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Subject: Software Laboratory III (DATA SCIENCE)

Assignment No : 02

Problem statement:

Data Wrangling II

Create an "Academic performance" dataset of students and perform thefollowing operations using Python.

1. Scan all variables for missing values and inconsistencies. If there are missing values and/or inconsistencies, use any of the suitable techniques to deal with them.

2. Scan all numeric variables for outliers. If there are outliers, use any of the suitable techniques to deal with them.

3. Apply data transformations on at least one of the variables. The purpose of this transformation should be one of the following reasons: to change the scale for better understanding of the variable, to convert a non-linear relation into a linear one, or to decrease the skewness and convert the distribution into a normal distribution.

CODE :

Read Dataset

```
df = pd.read_csv('exam.csv')
df
```

	gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Relation	raisedhands	VisITedResources	AnnouncementsView	Discussion	ParentAnsweringSurvey
0	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	15	16	2	20	Yes
1	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	20	20	3	25	Yes
2	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	10	7	0	30	No
3	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	30	25	5	35	No
4	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	40	50	12	50	No
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
475	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	S	Father	5	4	5	8	No
476	F	Jordan	Jordan	MiddleSchool	G-08	A	Geology	F	Father	90	77	14	28	No
477	F	Jordan	Jordan	MiddleSchool	G-08	A	Geology	S	Father	55	74	25	29	No
478	F	Jordan	Jordan	MiddleSchool	G-08	A	History	F	Father	30	17	14	57	No
479	F	Jordan	Jordan	MiddleSchool	G-08	A	History	S	Father	35	14	23	62	No

480 rows × 17 columns

Checking For Heads

```
df.head()
```

	gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Relation	raisedhands	VisITedResources	AnnouncementsView	Discussion	ParentAnsweringSurvey
0	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	15	16	2	20	Yes
1	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	20	20	3	25	Yes
2	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	10	7	0	30	No
3	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	30	25	5	35	No
4	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	Father	40	50	12	50	No

###check for info of dataset

###check for Info of dataset

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 480 entries, 0 to 479
Data columns (total 17 columns):
 #   Column                    Non-Null Count  Dtype
---  ------                    --------------  -----
 0   gender                    480 non-null    object
 1   NationalITy               480 non-null    object
 2   PlaceofBirth              480 non-null    object
 3   StageID                   480 non-null    object
 4   GradeID                   480 non-null    object
 5   SectionID                 480 non-null    object
 6   Topic                     480 non-null    object
 7   Semester                  480 non-null    object
 8   Relation                  480 non-null    object
 9   raisedhands               480 non-null    int64
 10  VisITedResources          480 non-null    int64
 11  AnnouncementsView         480 non-null    int64
 12  Discussion                480 non-null    int64
 13  ParentAnsweringSurvey     480 non-null    object
 14  ParentschoolSatisfaction  480 non-null    object
 15  StudentAbsenceDays        480 non-null    object
 16  Class                     480 non-null    object
dtypes: int64(4), object(13)
memory usage: 63.9+ KB
```

```
df.dtypes
```
✓ 0.0s

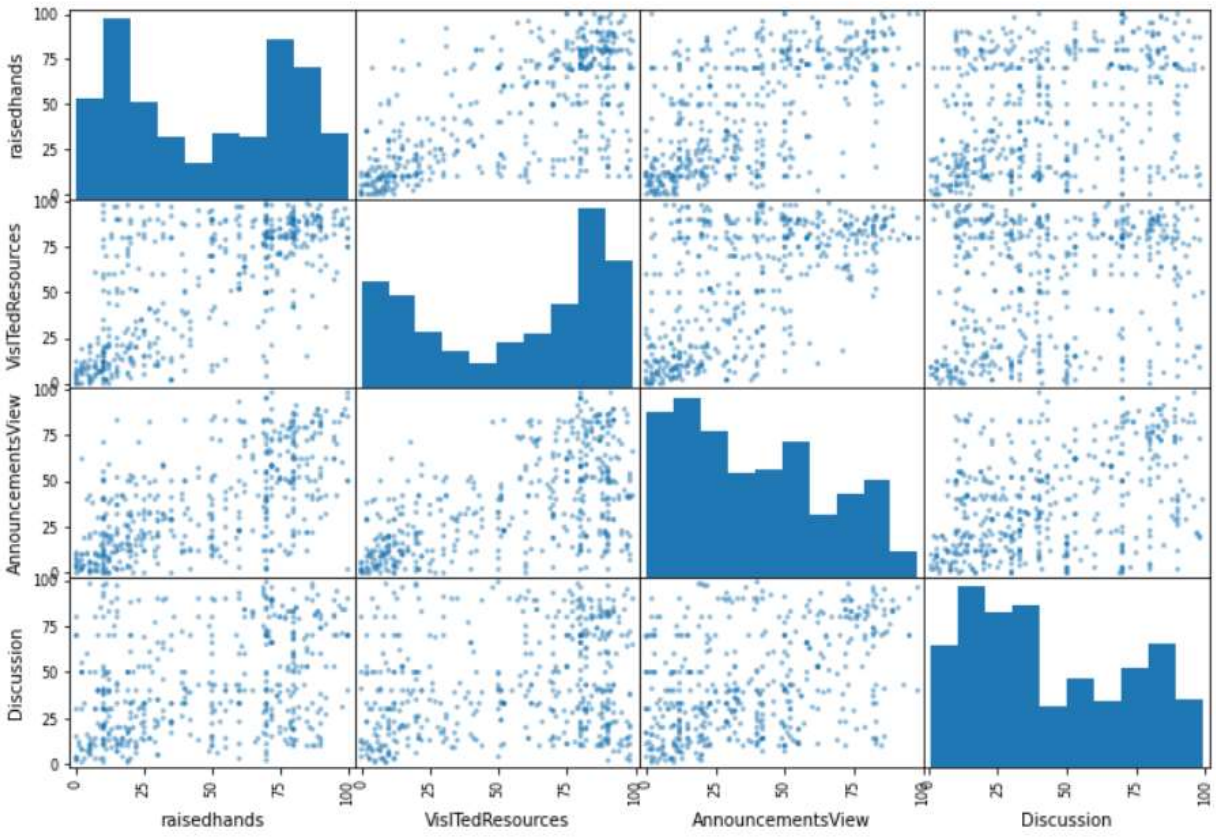
```
gender                      object
NationalITy                 object
PlaceofBirth                object
StageID                     object
GradeID                     object
SectionID                   object
Topic                       object
Semester                    object
Relation                    object
raisedhands                  int64
VisITedResources             int64
AnnouncementsView            int64
Discussion                   int64
ParentAnsweringSurvey       object
ParentschoolSatisfaction    object
StudentAbsenceDays          object
Class                       object
dtype: object
```

Checking for any Outliers

By ploting scatter Matrix

```
from pandas.plotting import scatter_matrix
num_attribs=['raisedhands','VisITedResources','AnnouncementsView','Discussion']
scatter_matrix(df[num_attribs],figsize=(12,8))
```
7] ✓ 1.3s

```
array([[<AxesSubplot:xlabel='raisedhands', ylabel='raisedhands'>,
        <AxesSubplot:xlabel='VisITedResources', ylabel='raisedhands'>,
        <AxesSubplot:xlabel='AnnouncementsView', ylabel='raisedhands'>,
        <AxesSubplot:xlabel='Discussion', ylabel='raisedhands'>],
       [<AxesSubplot:xlabel='raisedhands', ylabel='VisITedResources'>,
        <AxesSubplot:xlabel='VisITedResources', ylabel='VisITedResources'>,
        <AxesSubplot:xlabel='AnnouncementsView', ylabel='VisITedResources'>,
        <AxesSubplot:xlabel='Discussion', ylabel='VisITedResources'>],
       [<AxesSubplot:xlabel='raisedhands', ylabel='AnnouncementsView'>,
        <AxesSubplot:xlabel='VisITedResources', ylabel='AnnouncementsView'>,
        <AxesSubplot:xlabel='AnnouncementsView', ylabel='AnnouncementsView'>,
        <AxesSubplot:xlabel='Discussion', ylabel='AnnouncementsView'>],
       [<AxesSubplot:xlabel='raisedhands', ylabel='Discussion'>,
        <AxesSubplot:xlabel='VisITedResources', ylabel='Discussion'>,
        <AxesSubplot:xlabel='AnnouncementsView', ylabel='Discussion'>,
        <AxesSubplot:xlabel='Discussion', ylabel='Discussion'>]],
      dtype=object)
```




```
df['raisedhands'].describe()
```

[8] ✓ 0.0s

```
count    480.000000
mean      46.775000
std       30.779223
min        0.000000
25%       15.750000
50%       50.000000
75%       75.000000
max      100.000000
Name: raisedhands, dtype: float64
```

Transformation of Data

BY calculating std devition then descale

```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
df[['raisedhands']]=sc.fit_transform(df[['raisedhands']])
```

✓ 4.0s

```
df['raisedhands'].describe()
```

✓ 0.1s

```
count    4.800000e+02
mean     4.440892e-17
std      1.001043e+00
min     -1.521279e+00
25%     -1.009037e+00
50%      1.048878e-01
75%      9.179714e-01
max      1.731055e+00
Name: raisedhands, dtype: float64
```

--> shivam borse