In [5]:
```
#Name: Dongare Shweta Santosh
#Roll no: 15
#Practical no: 01
#Academic year: 2024-25
```

In [18]:
```
import pandas as pd
```

In [19]:
```
iris=pd.read_csv("iris.csv")
```

In [20]:
```
iris.describe()
```

Out[20]:

	sepal.length	sepal.width	petal.length	petal.width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.057333	3.758000	1.199333
std	0.828066	0.435866	1.765298	0.762238
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

In [21]:
```
iris.head()
```

Out[21]:

	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 [22]:
```
iris.tail()
```

Out[22]:

	sepal.length	sepal.width	petal.length	petal.width	variety
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

In [23]:
```
iris.index
```

Out[23]:
```
RangeIndex(start=0, stop=150, step=1)
```

In [24]:
```
iris.columns
```

Out[24]:
```
Index(['sepal.length', 'sepal.width', 'petal.length', 'petal.widt
h',
       'variety'],
      dtype='object')
```

In [25]:
```
iris.shape
```

Out[25]:
```
(150, 5)
```

In [26]:
```
iris.dtypes
```

Out[26]:
```
 sepal.length    float64
sepal.width      float64
petal.length     float64
petal.width      float64
variety           object
dtype: object
```

In [27]:
```
iris.columns.values
```

Out[27]:
```
array(['sepal.length', 'sepal.width', 'petal.length', 'petal.widt
h',
       'variety'], dtype=object)
```

In [28]:
```
iris.describe(include="all")
```

Out[28]:

	sepal.length	sepal.width	petal.length	petal.width	variety
count	150.000000	150.000000	150.000000	150.000000	150
unique	NaN	NaN	NaN	NaN	3
top	NaN	NaN	NaN	NaN	Setosa
freq	NaN	NaN	NaN	NaN	50
mean	5.843333	3.057333	3.758000	1.199333	NaN
std	0.828066	0.435866	1.765298	0.762238	NaN
min	4.300000	2.000000	1.000000	0.100000	NaN
25%	5.100000	2.800000	1.600000	0.300000	NaN
50%	5.800000	3.000000	4.350000	1.300000	NaN
75%	6.400000	3.300000	5.100000	1.800000	NaN
max	7.900000	4.400000	6.900000	2.500000	NaN

In [29]:
```
iris['sepal.length']
```

Out[29]:
```
0      5.1
1      4.9
2      4.7
3      4.6
4      5.0

145    6.7
146    6.3
147    6.5
148    6.2
149    5.9
Name: sepal.length, Length: 150, dtype: float64
```

In [30]:
```
iris['petal.length']
```

Out[30]:
```
0      1.4
1      1.4
2      1.3
3      1.5
4      1.4

145    5.2
146    5.0
147    5.2
148    5.4
149    5.1
Name: petal.length, Length: 150, dtype: float64
```

In [31]:
```
iris.sort_index(axis=1,ascending=False)
```

Out[31]:

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

150 rows × 5 columns

In [32]:
```
iris.sort_values(by="sepal.width")
```

Out[32]:

	sepal.length	sepal.width	petal.length	petal.width	variety
60	5.0	2.0	3.5	1.0	Versicolor
62	6.0	2.2	4.0	1.0	Versicolor
119	6.0	2.2	5.0	1.5	Virginica
68	6.2	2.2	4.5	1.5	Versicolor
41	4.5	2.3	1.3	0.3	Setosa
...	...	...	...	...	...
16	5.4	3.9	1.3	0.4	Setosa
14	5.8	4.0	1.2	0.2	Setosa
32	5.2	4.1	1.5	0.1	Setosa
33	5.5	4.2	1.4	0.2	Setosa
15	5.7	4.4	1.5	0.4	Setosa

150 rows × 5 columns

In [33]:
```
iris.iloc[5]
```

Out[33]:
```
sepal.length        5.4
sepal.width         3.9
petal.length        1.7
petal.width         0.4
variety          Setosa
Name: 5, dtype: object
```

In [34]:
```
iris[0:3]
```

Out[34]:

	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

In [35]:
```
iris.loc[:, ["sepal.length","sepal.width"]]
```

Out[35]:

	sepal.length	sepal.width
0	5.1	3.5
1	4.9	3.0
2	4.7	3.2
3	4.6	3.1
4	5.0	3.6
...	...	...
145	6.7	3.0
146	6.3	2.5
147	6.5	3.0
148	6.2	3.4
149	5.9	3.0

150 rows × 2 columns

In [36]:
```
iris.iloc[:5, :]
```

Out[36]:

	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 [37]:
```
iris.iloc[:, :4]
```

Out[37]:

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

150 rows × 4 columns

In [38]:
```
iris.iloc[:7, :5]
```

Out[38]:

	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
5	5.4	3.9	1.7	0.4	Setosa
6	4.6	3.4	1.4	0.3	Setosa

In [39]:
```
iris.iloc[3:5, 0:2]
```

Out[39]:

	sepal.length	sepal.width
3	4.6	3.1
4	5.0	3.6

In [40]:
```
iris.iloc[[1, 2, 4],[0,2]]
```

Out[40]:

	sepal.length	petal.length
1	4.9	1.4
2	4.7	1.3
4	5.0	1.4

In [41]:
```
iris.iloc[1:3, :]
```

Out[41]:

	sepal.length	sepal.width	petal.length	petal.width	variety
1	4.9	3.0	1.4	0.2	Setosa
2	4.7	3.2	1.3	0.2	Setosa

In [42]:
```
iris.iloc[:, 1:3]
```

Out[42]:

	sepal.width	petal.length
0	3.5	1.4
1	3.0	1.4
2	3.2	1.3
3	3.1	1.5
4	3.6	1.4
...	...	...
145	3.0	5.2
146	2.5	5.0
147	3.0	5.2
148	3.4	5.4
149	3.0	5.1

150 rows × 2 columns

In [43]:
```
iris.iloc[1,1]
```

Out[43]:
```
3.0
```

In [44]:
```
iris['petal.length'].iloc[5]
```

Out[44]:
```
1.7
```

In [45]:
```
cols_2_4=iris.columns[2:4]
iris[cols_2_4]
```

Out[45]:

	petal.length	petal.width
0	1.4	0.2
1	1.4	0.2
2	1.3	0.2
3	1.5	0.2
4	1.4	0.2
...	...	...
145	5.2	2.3
146	5.0	1.9
147	5.2	2.0
148	5.4	2.3
149	5.1	1.8

150 rows × 2 columns

In [46]:
```
iris[iris.columns[2:4]].iloc[5:10]
```

Out[46]:

	petal.length	petal.width
5	1.7	0.4
6	1.4	0.3
7	1.5	0.2
8	1.4	0.2
9	1.5	0.1

In [47]:
```
iris.isnull()
```

Out[47]:

	sepal.length	sepal.width	petal.length	petal.width	variety
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
...	...	...	...	...	...
145	False	False	False	False	False
146	False	False	False	False	False
147	False	False	False	False	False
148	False	False	False	False	False
149	False	False	False	False	False

150 rows × 5 columns

In [48]:
```
data={'Name':['Jai','Princi','Gaurav','Anuj','Ravi','Natasha','Riy
a'],
      'Age':[17,17,18,17,18,17,17],
      'Gender':['M','F','M','M','M','F','F'],
      'Marks':[90,76,'NaN',74,65,'NaN',71]}
```

In [49]:
```
df=pd.DataFrame(data)
```

In [50]:
```
df
```

Out[50]:

	Name	Age	Gender	Marks
0	Jai	17	M	90
1	Princi	17	F	76
2	Gaurav	18	M	NaN
3	Anuj	17	M	74
4	Ravi	18	M	65
5	Natasha	17	F	NaN
6	Riya	17	F	71

In [51]:
```
  = avg = 0
for ele in df['Marks']:
    if str(ele).isnumeric(): # Ensure 'ele' is numeric
        c += 1
        avg += float(ele) # Convert to float to avoid type issues
avg /= c
```

In [52]:
```
df=df.replace(to_replace="NaN", value=avg)
```

In [53]:
```
df
```

Out[53]:

	Name	Age	Gender	Marks
0	Jai	17	M	90.0
1	Princi	17	F	76.0
2	Gaurav	18	M	75.2
3	Anuj	17	M	74.0
4	Ravi	18	M	65.0
5	Natasha	17	F	75.2
6	Riya	17	F	71.0

In [54]:
```
df['Gender'] = df['Gender'].map({'M': 0,'F': 1, }).astype(float)
```

In [55]:
```
df
```

Out[55]:

	Name	Age	Gender	Marks
0	Jai	17	0.0	90.0
1	Princi	17	1.0	76.0
2	Gaurav	18	0.0	75.2
3	Anuj	17	0.0	74.0
4	Ravi	18	0.0	65.0
5	Natasha	17	1.0	75.2
6	Riya	17	1.0	71.0

In [56]:
```
df = df[df['Marks'] >= 75]
```

In [57]:
```
df = df.drop(['Age'], axis=1)
```

In [58]:
```
df
```

Out[58]:

	Name	Gender	Marks
0	Jai	0.0	90.0
1	Princi	1.0	76.0
2	Gaurav	0.0	75.2
5	Natasha	1.0	75.2