colab.research.google.com/drive/1J8TPwbjOhVPGpOIT4NVums1daGMojMHk#scrollTo=C9WrwqcUdac5

ex_1.ipynb

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[2] 22s
```
from google.colab import files
uploaded = files.upload()
```

Choose Files train.csv

- **train.csv**(text/csv) - 460676 bytes, last modified: 12/15/2019 - 100% done

```
Saving train.csv to train.csv
```

[23] 0s
```
import pandas as pd
import io
df=pd.read_csv(io.BytesIO(uploaded['train.csv']))
print(df)
```

```
         Id  MSSubClass MSZoning  LotFrontage  LotArea Street Alley LotShape  \
0         1          60       RL         65.0     8450   Pave   NaN      Reg
1         2          20       RL         80.0     9600   Pave   NaN      Reg
2         3          60       RL         68.0    11250   Pave   NaN      IR1
3         4          70       RL         60.0     9550   Pave   NaN      IR1
4         5          60       RL         84.0    14260   Pave   NaN      IR1
...     ...         ...      ...          ...      ...    ...   ...      ...
1455   1456          60       RL         62.0     7917   Pave   NaN      Reg
1456   1457          20       RL         85.0    13175   Pave   NaN      Reg
1457   1458          70       RL         66.0     9042   Pave   NaN      Reg
1458   1459          20       RL         68.0     9717   Pave   NaN      Reg
1459   1460          20       RL         75.0     9937   Pave   NaN      Reg
```

Variables Terminal

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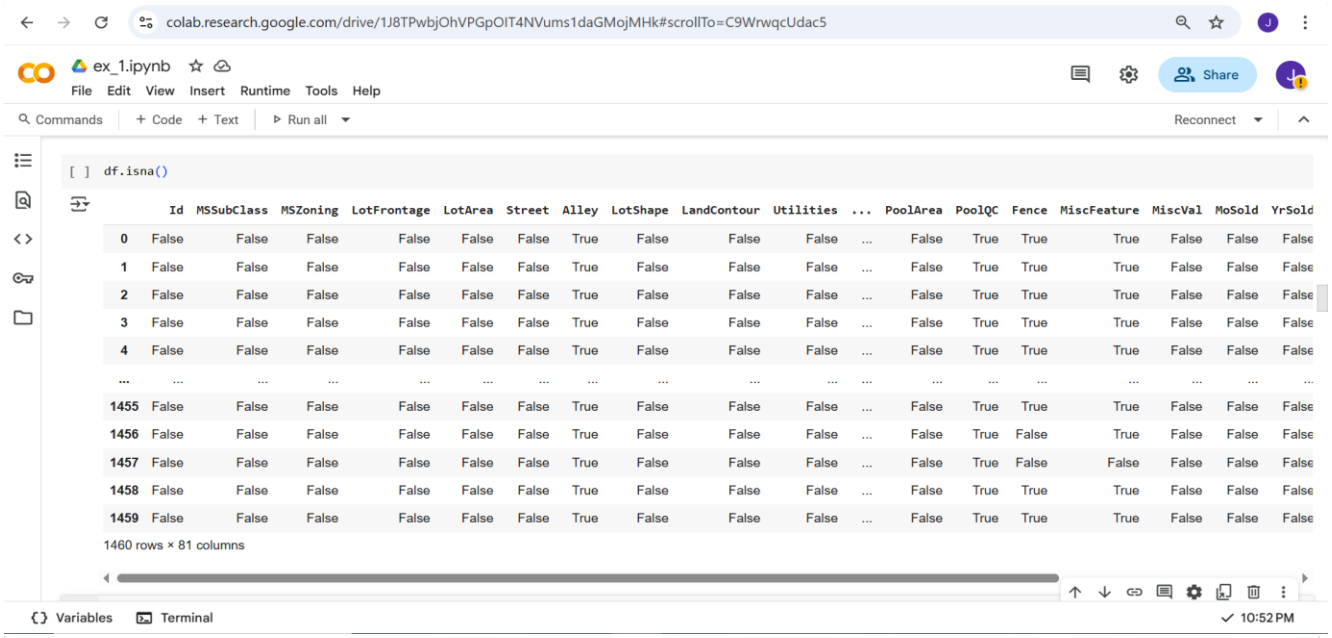
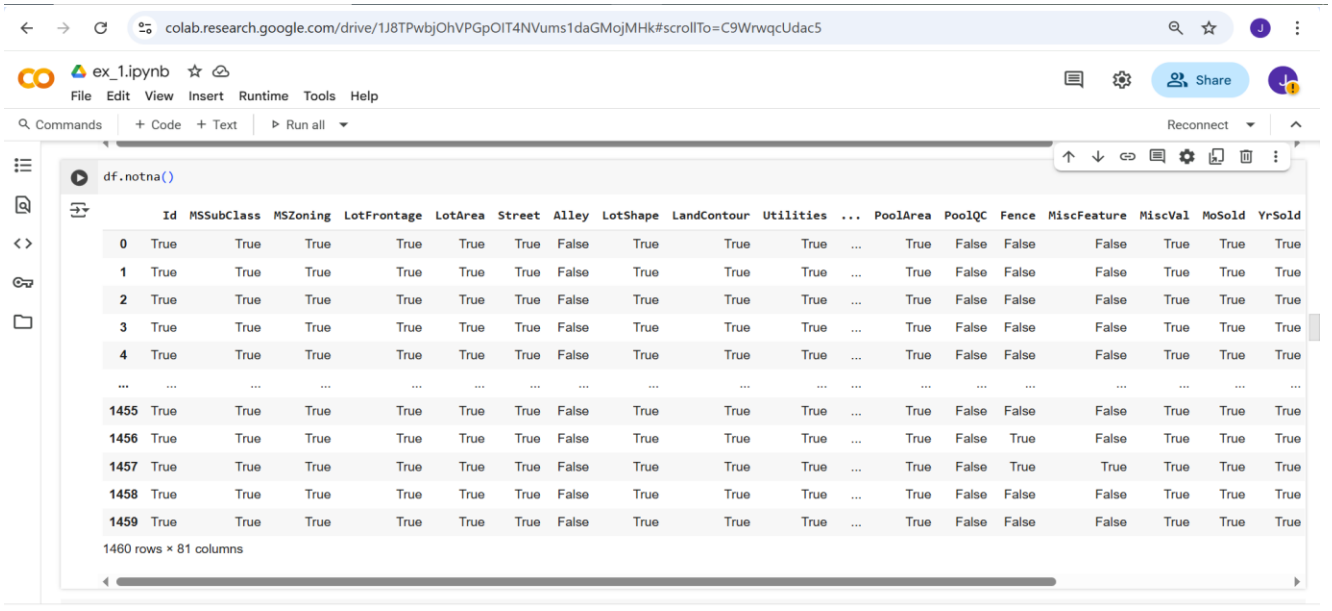
```
     LandContour Utilities  ... PoolArea PoolQC  Fence MiscFeature MiscVal  \
0            Lvl    AllPub  ...        0    NaN    NaN         NaN       0
1            Lvl    AllPub  ...        0    NaN    NaN         NaN       0
2            Lvl    AllPub  ...        0    NaN    NaN         NaN       0
3            Lvl    AllPub  ...        0    NaN    NaN         NaN       0
4            Lvl    AllPub  ...        0    NaN    NaN         NaN       0
...          ...       ...  ...      ...    ...    ...         ...     ...
1455         Lvl    AllPub  ...        0    NaN    NaN         NaN       0
1456         Lvl    AllPub  ...        0    NaN  MnPrv         NaN       0
1457         Lvl    AllPub  ...        0    NaN  GdPrv        Shed    2500
1458         Lvl    AllPub  ...        0    NaN    NaN         NaN       0
1459         Lvl    AllPub  ...        0    NaN    NaN         NaN       0

     MoSold YrSold  SaleType  SaleCondition  SalePrice
0         2   2008        WD         Normal     208500
1         5   2007        WD         Normal     181500
2         9   2008        WD         Normal     223500
3         2   2006        WD        Abnorml     140000
4        12   2008        WD         Normal     250000
...     ...    ...       ...            ...        ...
1455      8   2007        WD         Normal     175000
1456      2   2010        WD         Normal     210000
1457      5   2010        WD         Normal     266500
1458      4   2010        WD         Normal     142125
1459      6   2008        WD         Normal     147500

[1460 rows x 81 columns]
```

Variables Terminal



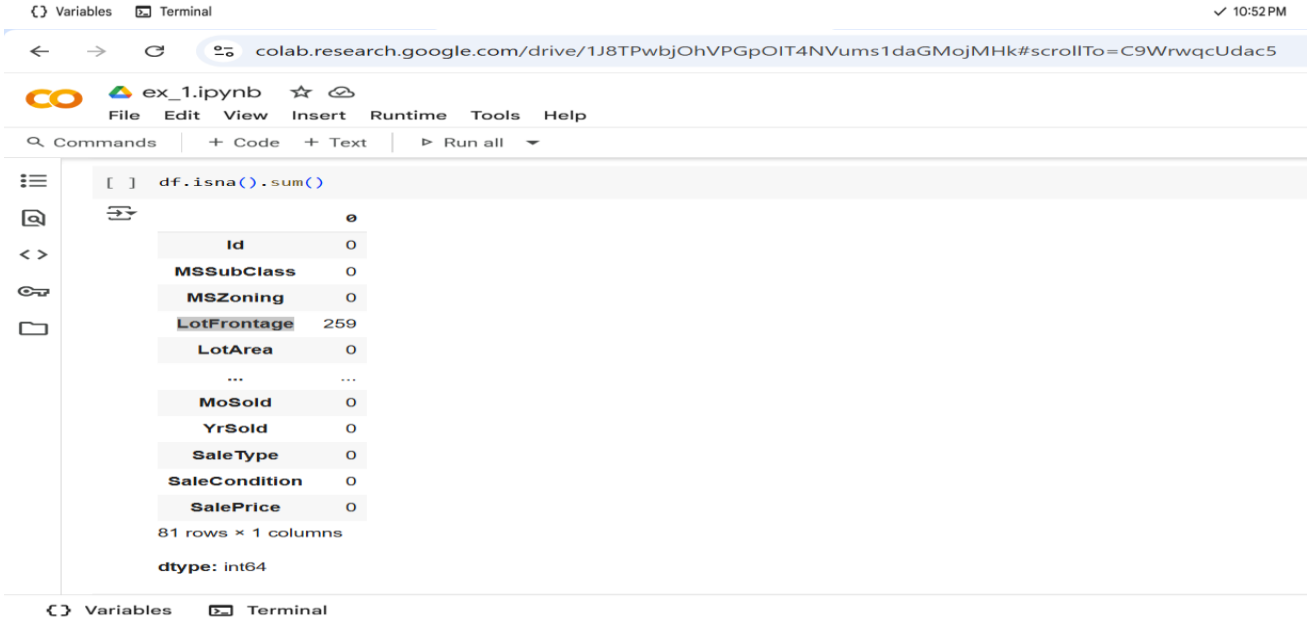
	Id	MSSubClass	MSZoning	LotFrontage	LotArea	Street	Alley	LotShape	LandContour	Utilities	...	PoolArea	PoolQC	Fence	MiscFeature	MiscVal	MoSold	YrSold
0	False	False	False	False	False	False	True	False	False	False	...	False	True	True	True	False	False	False
1	False	False	False	False	False	False	True	False	False	False	...	False	True	True	True	False	False	False
2	False	False	False	False	False	False	True	False	False	False	...	False	True	True	True	False	False	False
3	False	False	False	False	False	False	True	False	False	False	...	False	True	True	True	False	False	False
4	False	False	False	False	False	False	True	False	False	False	...	False	True	True	True	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1455	False	False	False	False	False	False	True	False	False	False	...	False	True	True	True	False	False	False
1456	False	False	False	False	False	False	True	False	False	False	...	False	True	False	True	False	False	False
1457	False	False	False	False	False	False	True	False	False	False	...	False	True	False	False	False	False	False
1458	False	False	False	False	False	False	True	False	False	False	...	False	True	True	True	False	False	False
1459	False	False	False	False	False	False	True	False	False	False	...	False	True	True	True	False	False	False

1460 rows × 81 columns



	Id	MSSubClass	MSZoning	LotFrontage	LotArea	Street	Alley	LotShape	LandContour	Utilities	...	PoolArea	PoolQC	Fence	MiscFeature	MiscVal	MoSold	YrSold
0	True	True	True	True	True	True	False	True	True	True	...	True	False	False	False	True	True	True
1	True	True	True	True	True	True	False	True	True	True	...	True	False	False	False	True	True	True
2	True	True	True	True	True	True	False	True	True	True	...	True	False	False	False	True	True	True
3	True	True	True	True	True	True	False	True	True	True	...	True	False	False	False	True	True	True
4	True	True	True	True	True	True	False	True	True	True	...	True	False	False	False	True	True	True
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1455	True	True	True	True	True	True	False	True	True	True	...	True	False	False	False	True	True	True
1456	True	True	True	True	True	True	False	True	True	True	...	True	False	True	False	True	True	True
1457	True	True	True	True	True	True	False	True	True	True	...	True	False	True	True	True	True	True
1458	True	True	True	True	True	True	False	True	True	True	...	True	False	False	False	True	True	True
1459	True	True	True	True	True	True	False	True	True	True	...	True	False	False	False	True	True	True

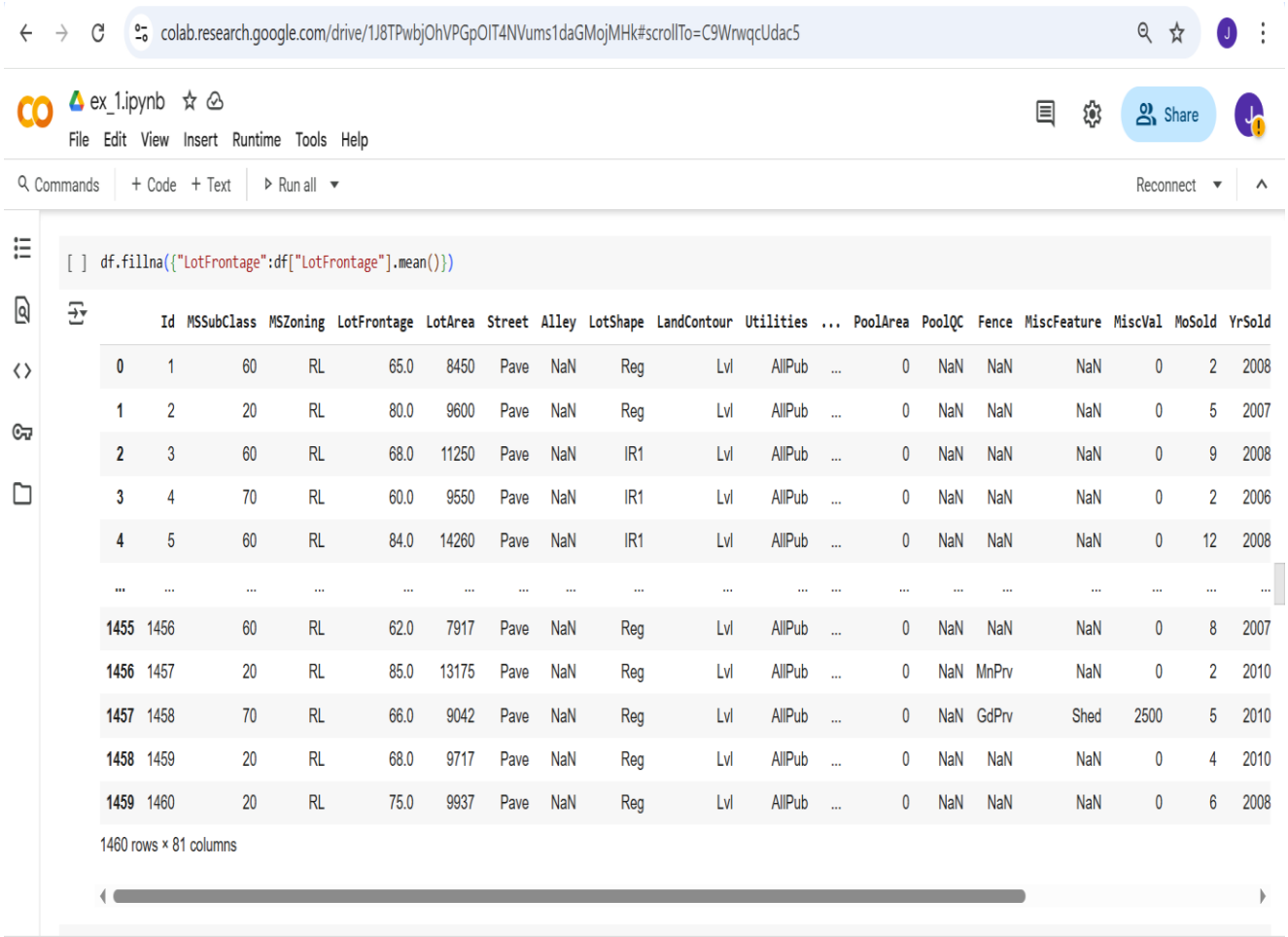
1460 rows × 81 columns



	0
Id	0
MSSubClass	0
MSZoning	0
LotFrontage	259
LotArea	0
...	...
MoSold	0
YrSold	0
SaleType	0
SaleCondition	0
SalePrice	0

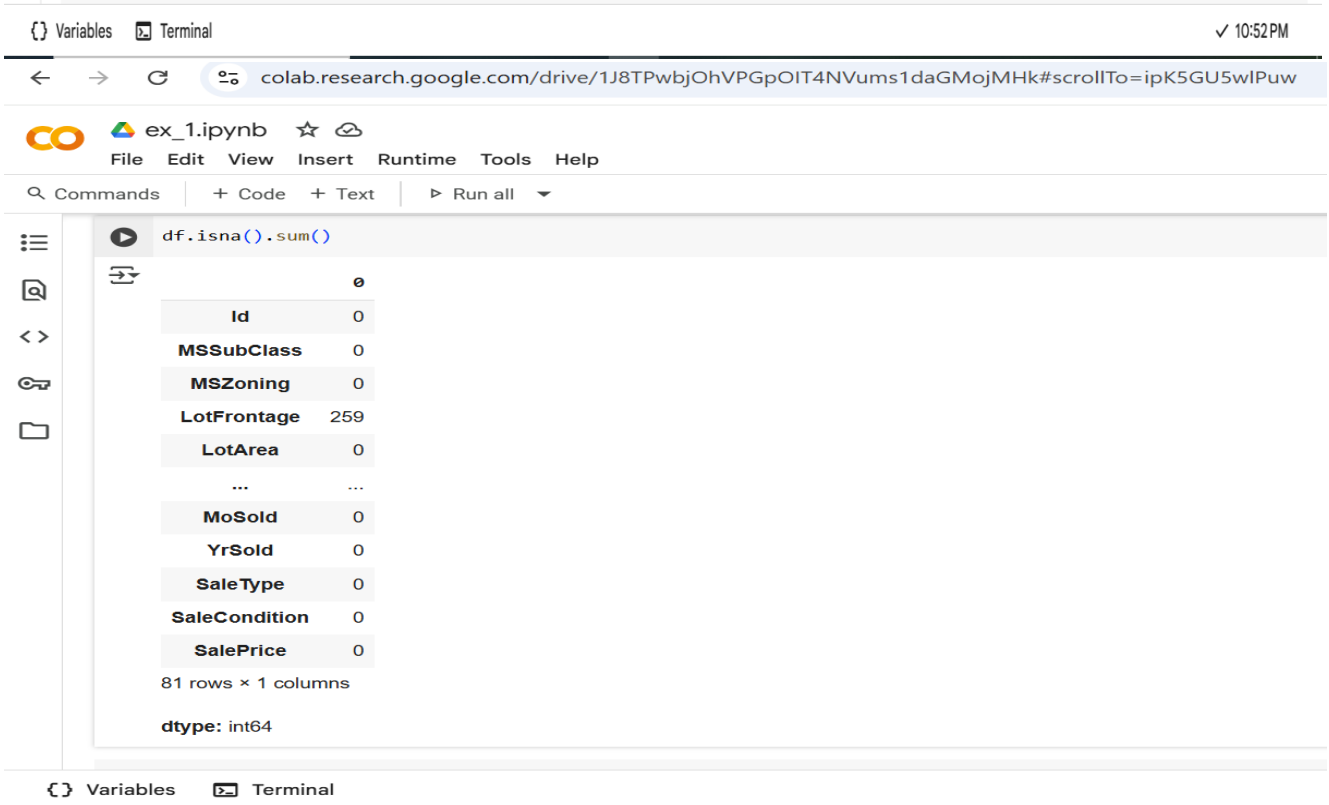
81 rows × 1 columns

dtype: int64



	Id	MSSubClass	MSZoning	LotFrontage	LotArea	Street	Alley	LotShape	LandContour	Utilities	...	PoolArea	PoolQC	Fence	MiscFeature	MiscVal	MoSold	YrSold
0	1	60	RL	65.0	8450	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	2	2008
1	2	20	RL	80.0	9600	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	5	2007
2	3	60	RL	68.0	11250	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	9	2008
3	4	70	RL	60.0	9550	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	2	2006
4	5	60	RL	84.0	14260	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	12	2008
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1455	1456	60	RL	62.0	7917	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	8	2007
1456	1457	20	RL	85.0	13175	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	MnPrv	NaN	0	2	2010
1457	1458	70	RL	66.0	9042	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	GdPrv	Shed	2500	5	2010
1458	1459	20	RL	68.0	9717	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	4	2010
1459	1460	20	RL	75.0	9937	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	6	2008

1460 rows × 81 columns



	0
Id	0
MSSubClass	0
MSZoning	0
LotFrontage	259
LotArea	0
...	...
MoSold	0
YrSold	0
SaleType	0
SaleCondition	0
SalePrice	0

81 rows × 1 columns

dtype: int64

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```
[ ] df.fillna({"MoSold":df["MoSold"].median()})
```

	Id	MSSubClass	MSZoning	LotFrontage	LotArea	Street	Alley	LotShape	LandContour	Utilities	...	PoolArea	PoolQC	Fence	MiscFeature	MiscVal	MoSold	YrSold
0	1	60	RL	65.0	8450	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	2	2008
1	2	20	RL	80.0	9600	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	5	2007
2	3	60	RL	68.0	11250	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	9	2008
3	4	70	RL	60.0	9550	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	2	2006
4	5	60	RL	84.0	14260	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	12	2008
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1455	1456	60	RL	62.0	7917	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	8	2007
1456	1457	20	RL	85.0	13175	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	MnPrv	NaN	0	2	2010
1457	1458	70	RL	66.0	9042	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	GdPrv	Shed	2500	5	2010
1458	1459	20	RL	68.0	9717	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	4	2010
1459	1460	20	RL	75.0	9937	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	6	2008

1460 rows × 81 columns

Variables Terminal 10:52 PM

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```
[ ] df['MoSold']=df['MoSold'].fillna(df['MoSold'].mean())
```

Double-click (or enter) to edit

```
[ ] df.isna().sum()
```

	0
Id	0
MSSubClass	0
MSZoning	0
LotFrontage	259
LotArea	0
...	...
MoSold	0
YrSold	0
SaleType	0
SaleCondition	0
SalePrice	0

Variables Terminal

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ex_1.ipynb

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81 rows × 1 columns

dtype: int64

Double-click (or enter) to edit

```
[ ] df.fillna({"LotFrontage":df["LotFrontage"].mean()},inplace=True)
```

```
[ ] df.isna().sum()
```

	0
Id	0
MSSubClass	0
MSZoning	0
LotFrontage	0
LotArea	0
...	...
MoSold	0
YrSold	0

Variables Terminal

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```
[ ] df.isna()
    df.notna()
    df.fillna({"LotFrontage":df["LotFrontage"].mean()},inplace=True)
    df.fillna({"MoSold":df["MoSold"].median()},inplace=True)
    df.fillna(method='bfill',inplace=True)
    df.replace('NaN','completed',inplace=True)
    df.interpolate()
```

```
/tmp/ipython-input-17-33252615.py:5: FutureWarning: DataFrame.fillna with 'method' is deprecated and will raise in a future version. Use obj.ffill() or obj.bfill() instead.
  df.fillna(method='bfill',inplace=True)
/tmp/ipython-input-17-33252615.py:7: FutureWarning: DataFrame.interpolate with object dtype is deprecated and will raise in a future version. Call obj.infer_objects(copy=False) before interpolating instead.
  df.interpolate()
```

	Id	MSSubClass	MSZoning	LotFrontage	LotArea	Street	Alley	LotShape	LandContour	Utilities	...	PoolArea	PoolQC	Fence	MiscFeature	MiscVal	MoSold	YrSold	SaleType	SaleCondition	SalePrice
0	1	60	RL	65.0	8450	Pave	Grvl	Reg	Lvl	AllPub	...	0	Ex	MnPrv	Shed	0	2	2008	WD	Normal	208500
1	2	20	RL	80.0	9600	Pave	Grvl	Reg	Lvl	AllPub	...	0	Ex	MnPrv	Shed	0	5	2007	WD	Normal	181500
2	3	60	RL	68.0	11250	Pave	Grvl	IR1	Lvl	AllPub	...	0	Ex	MnPrv	Shed	0	9	2008	WD	Normal	223500
3	4	70	RL	60.0	9550	Pave	Grvl	IR1	Lvl	AllPub	...	0	Ex	MnPrv	Shed	0	2	2006	WD	Abnorml	140000
4	5	60	RL	84.0	14260	Pave	Grvl	IR1	Lvl	AllPub	...	0	Ex	MnPrv	Shed	0	12	2008	WD	Normal	250000
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1455	1456	60	RL	62.0	7917	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	MnPrv	Shed	0	8	2007	WD	Normal	175000
1456	1457	20	RL	85.0	13175	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	MnPrv	Shed	0	2	2010	WD	Normal	210000
1457	1458	70	RL	66.0	9042	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	GdPrv	Shed	2500	5	2010	WD	Normal	266500
1458	1459	20	RL	68.0	9717	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	4	2010	WD	Normal	142125
1459	1460	20	RL	75.0	9937	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	6	2008	WD	Normal	147500

1460 rows × 81 columns

Variables Terminal ✓ 10:52PM

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ex_1.ipynb

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```
[ ] df.isna().sum()
```

	0
Id	0
MSSubClass	0
MSZoning	0
LotFrontage	0
LotArea	0
...	...
MoSold	0
YrSold	0
SaleType	0
SaleCondition	0
SalePrice	0

81 rows × 1 columns

dtype: int64

Variables Terminal

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ex_1.ipynb

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```
df.to_csv('train.csv')
```

```
[ ] from google.colab import files
    files.download('train.csv')
```

Variables Terminal

colab.research.google.com/drive/1NPNSVlBXyE5Np9F0Q3dhIacztDQpG-oi

EX 2 20ITR002.ipynb

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```
import numpy as np
x=np.array([20,28,3,17])
y=np.array([26,47,5,24])
xm=np.mean(x)
ym=np.mean(y)
print(xm,ym)
covxy=np.cov(x,y)
print(covxy)
w,v=np.linalg.eig(covxy)
print(w)
print(v)
vt=v.transpose()
print(vt)
e1,e2=np.hsplit(vt,2)
print(e1)
print(e2)
x=x-xm
y=y-ym
data=np.stack((x.T,y.T),axis=0)
print(data)
p1=e1*data
print(p1)
p2=e2*data
print(p2)
import matplotlib.pyplot as np
np.scatter(p1,p2)
np.show()
```

Variables Terminal

colab.research.google.com/drive/1NPNSVlBXyE5Np9F0Q3dhIacztDQpG-oi

EX 2 20ITR002.ipynb

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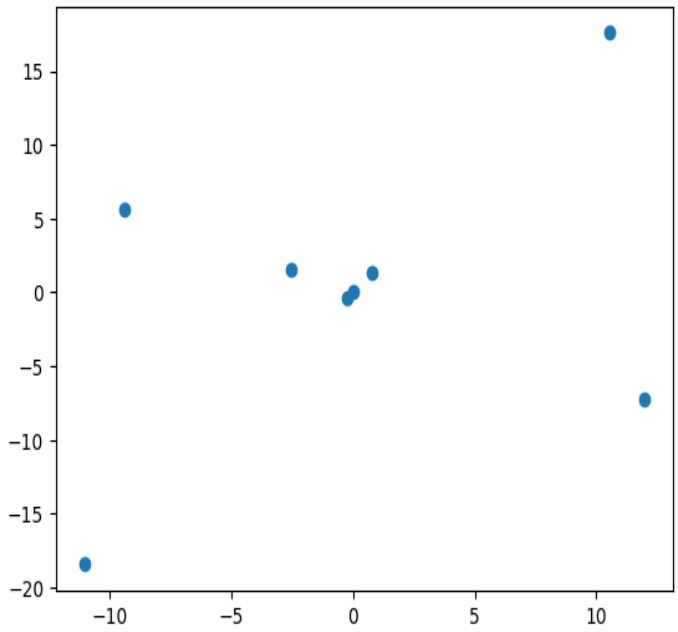
```
17.0 25.5
[[108.66666667 175.        ]
 [175.         295.        ]]
[  3.57837683 400.08828984]
[[-0.85730205 -0.51481375]
 [ 0.51481375 -0.85730205]]
[[-0.85730205  0.51481375]
 [-0.51481375 -0.85730205]]
[[-0.85730205]
 [-0.51481375]]
[[ 0.51481375]
 [-0.85730205]]
[[  3.   11.  -14.    0. ]
 [  0.5  21.5 -20.5  -1.5]]
[[ -2.57190615  -9.43032254  12.00222869  -0.        ]
 [ -0.25740687 -11.06849562  10.55368187   0.77222062]]
[[  1.54444125   5.66295125  -7.2073925    0.        ]
 [ -0.42865102 -18.43199405  17.574692     1.28595307]]
```



Variables Terminal