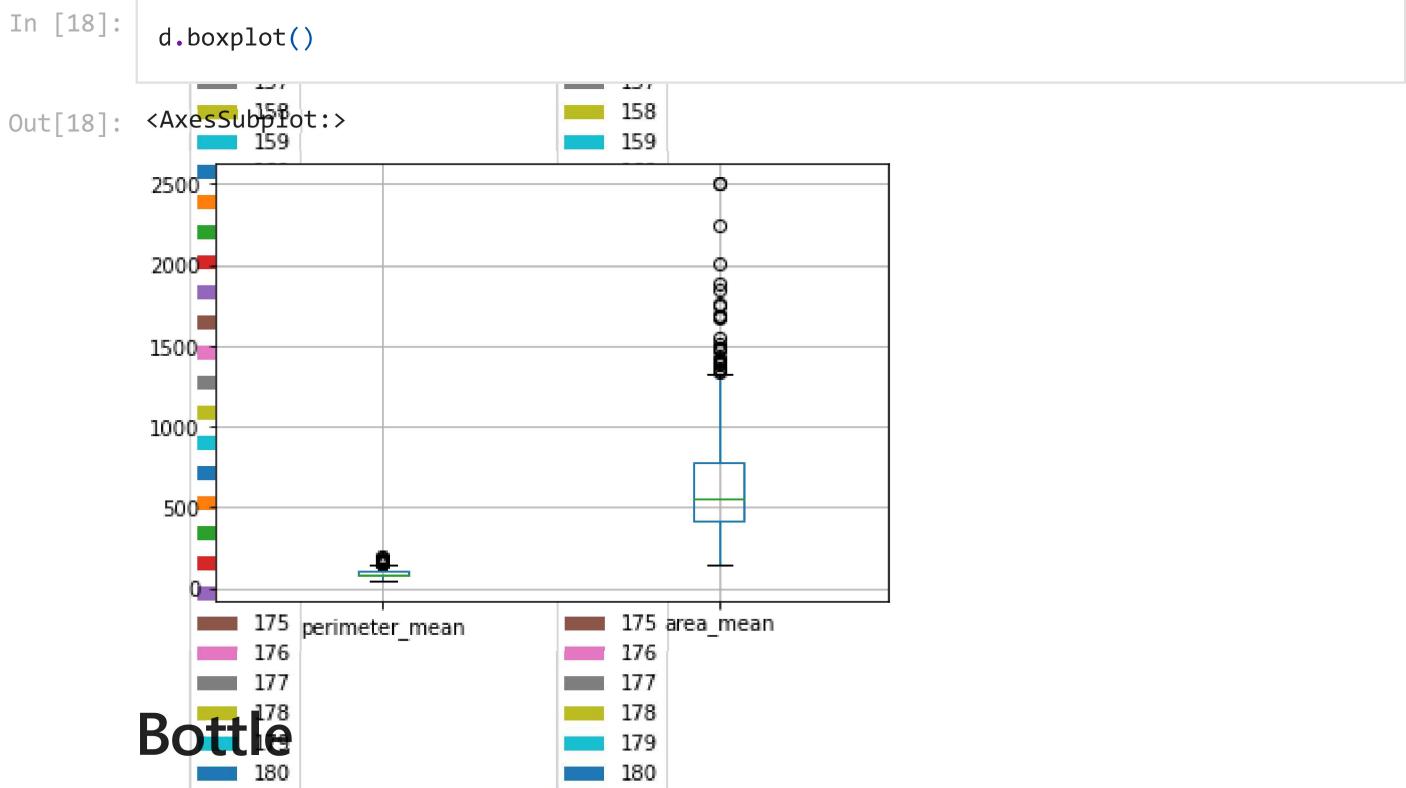
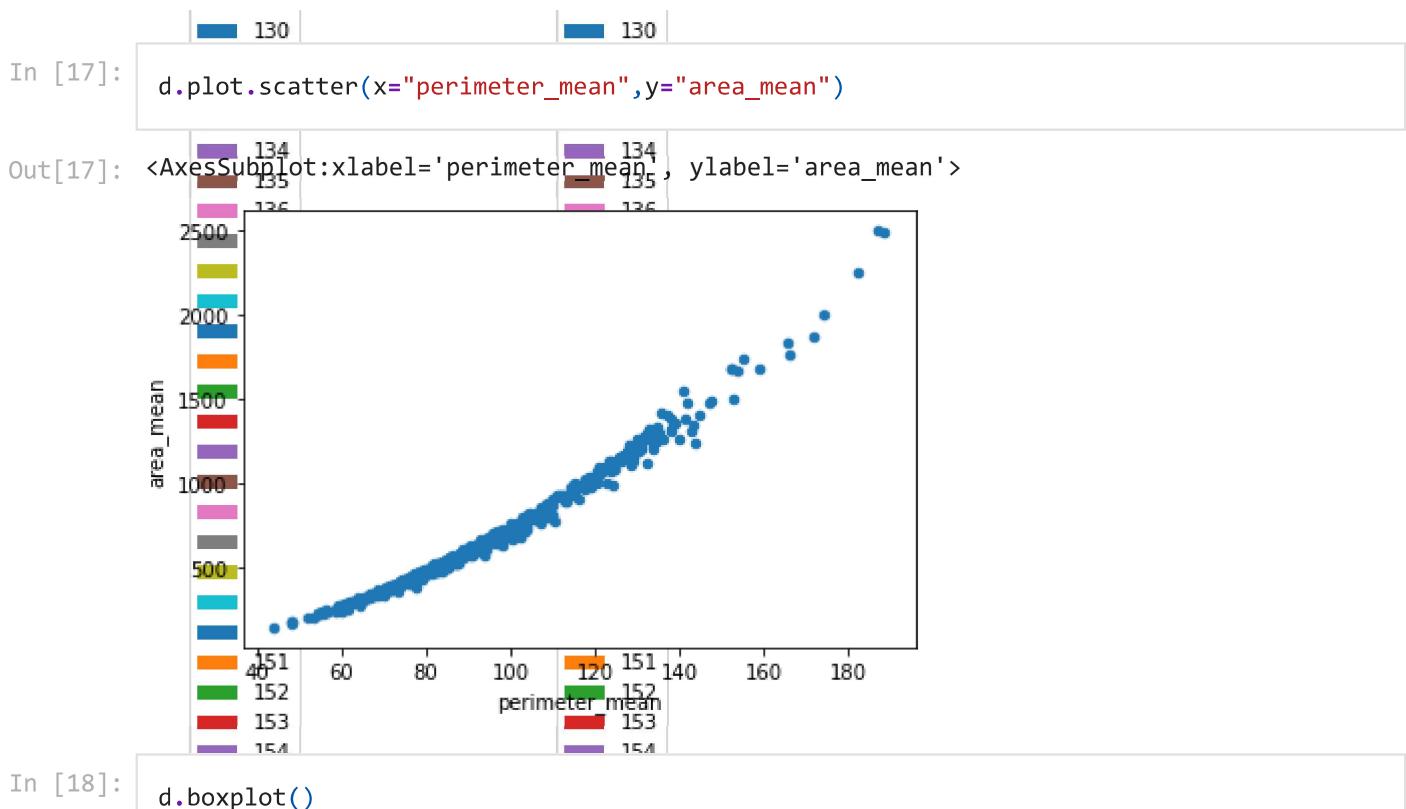


perimeter\_mean

area mean

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
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118	118
119	119
120	120
121	121
122	122
123	123
124	124
125	125
126	126
127	127
128	128
129	129



Bottle

In [83]:

```
a=pd.read_csv(r"C:\Users\user\Downloads\9_bottle.csv")
a
```

C:\ProgramData\Anaconda3\lib\site-packages\IPython\core\interactiveshell.py:3165: DtypeWarning: Columns (47,73) have mixed types. Specify dtype option on import or set low\_memory=False.

```
has_raised = await self.run_ast_nodes(code_ast.body, cell_name,
190
191
192
193
194
```

Out[83]:

	Cst_Cnt	Btl_Cnt	Sta_ID	Depth_ID	Depthm	T_degC	Salnty	O2ml_L	STheta	O2Sat	R
	195			195							
	196			196							
	197			197							
	198			198							
<b>0</b>	1	1	054.0 056.0	19- 4903CR- HY-060- 0930- 05400560- 0000A-3	0	10.500	33.4400	NaN	25.64900	NaN	...
<b>1</b>	1	2	054.0 056.0	19- 4903CR- HY-060- 0930- 05400560- 0008A-3	8	10.460	33.4400	NaN	25.65600	NaN	...
<b>2</b>	1	3	054.0 056.0	19- 4903CR- HY-060- 0930- 05400560- 0010A-7	10	10.460	33.4370	NaN	25.65400	NaN	...
<b>3</b>	1	4	054.0 056.0	19- 4903CR- HY-060- 0930- 05400560- 0019A-3	19	10.450	33.4200	NaN	25.64300	NaN	...
<b>4</b>	1	5	054.0 056.0	19- 4903CR- HY-060- 0930- 05400560- 0020A-7	20	10.450	33.4210	NaN	25.64300	NaN	...
...	...	...	...	...	...	...	...	...	...	...	...
<b>864858</b>	34404	864859	093.4 026.4	20- 1611SR- MX-310- 2239- 09340264- 0000A-7	0	18.744	33.4083	5.805	23.87055	108.74	...
<b>864859</b>	34404	864860	093.4 026.4	20- 1611SR- MX-310- 2239- 09340264- 0002A-3	2	18.744	33.4083	5.805	23.87072	108.74	...
<b>864860</b>	34404	864861	093.4 026.4	20- 1611SR- MX-310- 2239- 09340264- 0005A-3	5	18.692	33.4150	5.796	23.88911	108.46	...
	259			259							
	760			760							

	Cst_Cnt	Btl_Cnt	Sta_ID	Depth_ID	Depthm	T_degC	Salnty	O2ml_L	STheta	O2Sat	R
	200	261	262	263	264						
864861	34404	864862	093.4 026.4	1611SR- MX-310- 2239- 09340264- 0010A-3	20-	10	18.161	33.4062	5.816	24.01426	107.74 ...
864862	34404	864863	093.4 026.4	1611SR- MX-310- 2239- 09340264- 0015A-3	20-	15	17.533	33.3880	5.774	24.15297	105.66 ...
864863	34404	864863	093.4 026.4	1611SR- MX-310- 2239- 09340264- 0015A-3	20-	15	17.533	33.3880	5.774	24.15297	105.66 ...
	279	280	281	282	283						

864863 rows × 74 columns

In [84]:

a.head()

Out[84]:

	Cst_Cnt	Btl_Cnt	Sta_ID	Depth_ID	Depthm	T_degC	Salnty	O2ml_L	STheta	O2Sat	R_PHAEO
	286	287	288	289	290						
0	1	1	054.0 056.0	4903CR- HY-060- 0930- 05400560- 0000A-3	19-	0	10.50	33.440	NaN	25.649	NaN ... NaN
1	1	2	054.0 056.0	4903CR- HY-060- 0930- 05400560- 0008A-3	19-	8	10.46	33.440	NaN	25.656	NaN ... NaN
2	1	3	054.0 056.0	4903CR- HY-060- 0930- 05400560- 0010A-7	19-	10	10.46	33.437	NaN	25.654	NaN ... NaN
3	1	4	054.0 056.0	4903CR- HY-060- 0930- 05400560- 0019A-3	19-	19	10.45	33.420	NaN	25.643	NaN ... NaN
4	1	5	054.0 056.0	4903CR- HY-060- 0930-	19-	20	10.45	33.421	NaN	25.643	NaN ... NaN

0	1	1	054.0 056.0	4903CR- HY-060- 0930- 05400560- 0000A-3	19-	0	10.50	33.440	NaN	25.649	NaN ... NaN
1	1	2	054.0 056.0	4903CR- HY-060- 0930- 05400560- 0008A-3	19-	8	10.46	33.440	NaN	25.656	NaN ... NaN
2	1	3	054.0 056.0	4903CR- HY-060- 0930- 05400560- 0010A-7	19-	10	10.46	33.437	NaN	25.654	NaN ... NaN
3	1	4	054.0 056.0	4903CR- HY-060- 0930- 05400560- 0019A-3	19-	19	10.45	33.420	NaN	25.643	NaN ... NaN
4	1	5	054.0 056.0	4903CR- HY-060- 0930-	19-	20	10.45	33.421	NaN	25.643	NaN ... NaN



In [88]:	np.size(d)																																																																																																																																																												
Out[88]:	18208																																																																																																																																																												
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<b>864862</b>	False	False	False	False	False	False	False	False	False	False	...																																																																																																																																																		

In [69]: `a.dropna()`

Out[69]:

Cst_Cnt	Btl_Cnt	Sta_ID	Depth_ID	Depthm	T_degC	Salnty	O2ml_L	STheta	O2Sat	R_PHAEOT	F
460				460							
461				461							
462				462							
463				463							
464				464							
465				465							
466				466							
467				467							

0 rows × 74 columns

◀ ▶

visualization

In [55]:

```
a=a[["Depthm","T_degC"]].head(100)
a
```

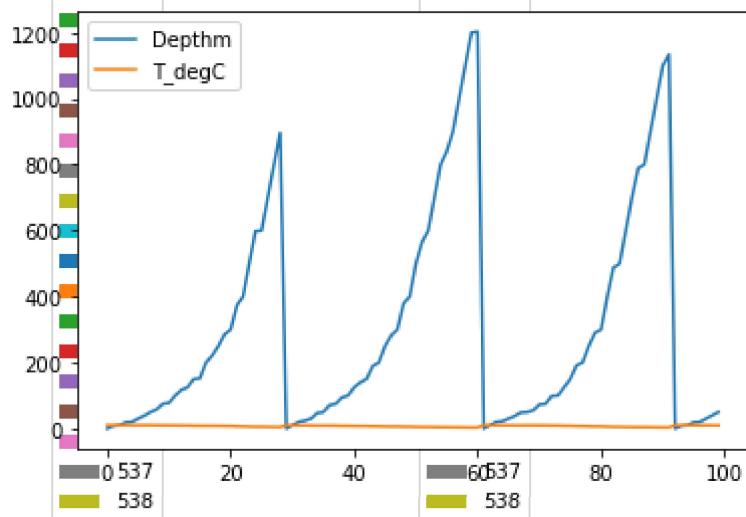
Out[55]:

	Depthm	T_degC
0	0	10.50
1	8	10.46
2	10	10.46
3	19	10.45
4	20	10.45
...	...	...
95	19	10.14
96	20	10.14
97	30	10.07
98	40	9.97
99	50	9.72
	499	
	500	
	501	
	502	

In [56]: `a.plot.line()`

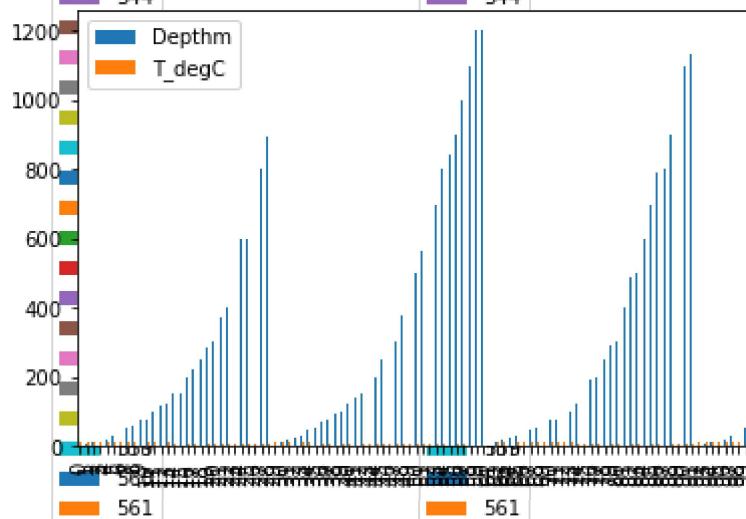
Out[56]: <AxesSubplot:>

Index	Value	Index	Value
506	1.0	507	1.0
508	1.0	509	1.0
510	1.0	511	1.0
512	1.0	513	1.0
514	1.0	515	1.0
516	1.0	517	1.0
518	1.0	519	1.0
520	1.0	521	1.0



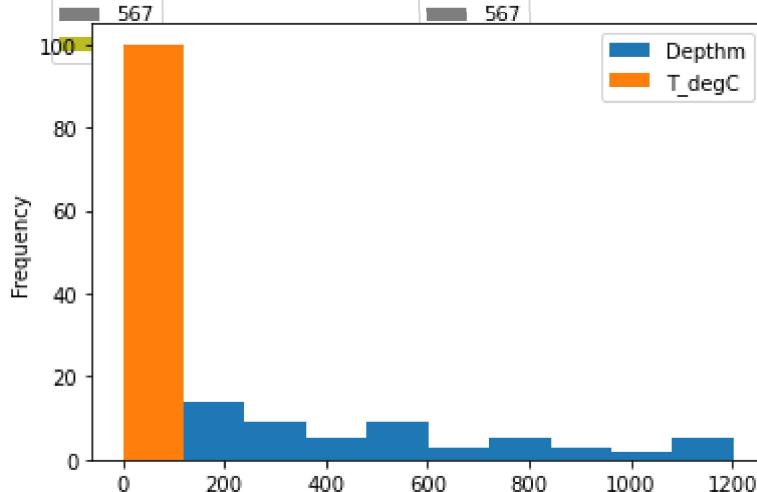
```
In [57]: a.plot.bar()
```

```
Out[57]: <AxesSubplot: xlabel='Index'>
```



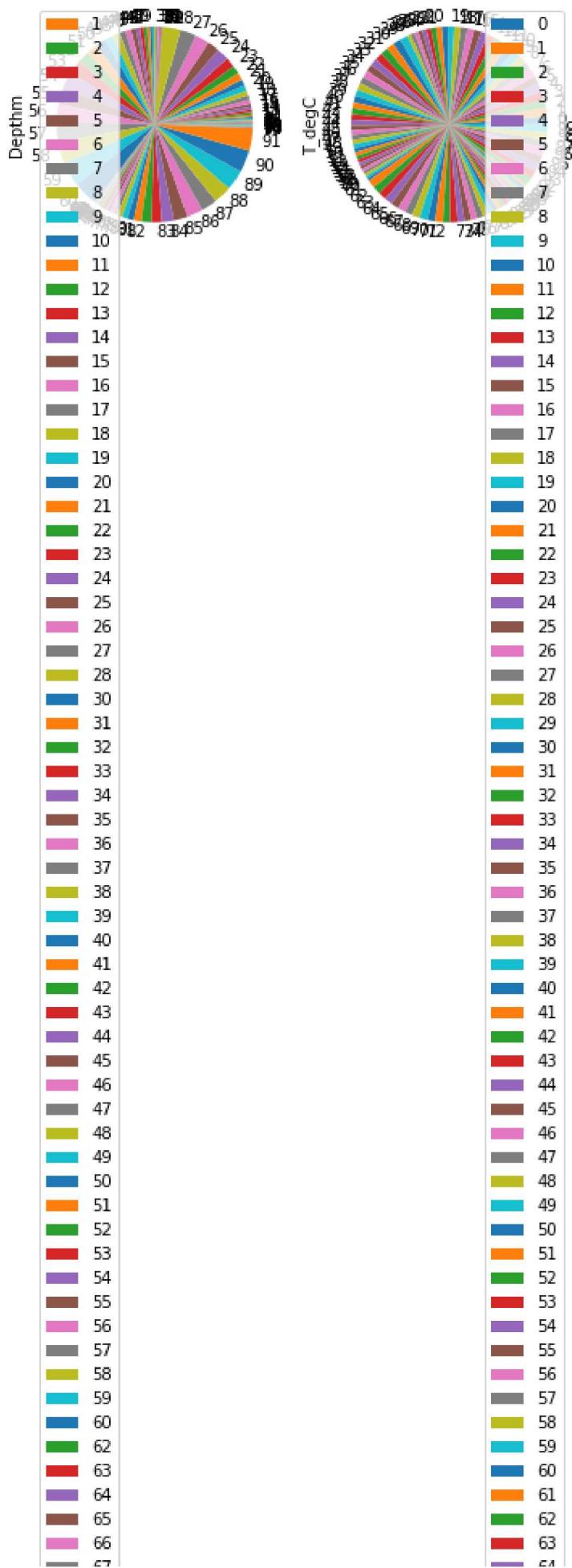
```
In [58]: a.plot.hist()
```

```
Out[58]: <AxesSubplot: ylabel='Frequency'>
```



```
In [59]: a.plot.pie(subplots=True)
```

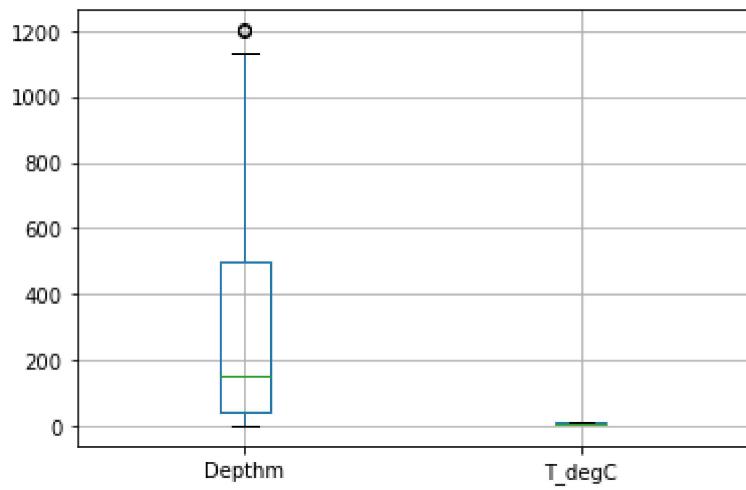
```
Out[59]: array([<AxesSubplot:ylabel='Depthm'>, <AxesSubplot:ylabel='T_degC'>],  
dtype=object)
```





In [60]:  
a.boxplot()

Out[60]: <AxesSubplot:>



In [61]:  
a.plot.scatter(x="Depthm",y="T\_degC")

```
Out[61]: <AxesSubplot:xlabel='Depthm', ylabel='T_degC'>
```

