Darshan UNIVERSITY
योगः कर्मसु कौशलम्

Data Mining

Lab - 1

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Introduction to Pandas Library Function:

Step-1 Import the pandas Libraries

```
In [5]:   import pandas as pd
```

Step-2 Import the dataset from this:....

```
In [ ]:
```

Step-3 Read csv or excel File

```
In [11]:   df = pd.read_csv('titanic.csv')
```

Step-4 Print Data from csv or excel File

```
In [13]:   df
```

Out[13]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	F
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.25
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.28
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.92
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.10
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.05
...	...	...	...	...	...	...	...	...	...	
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.00
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.00
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.45
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.00
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.75

891 rows × 12 columns

Step-5 See the First 10 Rows

```
In [33]:  df.head(10)
          #df.head() #only 5 record print
```

Out[33]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th…	female	38.0	1	0	PC 17599	71.2833
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500
5	6	0	3	Moran, Mr. James	male	NaN	0	0	330877	8.4583
6	7	0	1	McCarthy, Mr. Timothy J	male	54.0	0	0	17463	51.8625
7	8	0	3	Palsson, Master. Gosta Leonard	male	2.0	3	1	349909	21.0750
8	9	1	3	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	female	27.0	0	2	347742	11.1333
9	10	1	2	Nasser, Mrs. Nicholas (Adele Achem)	female	14.0	1	0	237736	30.0708

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Step-6 See the Last 10 Rows

In [39]: `df.tail(10)`

Out[39]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	
881	882	0	3	Markun, Mr. Johann	male	33.0	0	0	349257	7.
882	883	0	3	Dahlberg, Miss. Gerda Ulrika	female	22.0	0	0	7552	10.
883	884	0	2	Banfield, Mr. Frederick James	male	28.0	0	0	C.A./SOTON 34068	10.
884	885	0	3	Sutehall, Mr. Henry Jr	male	25.0	0	0	SOTON/OQ 392076	7.
885	886	0	3	Rice, Mrs. William (Margaret Norton)	female	39.0	0	5	382652	29.
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.

Step-7 Data type of each columns

In [52]:   `df.dtypes`

Out[52]:
```
PassengerId      int64
Survived         int64
Pclass           int64
Name            object
Sex             object
Age            float64
SibSp            int64
Parch            int64
Ticket          object
Fare           float64
Cabin           object
Embarked        object
dtype: object
```

In [56]:   `df.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   PassengerId  891 non-null    int64
 1   Survived     891 non-null    int64
 2   Pclass       891 non-null    int64
 3   Name         891 non-null    object
 4   Sex          891 non-null    object
 5   Age          714 non-null    float64
 6   SibSp        891 non-null    int64
 7   Parch        891 non-null    int64
 8   Ticket       891 non-null    object
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object
 11  Embarked     889 non-null    object
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
```

Step-8 Display Summary Information

In [44]:   `df.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   PassengerId  891 non-null    int64
 1   Survived     891 non-null    int64
 2   Pclass       891 non-null    int64
 3   Name         891 non-null    object
 4   Sex          891 non-null    object
 5   Age          714 non-null    float64
 6   SibSp        891 non-null    int64
 7   Parch        891 non-null    int64
 8   Ticket       891 non-null    object
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object
 11  Embarked     889 non-null    object
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
```

In [66]: `df.shape`

Out[66]: `(891, 12)`

In [68]: `df.shape[0]   #row`

Out[68]: `891`

In [70]: `df.shape[1] #column`

Out[70]: `12`

In [72]: `df.describe()`

Out[72]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	714.000000	891.000000	891.000000	891.000000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
std	257.353842	0.486592	0.836071	14.526497	1.102743	0.806057	49.693429
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.000000
25%	223.500000	0.000000	2.000000	20.125000	0.000000	0.000000	7.910400
50%	446.000000	0.000000	3.000000	28.000000	0.000000	0.000000	14.454200
75%	668.500000	1.000000	3.000000	38.000000	1.000000	0.000000	31.000000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

Step-9 Access a specific column

```
In [85]:   df['Name']
           df.Name
```

```
Out[85]:   0                              Braund, Mr. Owen Harris
           1        Cumings, Mrs. John Bradley (Florence Briggs Th...
           2                               Heikkinen, Miss. Laina
           3        Futrelle, Mrs. Jacques Heath (Lily May Peel)
           4                               Allen, Mr. William Henry
                                          ...
           886                              Montvila, Rev. Juozas
           887                          Graham, Miss. Margaret Edith
           888           Johnston, Miss. Catherine Helen "Carrie"
           889                                Behr, Mr. Karl Howell
           890                                Dooley, Mr. Patrick
           Name: Name, Length: 891, dtype: object
```

```
In [87]:   df[['Name','Age']]
```

Out[87]:

	Name	Age
0	Braund, Mr. Owen Harris	22.0
1	Cumings, Mrs. John Bradley (Florence Briggs Th...	38.0
2	Heikkinen, Miss. Laina	26.0
3	Futrelle, Mrs. Jacques Heath (Lily May Peel)	35.0
4	Allen, Mr. William Henry	35.0
...	...	...
886	Montvila, Rev. Juozas	27.0
887	Graham, Miss. Margaret Edith	19.0
888	Johnston, Miss. Catherine Helen "Carrie"	NaN
889	Behr, Mr. Karl Howell	26.0
890	Dooley, Mr. Patrick	32.0

891 rows × 2 columns

Step-10 Access rows by their integer location

```
In [109…   df.iloc[15]
```

```
Out[109…   PassengerId                               16
           Survived                                   1
           Pclass                                     2
           Name             Hewlett, Mrs. (Mary D Kingcome)
           Sex                                   female
           Age                                     55.0
           SibSp                                      0
           Parch                                      0
           Ticket                                248706
           Fare                                    16.0
           Cabin                                    NaN
           Embarked                                   S
           Name: 15, dtype: object
```

In [113…   `df.iloc[10:20]`

Out[113...

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fa
10	11	1	3	Sandstrom, Miss. Marguerite Rut	female	4.0	1	1	PP 9549	16.70(
11	12	1	1	Bonnell, Miss. Elizabeth	female	58.0	0	0	113783	26.55(
12	13	0	3	Saundercock, Mr. William Henry	male	20.0	0	0	A/5. 2151	8.05(
13	14	0	3	Andersson, Mr. Anders Johan	male	39.0	1	5	347082	31.27!
14	15	0	3	Vestrom, Miss. Hulda Amanda Adolfina	female	14.0	0	0	350406	7.85
15	16	1	2	Hewlett, Mrs. (Mary D Kingcome)	female	55.0	0	0	248706	16.00(
16	17	0	3	Rice, Master. Eugene	male	2.0	4	1	382652	29.12!
17	18	1	2	Williams, Mr. Charles Eugene	male	NaN	0	0	244373	13.00(
18	19	0	3	Vander Planke, Mrs. Julius (Emelia Maria Vande...	female	31.0	1	0	345763	18.00(
19	20	1	3	Masselmani, Mrs. Fatima	female	NaN	0	0	2649	7.22!

In [115...   `df.iloc[10:20,3:6]`

Out[115...

	Name	Sex	Age
10	Sandstrom, Miss. Marguerite Rut	female	4.0
11	Bonnell, Miss. Elizabeth	female	58.0
12	Saundercock, Mr. William Henry	male	20.0
13	Andersson, Mr. Anders Johan	male	39.0
14	Vestrom, Miss. Hulda Amanda Adolfina	female	14.0
15	Hewlett, Mrs. (Mary D Kingcome)	female	55.0
16	Rice, Master. Eugene	male	2.0
17	Williams, Mr. Charles Eugene	male	NaN
18	Vander Planke, Mrs. Julius (Emelia Maria Vande...	female	31.0
19	Masselmani, Mrs. Fatima	female	NaN

In [119...
```python
df.iloc[:,3:6]
```

Out[119...

	Name	Sex	Age
0	Braund, Mr. Owen Harris	male	22.0
1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0
2	Heikkinen, Miss. Laina	female	26.0
3	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0
4	Allen, Mr. William Henry	male	35.0
...	...	...	...
886	Montvila, Rev. Juozas	male	27.0
887	Graham, Miss. Margaret Edith	female	19.0
888	Johnston, Miss. Catherine Helen "Carrie"	female	NaN
889	Behr, Mr. Karl Howell	male	26.0
890	Dooley, Mr. Patrick	male	32.0

891 rows × 3 columns

Step-11 Delete a specific Column

In [125...
```python
df.drop('Ticket',axis=1)
```

Out[125...

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Fare	Cabin
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	7.2500	NaN
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	71.2833	C85
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	7.9250	NaN
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	53.1000	C123
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	8.0500	NaN
...	...	...	...	...	...	...	...	...	...	...
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	13.0000	NaN
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	30.0000	B42
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	23.4500	NaN
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	30.0000	C148
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	7.7500	NaN

891 rows × 11 columns

In [131...
```python
df.drop('Pclass',axis=1,inplace=True)
```

In [133...
```python
df
```

In [131...
```python
df.drop('Pclass',axis=1,inplace=True)
```

Out[133...

	PassengerId	Survived	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cal
0	1	0	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	N
1	2	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C
2	3	1	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	N
3	4	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C1
4	5	0	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	N
...	...	...	...	...	...	...	...	...	...	
886	887	0	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	N
887	888	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	E
888	889	0	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	N
889	890	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C1
890	891	0	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	N

891 rows × 11 columns

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```
In [135…   df.drop(columns='Fare')
```

Out[135…

	PassengerId	Survived	Name	Sex	Age	SibSp	Parch	Ticket	Cabin	Emb
0	1	0	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	NaN	
1	2	1	Cumings, Mrs. John Bradley (Florence Briggs Th…	female	38.0	1	0	PC 17599	C85	
2	3	1	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	NaN	
3	4	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	C123	
4	5	0	Allen, Mr. William Henry	male	35.0	0	0	373450	NaN	
...	...	...	...	...	...	...	...	...	...	
886	887	0	Montvila, Rev. Juozas	male	27.0	0	0	211536	NaN	
887	888	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	B42	
888	889	0	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	NaN	
889	890	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	C148	
890	891	0	Dooley, Mr. Patrick	male	32.0	0	0	370376	NaN	

891 rows × 10 columns

Step-12 Create a new Column

```
In [139…   df['NewFare'] = df['Fare']*1.1
```

```
In [141…   df
```

Out[141...

	PassengerId	Survived	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cal
0	1	0	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	N
1	2	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C
2	3	1	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	N
3	4	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C1
4	5	0	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	N
...	...	...	...	...	...	...	...	...	...	
886	887	0	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	N
887	888	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	E
888	889	0	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	N
889	890	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C1
890	891	0	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	N

891 rows × 12 columns

Step-13 Perform Condition Selection on DataFrame

In [162… | `df[df['Fare']>10]`

Out[162...

	PassengerId	Survived	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin
1	2	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85
3	4	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123
6	7	0	McCarthy, Mr. Timothy J	male	54.0	0	0	17463	51.8625	E46
7	8	0	Palsson, Master. Gosta Leonard	male	2.0	3	1	349909	21.0750	NaN
8	9	1	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	female	27.0	0	2	347742	11.1333	NaN
...	...	...	...	...	...	...	...	...	...	...
885	886	0	Rice, Mrs. William (Margaret Norton)	female	39.0	0	5	382652	29.1250	NaN
886	887	0	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN
887	888	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42
888	889	0	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	NaN
889	890	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148

555 rows × 12 columns

In [168… `df[(df['Fare']>10) & (df['Fare']<12)]`

Out[168...

	PassengerId	Survived	Name	Sex	Age	SibSp	Parch	Ticket	Fare
8	9	1	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	female	27.0	0	2	347742	11.1333
33	34	0	Wheadon, Mr. Edward H	male	66.0	0	0	C.A. 24579	10.5000
39	40	1	Nicola-Yarred, Miss. Jamila	female	14.0	1	0	2651	11.2417
56	57	1	Rugg, Miss. Emily	female	21.0	0	0	C.A. 31026	10.5000
66	67	1	Nye, Mrs. (Elizabeth Ramell)	female	29.0	0	0	C.A. 29395	10.5000
70	71	0	Jenkin, Mr. Stephen Curnow	male	32.0	0	0	C.A. 33111	10.5000
84	85	1	Ilett, Miss. Bertha	female	17.0	0	0	SO/C 14885	10.5000
125	126	1	Nicola-Yarred, Master. Elias	male	12.0	1	0	2651	11.2417
144	145	0	Andrew, Mr. Edgardo Samuel	male	18.0	0	0	231945	11.5000
172	173	1	Johnson, Miss. Eleanor Ileen	female	1.0	1	1	347742	11.1333
205	206	0	Strom, Miss. Telma Matilda	female	2.0	0	1	347054	10.4625
219	220	0	Harris, Mr. Walter	male	30.0	0	0	W/C 14208	10.5000
226	227	1	Mellors, Mr. William John	male	19.0	0	0	SW/PP 751	10.5000
234	235	0	Leyson, Mr. Robert William Norman	male	24.0	0	0	C.A. 29566	10.5000
238	239	0	Pengelly, Mr. Frederick	male	19.0	0	0	28665	10.5000

	PassengerId	Survived	Name	Sex	Age	SibSp	Parch	Ticket	Fare
			William						
242	243	0	Coleridge, Mr. Reginald Charles	male	29.0	0	0	W./C. 14263	10.5000
251	252	0	Strom, Mrs. Wilhelm (Elna Matilda Persson)	female	29.0	1	1	347054	10.4625
265	266	0	Reeves, Mr. David	male	36.0	0	0	C.A. 17248	10.5000
398	399	0	Pain, Dr. Alfred	male	23.0	0	0	244278	10.5000
439	440	0	Kvillner, Mr. Johan Henrik Johannesson	male	31.0	0	0	C.A. 18723	10.5000
458	459	1	Toomey, Miss. Ellen	female	50.0	0	0	F.C.C. 13531	10.5000
516	517	1	Lemore, Mrs. (Amelia Milley)	female	34.0	0	0	C.A. 34260	10.5000
526	527	1	Ridsdale, Miss. Lucy	female	50.0	0	0	W./C. 14258	10.5000
529	530	0	Hocking, Mr. Richard George	male	23.0	2	1	29104	11.5000
570	571	1	Harris, Mr. George	male	62.0	0	0	S.W./PP 752	10.5000
619	620	0	Gavey, Mr. Lawrence	male	26.0	0	0	31028	10.5000
672	673	0	Mitchell, Mr. Henry Michael	male	70.0	0	0	C.A. 24580	10.5000
687	688	0	Dakic, Mr. Branko	male	19.0	0	0	349228	10.1708
717	718	1	Troutt, Miss. Edwina Celia "Winnie"	female	27.0	0	0	34218	10.5000
757	758	0	Bailey, Mr. Percy Andrew	male	18.0	0	0	29108	11.5000

	PassengerId	Survived	Name	Sex	Age	SibSp	Parch	Ticket	Fare
772	773	0	Mack, Mrs. (Mary)	female	57.0	0	0	S.O./P.P. 3	10.5000
812	813	0	Slemen, Mr. Richard James	male	35.0	0	0	28206	10.5000
841	842	0	Mudd, Mr. Thomas Charles	male	16.0	0	0	S.O./P.P. 3	10.5000
861	862	0	Giles, Mr. Frederick Edward	male	21.0	1	0	28134	11.5000
869	870	1	Johnson, Master. Harold Theodor	male	4.0	1	1	347742	11.1333
882	883	0	Dahlberg, Miss. Gerda Ulrika	female	22.0	0	0	7552	10.5167
883	884	0	Banfield, Mr. Frederick James	male	28.0	0	0	C.A./SOTON 34068	10.5000

Step-14 Compute the sum of value

```
In [180…    df.Survived.sum()
```

```
Out[180…    342
```

Step-15 Compute the mean of value

```
In [172…    df.Age.mean()
```

```
Out[172…    29.69911764705882
```

Step-16 Count non-null value (column)

```
In [190…    df.count()
```

```
Out[190...   PassengerId     891
             Survived        891
             Name            891
             Sex             891
             Age             714
             SibSp           891
             Parch           891
             Ticket          891
             Fare            891
             Cabin           204
             Embarked        889
             NewFare         891
             dtype: int64
```

In [196...
```python
df.isnull().sum()
```

```
Out[196...   PassengerId       0
             Survived          0
             Name              0
             Sex               0
             Age             177
             SibSp             0
             Parch             0
             Ticket            0
             Fare              0
             Cabin           687
             Embarked          2
             NewFare           0
             dtype: int64
```

In [198...
```python
(~df.isnull()).sum()
```

```
Out[198...   PassengerId     891
             Survived        891
             Name            891
             Sex             891
             Age             714
             SibSp           891
             Parch           891
             Ticket          891
             Fare            891
             Cabin           204
             Embarked        889
             NewFare         891
             dtype: int64
```

Step-17 Find Minimun or Maximum values

In [174...
```python
df.Age.max()
```

Out[174...   80.0

In [176...
```python
df.Age.min()
```

Out[176…   0.42

In [ ]: