Visualization

```
In [3]:  import pandas as pd
         import numpy as np
         import matplotlib.pyplot as plt
         %matplotlib inline
         import seaborn as sns
         from sklearn import preprocessing
```

```
In [ ]:
```

```
In [4]:  iris = pd.read_csv('Iris.csv')
         iris
```

Out[4]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

```
In [5]:  iris.describe()
```

Out[5]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000	150.000000
mean	75.500000	5.843333	3.054000	3.758667	1.198667
std	43.445368	0.828066	0.433594	1.764420	0.763161
min	1.000000	4.300000	2.000000	1.000000	0.100000
25%	38.250000	5.100000	2.800000	1.600000	0.300000
50%	75.500000	5.800000	3.000000	4.350000	1.300000
75%	112.750000	6.400000	3.300000	5.100000	1.800000
max	150.000000	7.900000	4.400000	6.900000	2.500000

```
In [6]:  iris.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Id             150 non-null    int64
 1   SepalLengthCm  150 non-null    float64
 2   SepalWidthCm   150 non-null    float64
 3   PetalLengthCm  150 non-null    float64
 4   PetalWidthCm   150 non-null    float64
 5   Species        150 non-null    object
dtypes: float64(4), int64(1), object(1)
memory usage: 7.2+ KB
```

In [9]:
```python
ax = iris[iris.Species=='Iris-setosa'].plot.scatter(x='SepalLengthCm', y='SepalWidthCm',
                                                     color='red', label='setosa')
iris[iris.Species=='Iris-versicolor'].plot.scatter(x='SepalLengthCm', y='SepalWidthCm',
                                                   color='green', label='versicolor', ax=ax)
iris[iris.Species=='Iris-virginica'].plot.scatter(x='SepalLengthCm', y='SepalWidthCm',
                                                  color='blue', label='virginica', ax=ax)
ax.set_title("scatter")
```
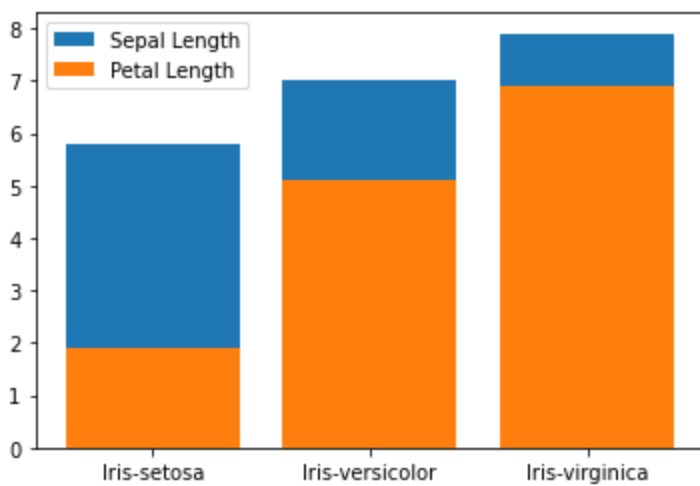
Out[9]:
```
Text(0.5, 1.0, 'scatter')
```


In [ ]:
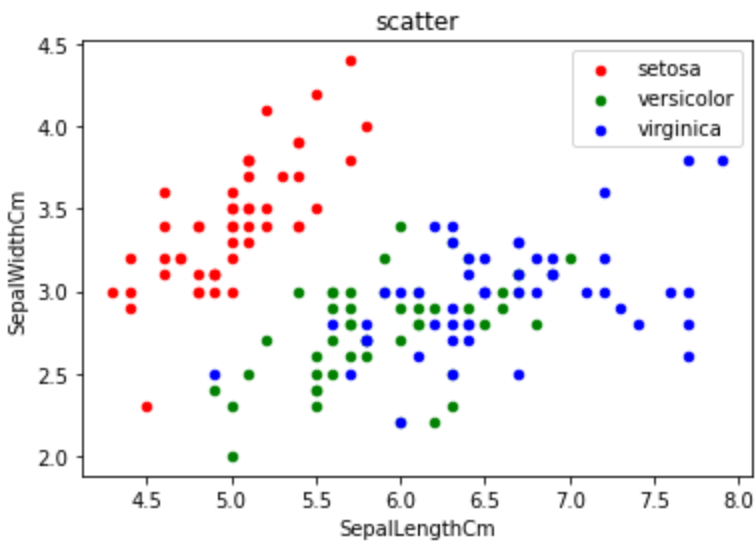
In [8]:
```python
x=iris.Species
```

In [15]:
```python
seplen = df.SepalLengthCm
sepwidth = df.SepalWidthCm
petlen = df.PetalLengthCm
petwidth = df.PetalWidthCm
```

In [21]:
```python
plt.bar(x,seplen,label="Sepal Length")
plt.bar(x,petlen,label="Petal Length")
plt.title("Length")
plt.legend()
```

Out[21]:
```
<matplotlib.legend.Legend at 0x192cfec70d0>
```

```
In [11]: sns.factorplot('Species',data=iris,kind='count')
```

```
C:\Users\pd277\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn\categorical.py:
3717: UserWarning: The `factorplot` function has been renamed to `catplot`. The original name wi
ll be removed in a future release. Please update your code. Note that the default `kind` in `fac
torplot` (`'point'`) has changed ``'strip'`` in `catplot`.
  warnings.warn(msg)
C:\Users\pd277\AppData\Local\Programs\Python\Python310\lib\site-packages\seaborn\_decorators.py:
36: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only
valid positional argument will be `data`, and passing other arguments without an explicit keywor
d will result in an error or misinterpretation.
  warnings.warn(
```

```
Out[11]: <seaborn.axisgrid.FacetGrid at 0x1dad8931cc0>
```
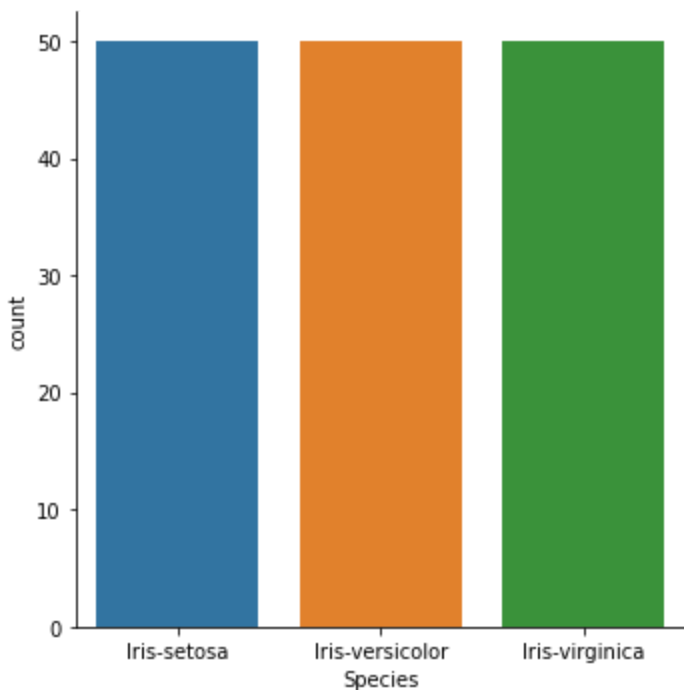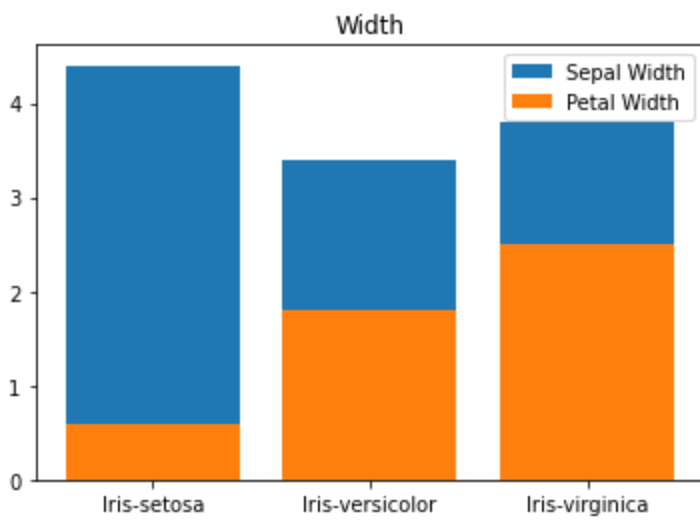


```
In [ ]:
```

```
In [ ]:
```

```
In [23]: plt.bar(x,sepwidth,label="Sepal Width")
         plt.bar(x,petwidth,label="Petal Width")
         plt.title("Width")
         plt.legend()
```

```
Out[23]: <matplotlib.legend.Legend at 0x192d1a6d2d0>
```

Width

In [25]:
```python
cat1 = df[df.Species=="Iris-setosa"]
cat2 = df[df.Species=="Iris-versicolor"]
cat3 = df[df.Species=="Iris-virginica"]
```

In [27]:
```python
cat1
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
5	6	5.4	3.9	1.7	0.4	Iris-setosa
6	7	4.6	3.4	1.4	0.3	Iris-setosa
7	8	5.0	3.4	1.5	0.2	Iris-setosa
8	9	4.4	2.9	1.4	0.2	Iris-setosa
9	10	4.9	3.1	1.5	0.1	Iris-setosa
10	11	5.4	3.7	1.5	0.2	Iris-setosa
11	12	4.8	3.4	1.6	0.2	Iris-setosa
12	13	4.8	3.0	1.4	0.1	Iris-setosa
13	14	4.3	3.0	1.1	0.1	Iris-setosa
14	15	5.8	4.0	1.2	0.2	Iris-setosa
15	16	5.7	4.4	1.5	0.4	Iris-setosa
16	17	5.4	3.9	1.3	0.4	Iris-setosa
17	18	5.1	3.5	1.4	0.3	Iris-setosa
18	19	5.7	3.8	1.7	0.3	Iris-setosa
19	20	5.1	3.8	1.5	0.3	Iris-setosa
20	21	5.4	3.4	1.7	0.2	Iris-setosa
21	22	5.1	3.7	1.5	0.4	Iris-setosa
22	23	4.6	3.6	1.0	0.2	Iris-setosa
23	24	5.1	3.3	1.7	0.5	Iris-setosa
24	25	4.8	3.4	1.9	0.2	Iris-setosa
25	26	5.0	3.0	1.6	0.2	Iris-setosa
26	27	5.0	3.4	1.6	0.4	Iris-setosa
27	28	5.2	3.5	1.5	0.2	Iris-setosa
28	29	5.2	3.4	1.4	0.2	Iris-setosa
29	30	4.7	3.2	1.6	0.2	Iris-setosa
30	31	4.8	3.1	1.6	0.2	Iris-setosa
31	32	5.4	3.4	1.5	0.4	Iris-setosa
32	33	5.2	4.1	1.5	0.1	Iris-spetosa
33	34	5.5	4.2	1.4	0.2	Iris-setosa
34	35	4.9	3.1	1.5	0.1	Iris-setosa
35	36	5.0	3.2	1.2	0.2	Iris-setosa

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
36	37	5.5	3.5	1.3	0.2	Iris-setosa
37	38	4.9	3.1	1.5	0.1	Iris-setosa
38	39	4.4	3.0	1.3	0.2	Iris-setosa
39	40	5.1	3.4	1.5	0.2	Iris-setosa
40	41	5.0	3.5	1.3	0.3	Iris-setosa
41	42	4.5	2.3	1.3	0.3	Iris-setosa
42	43	4.4	3.2	1.3	0.2	Iris-setosa
43	44	5.0	3.5	1.6	0.6	Iris-setosa
44	45	5.1	3.8	1.9	0.4	Iris-setosa
45	46	4.8	3.0	1.4	0.3	Iris-setosa
46	47	5.1	3.8	1.6	0.2	Iris-setosa
47	48	4.6	3.2	1.4	0.2	Iris-setosa
48	49	5.3	3.7	1.5	0.2	Iris-setosa
49	50	5.0	3.3	1.4	0.2	Iris-setosa

In [28]: ```cat2```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
50	51	7.0	3.2	4.7	1.4	Iris-versicolor
51	52	6.4	3.2	4.5	1.5	Iris-versicolor
52	53	6.9	3.1	4.9	1.5	Iris-versicolor
53	54	5.5	2.3	4.0	1.3	Iris-versicolor
54	55	6.5	2.8	4.6	1.5	Iris-versicolor
55	56	5.7	2.8	4.5	1.3	Iris-versicolor
56	57	6.3	3.3	4.7	1.6	Iris-versicolor
57	58	4.9	2.4	3.3	1.0	Iris-versicolor
58	59	6.6	2.9	4.6	1.3	Iris-versicolor
59	60	5.2	2.7	3.9	1.4	Iris-versicolor
60	61	5.0	2.0	3.5	1.0	Iris-versicolor
61	62	5.9	3.0	4.2	1.5	Iris-versicolor
62	63	6.0	2.2	4.0	1.0	Iris-versicolor
63	64	6.1	2.9	4.7	1.4	Iris-versicolor
64	65	5.6	2.9	3.6	1.3	Iris-versicolor
65	66	6.7	3.1	4.4	1.4	Iris-versicolor
66	67	5.6	3.0	4.5	1.5	Iris-versicolor
67	68	5.8	2.7	4.1	1.0	Iris-versicolor
68	69	6.2	2.2	4.5	1.5	Iris-versicolor
69	70	5.6	2.5	3.9	1.1	Iris-versicolor
70	71	5.9	3.2	4.8	1.8	Iris-versicolor
71	72	6.1	2.8	4.0	1.3	Iris-versicolor
72	73	6.3	2.5	4.9	1.5	Iris-versicolor
73	74	6.1	2.8	4.7	1.2	Iris-versicolor
74	75	6.4	2.9	4.3	1.3	Iris-versicolor
75	76	6.6	3.0	4.4	1.4	Iris-versicolor
76	77	6.8	2.8	4.8	1.4	Iris-versicolor
77	78	6.7	3.0	5.0	1.7	Iris-versicolor
78	79	6.0	2.9	4.5	1.5	Iris-versicolor
79	80	5.7	2.6	3.5	1.0	Iris-versicolor
80	81	5.5	2.4	3.8	1.1	Iris-versicolor
81	82	5.5	2.4	3.7	1.0	Iris-versicolor
82	83	5.8	2.7	3.9	1.2	Iris-verspicolor
83	84	6.0	2.7	5.1	1.6	Iris-versicolor
84	85	5.4	3.0	4.5	1.5	Iris-versicolor
85	86	6.0	3.4	4.5	1.6	Iris-versicolor

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
86	87	6.7	3.1	4.7	1.5	Iris-versicolor
87	88	6.3	2.3	4.4	1.3	Iris-versicolor
88	89	5.6	3.0	4.1	1.3	Iris-versicolor
89	90	5.5	2.5	4.0	1.3	Iris-versicolor
90	91	5.5	2.6	4.4	1.2	Iris-versicolor
91	92	6.1	3.0	4.6	1.4	Iris-versicolor
92	93	5.8	2.6	4.0	1.2	Iris-versicolor
93	94	5.0	2.3	3.3	1.0	Iris-versicolor
94	95	5.6	2.7	4.2	1.3	Iris-versicolor
95	96	5.7	3.0	4.2	1.2	Iris-versicolor
96	97	5.7	2.9	4.2	1.3	Iris-versicolor
97	98	6.2	2.9	4.3	1.3	Iris-versicolor
98	99	5.1	2.5	3.0	1.1	Iris-versicolor
99	100	5.7	2.8	4.1	1.3	Iris-versicolor

In [29]: `cat3`

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
100	101	6.3	3.3	6.0	2.5	Iris-virginica
101	102	5.8	2.7	5.1	1.9	Iris-virginica
102	103	7.1	3.0	5.9	2.1	Iris-virginica
103	104	6.3	2.9	5.6	1.8	Iris-virginica
104	105	6.5	3.0	5.8	2.2	Iris-virginica
105	106	7.6	3.0	6.6	2.1	Iris-virginica
106	107	4.9	2.5	4.5	1.7	Iris-virginica
107	108	7.3	2.9	6.3	1.8	Iris-virginica
108	109	6.7	2.5	5.8	1.8	Iris-virginica
109	110	7.2	3.6	6.1	2.5	Iris-virginica
110	111	6.5	3.2	5.1	2.0	Iris-virginica
111	112	6.4	2.7	5.3	1.9	Iris-virginica
112	113	6.8	3.0	5.5	2.1	Iris-virginica
113	114	5.7	2.5	5.0	2.0	Iris-virginica
114	115	5.8	2.8	5.1	2.4	Iris-virginica
115	116	6.4	3.2	5.3	2.3	Iris-virginica
116	117	6.5	3.0	5.5	1.8	Iris-virginica
117	118	7.7	3.8	6.7	2.2	Iris-virginica
118	119	7.7	2.6	6.9	2.3	Iris-virginica
119	120	6.0	2.2	5.0	1.5	Iris-virginica
120	121	6.9	3.2	5.7	2.3	Iris-virginica
121	122	5.6	2.8	4.9	2.0	Iris-virginica
122	123	7.7	2.8	6.7	2.0	Iris-virginica
123	124	6.3	2.7	4.9	1.8	Iris-virginica
124	125	6.7	3.3	5.7	2.1	Iris-virginica
125	126	7.2	3.2	6.0	1.8	Iris-virginica
126	127	6.2	2.8	4.8	1.8	Iris-virginica
127	128	6.1	3.0	4.9	1.8	Iris-virginica
128	129	6.4	2.8	5.6	2.1	Iris-virginica
129	130	7.2	3.0	5.8	1.6	Iris-virginica
130	131	7.4	2.8	6.1	1.9	Iris-virginica
131	132	7.9	3.8	6.4	2.0	Iris-virginica
132	133	6.4	2.8	5.6	2.2	Iris-virginica
133	134	6.3	2.8	5.1	1.5	Iris-virginica
134	135	6.1	2.6	5.6	1.4	Iris-virginica
135	136	7.7	3.0	6.1	2.3	Iris-virginica

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
136	137	6.3	3.4	5.6	2.4	Iris-virginica
137	138	6.4	3.1	5.5	1.8	Iris-virginica
138	139	6.0	3.0	4.8	1.8	Iris-virginica
139	140	6.9	3.1	5.4	2.1	Iris-virginica
140	141	6.7	3.1	5.6	2.4	Iris-virginica
141	142	6.9	3.1	5.1	2.3	Iris-virginica
142	143	5.8	2.7	5.1	1.9	Iris-virginica
143	144	6.8	3.2	5.9	2.3	Iris-virginica
144	145	6.7	3.3	5.7	2.5	Iris-virginica
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

In [37]:
```python
a = cat1["Species"].count()
b = cat2["Species"].count()
c = cat3["Species"].count()
print(a,b,c)
```

```
50 50 50
```

In [42]:
```python
values=[a,b,c]
species_labels=["Iris-setosa","Iris-versicolor","Iris-virginica"]
plt.pie(values,labels=species_labels,radius=2,autopct='%0.0f%%')
```

Out[42]:
```
([<matplotlib.patches.Wedge at 0x192d452faf0>,
  <matplotlib.patches.Wedge at 0x192d4520190>,
  <matplotlib.patches.Wedge at 0x192d45208b0>],
 [Text(1.099999940539023, 1.905255922655575, 'Iris-setosa'),
  Text(-2.199999999999991, -2.0597886516130004e-07, 'Iris-versicolor'),
  Text(1.1000002973048704, -1.9052557166766872, 'Iris-virginica')],
 [Text(0.5999999675667398, 1.039230503266677, '33%'),
  Text(-1.1999999999999948, -1.1235210826980001e-07, '33%'),
  Text(0.6000001621662929, -1.0392303909145566, '33%')])
```
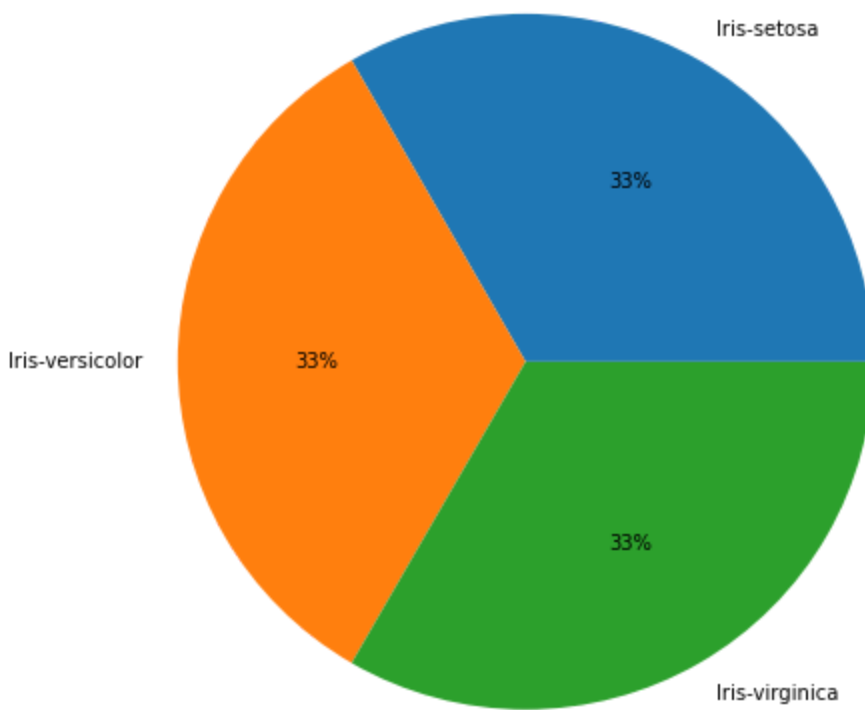
In [50]:
```python
plt.boxplot(df["SepalLengthCm"])
plt.boxplot(df["SepalWidthCm"])
```

Out[50]:
```
{'whiskers': [<matplotlib.lines.Line2D at 0x192d6696110>,
  <matplotlib.lines.Line2D at 0x192d66963e0>],
 'caps': [<matplotlib.lines.Line2D at 0x192d66966b0>,
  <matplotlib.lines.Line2D at 0x192d6696980>],
 'boxes': [<matplotlib.lines.Line2D at 0x192d6695e40>],
 'medians': [<matplotlib.lines.Line2D at 0x192d6696c50>],
 'fliers': [<matplotlib.lines.Line2D at 0x192d6696f20>],
 'means': []}
```
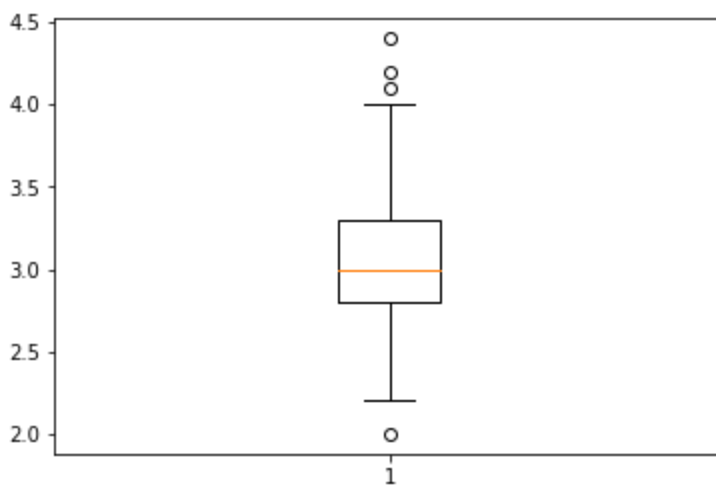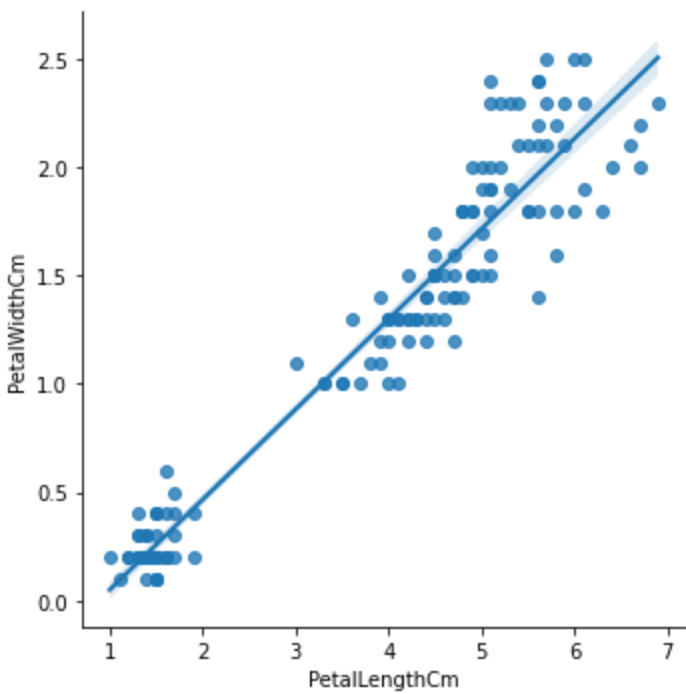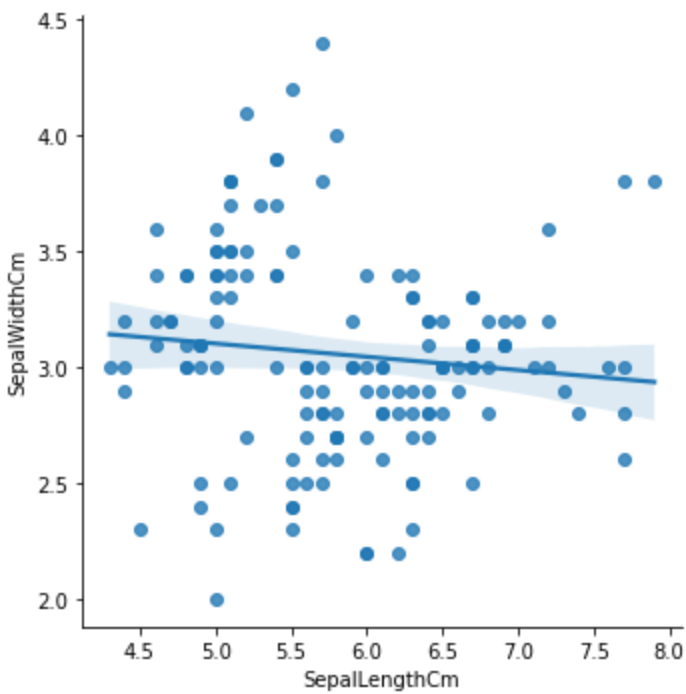

In [51]:
```python
plt.boxplot(df["SepalWeidthCm"])
```

Out[51]:
```
{'whiskers': [<matplotlib.lines.Line2D at 0x192d66ebf40>,
  <matplotlib.lines.Line2D at 0x192d6718250>],
 'caps': [<matplotlib.lines.Line2D at 0x192d6718520>,
  <matplotlib.lines.Line2D at 0x192d67187f0>],
 'boxes': [<matplotlib.lines.Line2D at 0x192d66ebd90>],
 'medians': [<matplotlib.lines.Line2D at 0x192d6718ac0>],
 'fliers': [<matplotlib.lines.Line2D at 0x192d6718d90>],
 'means': []}
```
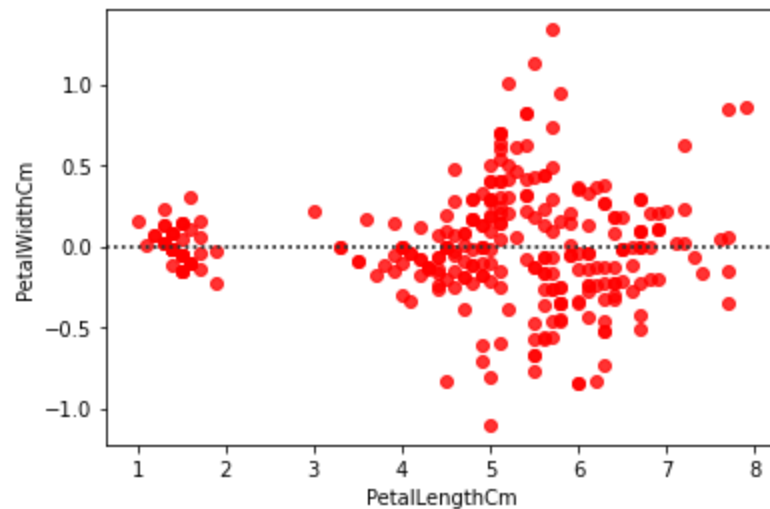
```
In [13]: sns.lmplot(x='SepalLengthCm',y='SepalWidthCm',data=iris)
         sns.lmplot(x='PetalLengthCm',y='PetalWidthCm',data=iris)
```
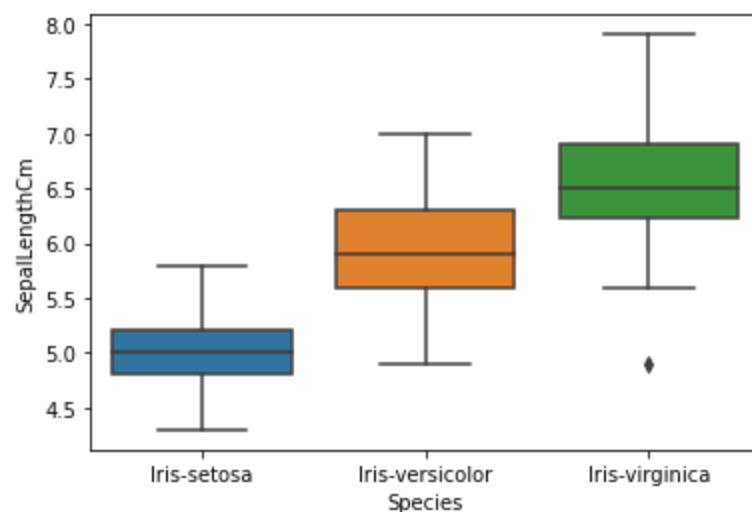
Out[13]: `<seaborn.axisgrid.FacetGrid at 0x1dafcad1bd0>`

`sns.residplot(x = iris['SepalLengthCm'], y =iris['SepalWidthCm'], color='red')`
`sns.residplot(x = iris['PetalLengthCm'], y =iris['PetalWidthCm'], color='red')`

`<AxesSubplot:xlabel='PetalLengthCm', ylabel='PetalWidthCm'>`

`sns.boxplot(x='Species', y = 'SepalLengthCm', data=iris)`

`<AxesSubplot:xlabel='Species', ylabel='SepalLengthCm'>`