```
import pandas as pd
import numpy as np


url= r"C:\Users\Rutuja Habib\Downloads\Iris.csv"
df=pd.read_csv(url) #reading the file
print(df)
```

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

            Species
0       Iris-setosa
1       Iris-setosa
2       Iris-setosa
3       Iris-setosa
4       Iris-setosa
..              ...
145  Iris-virginica
146  Iris-virginica
147  Iris-virginica
148  Iris-virginica
149  Iris-virginica

[150 rows x 6 columns]
```

```
df.describe()
```

	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

```
df.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
```

```
df.shape
```

```
(150, 6)
```

```
df.isnull()
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	False	False	False	False	False	False
1	False	False	False	False	False	False
2	False	False	False	False	False	False
3	False	False	False	False	False	False
4	False	False	False	False	False	False
...	...	...	...	...	...	...
145	False	False	False	False	False	False
146	False	False	False	False	False	False
147	False	False	False	False	False	False
148	False	False	False	False	False	False
149	False	False	False	False	False	False

150 rows × 6 columns

```
df.isnull().sum()
```

```
Id               0
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

Insert Null Values in the dataset

```
df.loc[5, 'petal.length']=np.nan
print(df)
```

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

            Species  petal.length
0       Iris-setosa           NaN
1       Iris-setosa           NaN
2       Iris-setosa           NaN
3       Iris-setosa           NaN
4       Iris-setosa           NaN
..              ...           ...
145  Iris-virginica           NaN
146  Iris-virginica           NaN
147  Iris-virginica           NaN
148  Iris-virginica           NaN
149  Iris-virginica           NaN

[150 rows x 7 columns]
```

```
df.isnull().sum()
```

```
Id                0
SepalLengthCm     0
SepalWidthCm      0
PetalLengthCm     0
PetalWidthCm      0
Species           0
petal.length    150
dtype: int64
```

```
df.loc[5, 'PetalLengthCm'] = np.nan
print(df)
```

```
      Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
0      1            5.1           3.5            1.4           0.2
```

```
1      2           4.9           3.0           1.4           0.2
2      3           4.7           3.2           1.3           0.2
3      4           4.6           3.1           1.5           0.2
4      5           5.0           3.6           1.4           0.2
..   ...           ...           ...           ...           ...
145  146           6.7           3.0           5.2           2.3
146  147           6.3           2.5           5.0           1.9
147  148           6.5           3.0           5.2           2.0
148  149           6.2           3.4           5.4           2.3
149  150           5.9           3.0           5.1           1.8

            Species  petal.length
0       Iris-setosa           NaN
1       Iris-setosa           NaN
2       Iris-setosa           NaN
3       Iris-setosa           NaN
4       Iris-setosa           NaN
..              ...           ...
145  Iris-virginica           NaN
146  Iris-virginica           NaN
147  Iris-virginica           NaN
148  Iris-virginica           NaN
149  Iris-virginica           NaN

[150 rows x 7 columns]
```

```
df.isnull().sum()
```

```
Id                0
SepalLengthCm     0
SepalWidthCm      0
PetalLengthCm     1
PetalWidthCm      0
Species           0
petal.length    150
dtype: int64
```

Fill NA Values with 0 or 1

```
df.fillna(1)
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species	petal.length
0	1	5.1	3.5	1.4	0.2	Iris-setosa	1.0
1	2	4.9	3.0	1.4	0.2	Iris-setosa	1.0
2	3	4.7	3.2	1.3	0.2	Iris-setosa	1.0
3	4	4.6	3.1	1.5	0.2	Iris-setosa	1.0
4	5	5.0	3.6	1.4	0.2	Iris-setosa	1.0
...	...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica	1.0
146	147	6.3	2.5	5.0	1.9	Iris-virginica	1.0
147	148	6.5	3.0	5.2	2.0	Iris-virginica	1.0
148	149	6.2	3.4	5.4	2.3	Iris-virginica	1.0
149	150	5.9	3.0	5.1	1.8	Iris-virginica	1.0

150 rows × 7 columns

```
df.fillna(0)
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species	petal.length
0	1	5.1	3.5	1.4	0.2	Iris-setosa	0.0
1	2	4.9	3.0	1.4	0.2	Iris-setosa	0.0
2	3	4.7	3.2	1.3	0.2	Iris-setosa	0.0
3	4	4.6	3.1	1.5	0.2	Iris-setosa	0.0
4	5	5.0	3.6	1.4	0.2	Iris-setosa	0.0
...	...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica	0.0
146	147	6.3	2.5	5.0	1.9	Iris-virginica	0.0
147	148	6.5	3.0	5.2	2.0	Iris-virginica	0.0
148	149	6.2	3.4	5.4	2.3	Iris-virginica	0.0
149	150	5.9	3.0	5.1	1.8	Iris-virginica	0.0

150 rows × 7 columns

```
df.fillna(df.mean)
```

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

150 rows × 7 columns

```
df.fillna(df.median)
```

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

150 rows × 7 columns

```
df.fillna(df.mode)
```

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

150 rows × 7 columns

Forward Fill

```
df.ffill
```

```
<bound method NDFrame.ffill of       Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
0      1            5.1           3.5            1.4           0.2
1      2            4.9           3.0            1.4           0.2
2      3            4.7           3.2            1.3           0.2
3      4            4.6           3.1            1.5           0.2
4      5            5.0           3.6            1.4           0.2
..   ...            ...           ...            ...           ...
145  146            6.7           3.0            5.2           2.3
146  147            6.3           2.5            5.0           1.9
147  148            6.5           3.0            5.2           2.0
148  149            6.2           3.4            5.4           2.3
149  150            5.9           3.0            5.1           1.8

            Species  petal.length
0       Iris-setosa           NaN
1       Iris-setosa           NaN
2       Iris-setosa           NaN
3       Iris-setosa           NaN
4       Iris-setosa           NaN
..              ...           ...
145  Iris-virginica           NaN
146  Iris-virginica           NaN
147  Iris-virginica           NaN
148  Iris-virginica           NaN
149  Iris-virginica           NaN

[150 rows x 7 columns]>
```

Backward Fill

```
df.bfill
```

```
<bound method NDFrame.bfill of       Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
0      1            5.1           3.5            1.4           0.2
1      2            4.9           3.0            1.4           0.2
2      3            4.7           3.2            1.3           0.2
3      4            4.6           3.1            1.5           0.2
4      5            5.0           3.6            1.4           0.2
..   ...            ...           ...            ...           ...
145  146            6.7           3.0            5.2           2.3
146  147            6.3           2.5            5.0           1.9
147  148            6.5           3.0            5.2           2.0
148  149            6.2           3.4            5.4           2.3
149  150            5.9           3.0            5.1           1.8

            Species  petal.length
0       Iris-setosa           NaN
1       Iris-setosa           NaN
2       Iris-setosa           NaN
3       Iris-setosa           NaN
4       Iris-setosa           NaN
..              ...           ...
145  Iris-virginica           NaN
146  Iris-virginica           NaN
147  Iris-virginica           NaN
148  Iris-virginica           NaN
149  Iris-virginica           NaN
```

```
[150 rows x 7 columns]>
```

Drop na values

```
df.dropna()
```

Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species	petal.length

```
df.loc[148, 'SepalLengthCm']=np.nan
print(df)
```

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

            Species  petal.length
0       Iris-setosa           NaN
1       Iris-setosa           NaN
2       Iris-setosa           NaN
3       Iris-setosa           NaN
4       Iris-setosa           NaN
..              ...           ...
145  Iris-virginica           NaN
146  Iris-virginica           NaN
147  Iris-virginica           NaN
148  Iris-virginica           NaN
149  Iris-virginica           NaN

[150 rows x 7 columns]
```

```
df.loc[145, 'SepalLengthCm'] = np.nan
print(df)
```

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

            Species  petal.length
0       Iris-setosa           NaN
1       Iris-setosa           NaN
2       Iris-setosa           NaN
3       Iris-setosa           NaN
4       Iris-setosa           NaN
..              ...           ...
145  Iris-virginica           NaN
146  Iris-virginica           NaN
147  Iris-virginica           NaN
148  Iris-virginica           NaN
149  Iris-virginica           NaN

[150 rows x 7 columns]
```

```
df.ffill
```

```
<bound method NDFrame.ffill of       Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
0       1            5.1           3.5            1.4           0.2
1       2            4.9           3.0            1.4           0.2
2       3            4.7           3.2            1.3           0.2
3       4            4.6           3.1            1.5           0.2
4       5            5.0           3.6            1.4           0.2
..    ...            ...           ...            ...           ...
145   146            NaN           3.0            5.2           2.3
146   147            6.3           2.5            5.0           1.9
147   148            6.5           3.0            5.2           2.0
```

```
148  149            NaN           3.4            5.4           2.3
149  150            5.9           3.0            5.1           1.8

            Species  petal.length
0       Iris-setosa           NaN
1       Iris-setosa           NaN
2       Iris-setosa           NaN
3       Iris-setosa           NaN
4       Iris-setosa           NaN
..              ...           ...
145  Iris-virginica           NaN
146  Iris-virginica           NaN
147  Iris-virginica           NaN
148  Iris-virginica           NaN
149  Iris-virginica           NaN

[150 rows x 7 columns]>
```

```
df.bfill
```

```
<bound method NDFrame.bfill of       Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
0      1            5.1           3.5            1.4           0.2
1      2            4.9           3.0            1.4           0.2
2      3            4.7           3.2            1.3           0.2
3      4            4.6           3.1            1.5           0.2
4      5            5.0           3.6            1.4           0.2
..   ...            ...           ...            ...           ...
145  146            NaN           3.0            5.2           2.3
146  147            6.3           2.5            5.0           1.9
147  148            6.5           3.0            5.2           2.0
148  149            NaN           3.4            5.4           2.3
149  150            5.9           3.0            5.1           1.8

            Species  petal.length
0       Iris-setosa           NaN
1       Iris-setosa           NaN
2       Iris-setosa           NaN
3       Iris-setosa           NaN
4       Iris-setosa           NaN
..              ...           ...
145  Iris-virginica           NaN
146  Iris-virginica           NaN
147  Iris-virginica           NaN
148  Iris-virginica           NaN
149  Iris-virginica           NaN

[150 rows x 7 columns]>
```

Mapping

```
mapping={'Iris-setosa':110,'Iris-virginica':111,'versicolor':112}
df['v_map']=df['Species'].map(mapping)
print(df)
```

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

            Species  petal.length  v_map
0       Iris-setosa           NaN  110.0
```