Assignment 2- Introduction To Data Science

Instructions:

- **Submit only one colab (.ipynb) file and one this report file (.pdf).**
- **Files should be named as yourrollnumber.ipynb (22L7521.ipynb, 22L7521.pdf)**
- **You are provided with three dataset files (Iris, Titanic, Housing) .csv files**
- **You have to provide code for all three datasets of the necessary steps described in the tables of each question.**
- **Only the mentioned columns/features mentioned for each dataset should be used.**
- **IN Q.2 you are only required to make the histograms and leave the BoxPlot part.**

Part A. Preprocessing

1. In this step, you are required to apply the preprocessing steps that you've covered in the course. Specifically, for each of the input dimension, fill in the following (add rows and complete the table for all input dimensions).

Iris:

Dim Name	Data Type	Total Instances	Number of Nulls	Number of Outliers	Min. Value	Max Value	Mode	Mean	Median	Std Dev	Variance
Sepal Length	Float 64	150	0	0	4.3	7.9	5 .0	5.843	5.8	0.828066	0.685694
Sepal Width	Float 64	150	0	4	2.0	4.4	3.0	3.054	3.0	0.433594	0.188004
Petal Length	Float 64	150	0	0	1.0	6.9	1.5	3.758	4.35	1.76442	3.113179
Petal Width	Float 64	150	0	0	0.1	2.5	0.2	1.198	1.3	0.763161	0.582414

Titanic:

Dim Name	Data Type	Total Instances	Number of Nulls	Number of Outliers	Min. Value	Max Value	Mode	Mean	Median	Std	Variance
Age	Float 64	714 (removing nulls)	177	11	0.42	80.0	24.0	29.69911	28.0	14.526497	211.019125
SibSp	Int 64	891	0	46	0	8	0	0.523008	0.0	1.102743	1.216043
Fare	Float 64	891	0	116	0.0	512.3292	8.05	32.204208	14.4542	49.693429	2469.436846

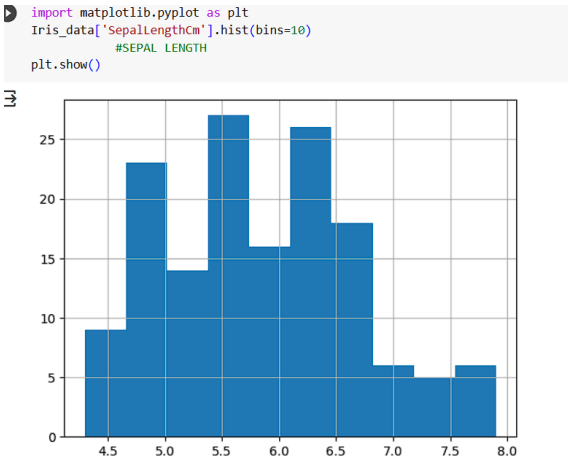
Housing Prices

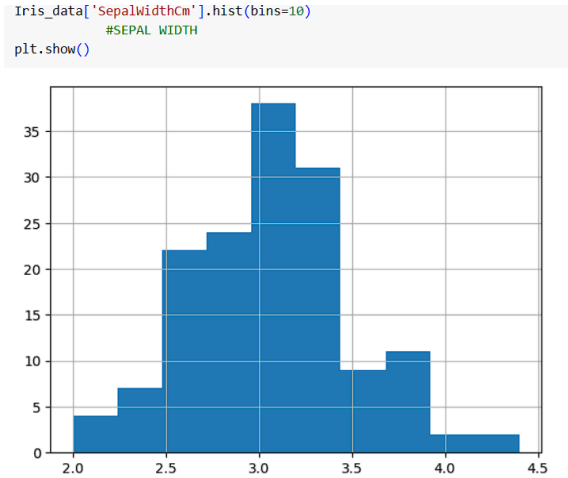
Dim Name	Data Type	Total Instances	Number of Nulls	Number of Outliers	Min. Value	Max Value	Mode	Mean	Median	Std	Variance
Area	Int 64	545	0	12	1650	16200	6000	5150.5412	4600	2170.141023	4709512.057576
Price	Int 64	545	0	15	1750000	13300000	3500000,4200000	4766729.2477	4340000.0	1870439.615657	3498544355820.573242
Bedrooms	Int 64	545	0	12	1	6	3	2.965138	3.0	0.738064	0.544738

2. For each of the input dimension, plot histogram and comment the type of distribution the dimension exhibits. Further, visualize each dimension using a Box Plot. Specifically,

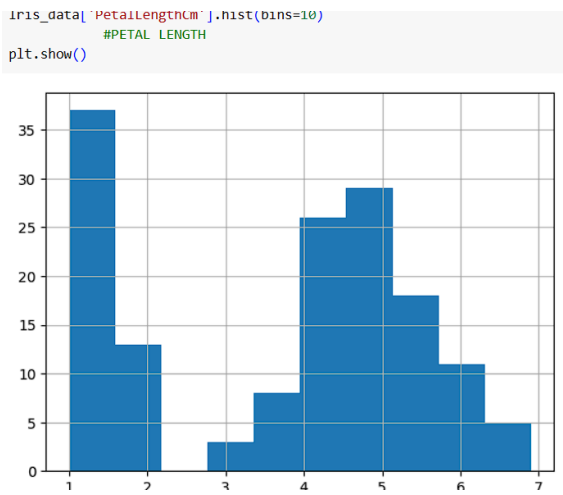
for each of the input dimension, you're required to fill the following table (duplicate it for each of the 15 dimensions).

Iris:

SepalLength	
Histogram	Box Plot
	
Comments: Normal distribution	Comments:

SepalWidth	
Histogram	Box Plot
	

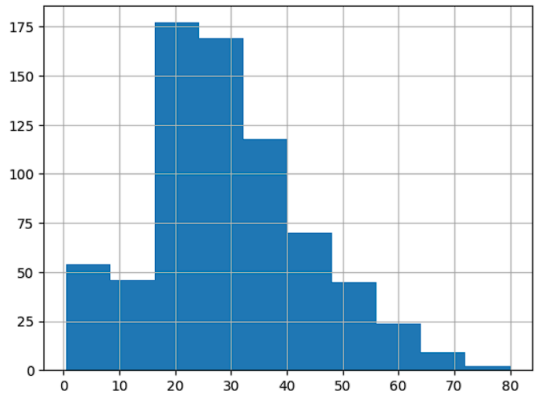
Comments: Normal distribution	Comments:

PetalLength	
Histogram	Box Plot
	
Comments: Right skewed	Comments:

Titanic:

Age	
Histogram	Box Plot

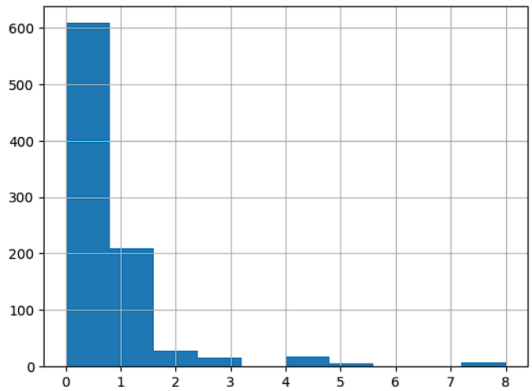
```
#AGE
plt.show()
```



Comments: Left skewed	Comments:

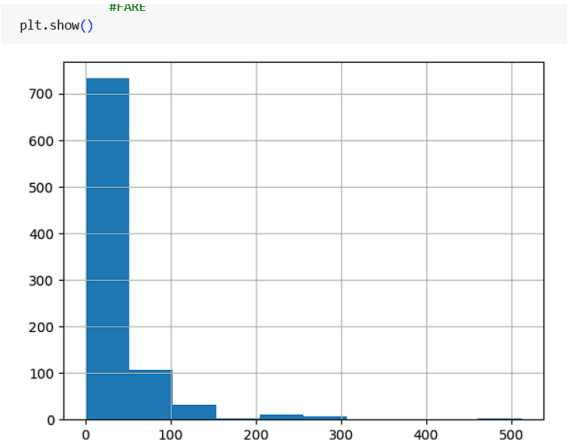
SibSp	
Histogram	Box Plot

```
#SIBSP
plt.show()
```

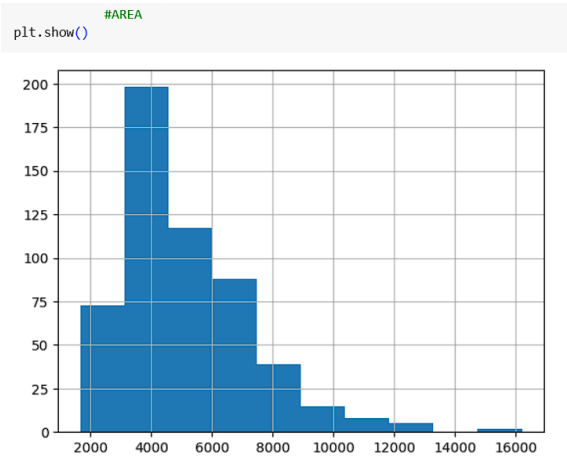


Comments: Most people travel alone	Comments:

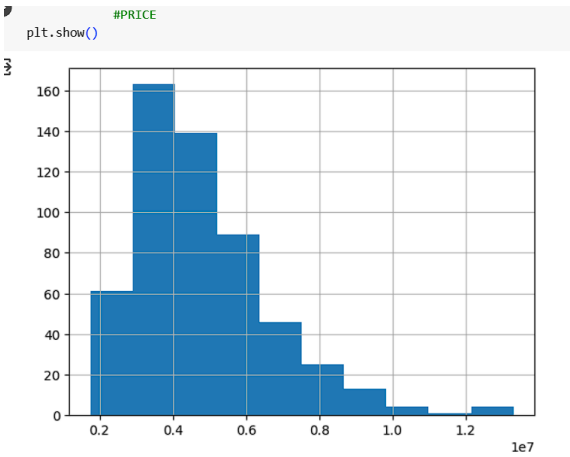
Fare	
Histogram	Box Plot

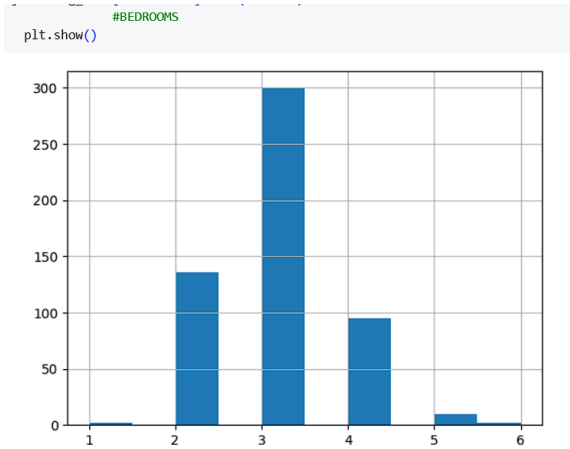
	
Comments: majority of fares are low	Comments:

Housing Prices:

Area	
Histogram	Box Plot
	
Comments: majority lies between 2500-7500	Comments:

Price

Histogram	Box Plot
	
Comments: Majority prices are medium	Comments:

Bedrooms	
Histogram	Box Plot
	
Comments: Majority of houses have 3 bedrooms or 2 bedrooms	Comments:

3. Find the missing values in each of the dimension (do this for both input and output dimensions), and fill these using an "appropriate" methodology that we've discussed in the class. You may also choose to drop a certain sample based on your analysis. Mention your approach and its justification.

Iris:

Dim Name	Number of Missing Values	Filled using OR Dropped	Reason for selecting a certain approach
SepalLength	0	0	0
SepalWidth	0	0	0
SepalHeight	0	0	0

Titanic:

Dim Name	Number of Missing Values	Filled using OR Dropped	Reason for selecting a certain approach
Age	177	mean	its about 20% of data so droping it could result in biasness of model to be trained
SibSp	0	0	0
Fare	0	0	0

Housing Prices:

Dim Name	Number of Missing Values	Filled using OR Dropped	Reason for selecting a certain approach
Area	0	0	0

Price	0	0	0
Bedrooms	0	0	0

4. For each of the dimension, find out the outliers (noisy data) and handle these appropriately.

Iris:

Dim Name	Number of Outliers	Smooth using/ Dropped	Reason for selecting a certain approach
SepalLength	0	0	0
SepalWidth	4	dropped	Only 2.7% of data wont make a difference
SepalHeight	0	0	0

Titanic:

Dim Name	Number of Missing Values	Filled using OR Dropped	Reason for selecting a certain approach
Age	11	drop	Dont need peoples age unless you need to train your model according to age

SibSp	46	Drop	Can be dropped because its only 5% of data
Fare	116	drop	13% of values are outliers so it can be dropped

Housing Prices:

Dim Name	Number of Missing Values	Filled using OR Dropped	Reason for selecting a certain approach
Area	12	drop	Its only 2.2% of the data
Price	15	Drop	Its around 2.5% of the data
Bedrooms	12	drop	dropping 2.2% of data wont change anything