Project Work

predict the price of house on the basis of its features

load libraries and modules

```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

load dataset

```python
data_set1=pd.read_csv(r"train.csv")
data_set2=pd.read_csv(r"test.csv")
print("shape of dataset1:",data_set1.shape)
print("Shape of dataset2:",data_set2.shape)

shape of dataset1: (1460, 81)
Shape of dataset2: (1459, 80)

pd.set_option("display.max_columns",None)

pd.set_option("display.max_columns",None)
```

know your data

```
data_set1.head()
    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


  LandContour Utilities LotConfig LandSlope Neighborhood Condition1  \
0         Lvl    AllPub    Inside       Gtl      CollgCr       Norm
1         Lvl    AllPub       FR2       Gtl      Veenker      Feedr
2         Lvl    AllPub    Inside       Gtl      CollgCr       Norm
3         Lvl    AllPub    Corner       Gtl      Crawfor       Norm
4         Lvl    AllPub       FR2       Gtl      NoRidge       Norm

  Condition2 BldgType HouseStyle  OverallQual  OverallCond  YearBuilt
```

```
                                                                          \
0         Norm   1Fam    2Story          7          5      2003

1         Norm   1Fam    1Story          6          8      1976

2         Norm   1Fam    2Story          7          5      2001

3         Norm   1Fam    2Story          7          5      1915

4         Norm   1Fam    2Story          8          5      2000


   YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  \
0          2003     Gable  CompShg     VinylSd     VinylSd    BrkFace

1          1976     Gable  CompShg     MetalSd     MetalSd        NaN

2          2002     Gable  CompShg     VinylSd     VinylSd    BrkFace

3          1970     Gable  CompShg     Wd Sdng     Wd Shng        NaN

4          2000     Gable  CompShg     VinylSd     VinylSd    BrkFace


   MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond BsmtExposure  \
0       196.0        Gd        TA      PConc       Gd       TA           No
1         0.0        TA        TA     CBlock       Gd       TA           Gd
2       162.0        Gd        TA      PConc       Gd       TA           Mn
3         0.0        TA        TA     BrkTil       TA       Gd           No
4       350.0        Gd        TA      PConc       Gd       TA           Av


   BsmtFinType1  BsmtFinSF1 BsmtFinType2  BsmtFinSF2  BsmtUnfSF TotalBsmtSF  \
0          GLQ         706          Unf           0        150         856
1          ALQ         978          Unf           0        284        1262
2          GLQ         486          Unf           0        434         920
3          ALQ         216          Unf           0        540         756
4          GLQ         655          Unf           0        490        1145
```

```
   Heating HeatingQC CentralAir Electrical  1stFlrSF  2ndFlrSF  \
LowQualFinSF
0    GasA        Ex          Y       SBrkr       856       854
0
1    GasA        Ex          Y       SBrkr      1262         0
0
2    GasA        Ex          Y       SBrkr       920       866
0
3    GasA        Gd          Y       SBrkr       961       756
0
4    GasA        Ex          Y       SBrkr      1145      1053
0

   GrLivArea  BsmtFullBath  BsmtHalfBath  FullBath  HalfBath  \
BedroomAbvGr
0       1710             1             0         2         1
3
1       1262             0             1         2         0
3
2       1786             1             0         2         1
3
3       1717             1             0         1         0
3
4       2198             1             0         2         1
4

   KitchenAbvGr KitchenQual  TotRmsAbvGrd Functional  Fireplaces  \
FireplaceQu
0             1          Gd             8        Typ           0
NaN
1             1          TA             6        Typ           1
TA
2             1          Gd             6        Typ           1
TA
3             1          Gd             7        Typ           1
Gd
4             1          Gd             9        Typ           1
TA

   GarageType  GarageYrBlt GarageFinish  GarageCars  GarageArea  \
GarageQual
0     Attchd       2003.0          RFn           2         548
TA
1     Attchd       1976.0          RFn           2         460
TA
2     Attchd       2001.0          RFn           2         608
TA
3     Detchd       1998.0          Unf           3         642
TA
4     Attchd       2000.0          RFn           3         836
```

TA

```
  GarageCond PavedDrive  WoodDeckSF  OpenPorchSF  EnclosedPorch
3SsnPorch  \
0         TA          Y           0           61              0
0
1         TA          Y         298            0              0
0
2         TA          Y           0           42              0
0
3         TA          Y           0           35            272
0
4         TA          Y         192           84              0
0
```

```
    ScreenPorch  PoolArea PoolQC Fence MiscFeature  MiscVal  MoSold
YrSold  \
0             0         0    NaN   NaN         NaN        0       2
2008
1             0         0    NaN   NaN         NaN        0       5
2007
2             0         0    NaN   NaN         NaN        0       9
2008
3             0         0    NaN   NaN         NaN        0       2
2006
4             0         0    NaN   NaN         NaN        0      12
2008
```

```
  SaleType SaleCondition  SalePrice
0       WD        Normal     208500
1       WD        Normal     181500
2       WD        Normal     223500
3       WD       Abnorml     140000
4       WD        Normal     250000
```

data_set1.tail()

```
        Id  MSSubClass MSZoning  LotFrontage  LotArea Street Alley
LotShape  \
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
```

```
      LandContour Utilities LotConfig LandSlope Neighborhood Condition1 \
1455          Lvl    AllPub    Inside       Gtl      Gilbert       Norm

1456          Lvl    AllPub    Inside       Gtl       NWAmes       Norm

1457          Lvl    AllPub    Inside       Gtl      Crawfor       Norm

1458          Lvl    AllPub    Inside       Gtl        NAmes       Norm

1459          Lvl    AllPub    Inside       Gtl      Edwards       Norm


     Condition2 BldgType HouseStyle  OverallQual  OverallCond  YearBuilt  \
1455       Norm     1Fam     2Story            6            5       1999
1456       Norm     1Fam     1Story            6            6       1978
1457       Norm     1Fam     2Story            7            9       1941
1458       Norm     1Fam     1Story            5            6       1950
1459       Norm     1Fam     1Story            5            6       1965

      YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  \
1455          2000     Gable  CompShg     VinylSd     VinylSd        NaN
1456          1988     Gable  CompShg     Plywood     Plywood      Stone
1457          2006     Gable  CompShg     CemntBd     CmentBd        NaN
1458          1996       Hip  CompShg     MetalSd     MetalSd        NaN
1459          1965     Gable  CompShg     HdBoard     HdBoard        NaN

      MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  \
1455         0.0        TA        TA      PConc       Gd       TA
1456       119.0        TA        TA     CBlock       Gd       TA
1457         0.0        Ex        Gd      Stone       TA       Gd
1458         0.0        TA        TA     CBlock       TA       TA
1459         0.0        Gd        TA     CBlock       TA       TA

     BsmtExposure BsmtFinType1  BsmtFinSF1 BsmtFinType2  BsmtFinSF2  \
1455           No          Unf           0          Unf           0
1456           No          ALQ         790          Rec         163
1457           No          GLQ         275          Unf           0
```

		Mn		GLQ		49		Rec		1029
1458	Mn	GLQ	49	Rec	1029
1459	No	BLQ	830	LwQ	290

	BsmtUnfSF	TotalBsmtSF	Heating	HeatingQC	CentralAir	Electrical \
1455	953	953	GasA	Ex	Y	SBrkr
1456	589	1542	GasA	TA	Y	SBrkr
1457	877	1152	GasA	Ex	Y	SBrkr
1458	0	1078	GasA	Gd	Y	FuseA
1459	136	1256	GasA	Gd	Y	SBrkr

	1stFlrSF	2ndFlrSF	LowQualFinSF	GrLivArea	BsmtFullBath	BsmtHalfBath \
1455	953	694	0	1647	0	0
1456	2073	0	0	2073	1	0
1457	1188	1152	0	2340	0	0
1458	1078	0	0	1078	1	0
1459	1256	0	0	1256	1	0

	FullBath	HalfBath	BedroomAbvGr	KitchenAbvGr	KitchenQual \
1455	2	1	3	1	TA
1456	2	0	3	1	TA
1457	2	0	4	1	Gd
1458	1	0	2	1	Gd
1459	1	1	3	1	TA

	TotRmsAbvGrd	Functional	Fireplaces	FireplaceQu	GarageType	GarageYrBlt \
1455	7	Typ	1	TA	Attchd	1999.0
1456	7	Min1	2	TA	Attchd	1978.0
1457	9	Typ	2	Gd	Attchd	1941.0
1458	5	Typ	0	NaN	Attchd	1950.0
1459	6	Typ	0	NaN	Attchd	1965.0

| | GarageFinish | GarageCars | GarageArea | GarageQual | GarageCond |

```
        PavedDrive  \
1455            RFn          2          460           TA           TA
Y
1456            Unf          2          500           TA           TA
Y
1457            RFn          1          252           TA           TA
Y
1458            Unf          1          240           TA           TA
Y
1459            Fin          1          276           TA           TA
Y

      WoodDeckSF  OpenPorchSF  EnclosedPorch  3SsnPorch
ScreenPorch  \
1455             0           40              0          0            0

1456           349            0              0          0            0

1457             0           60              0          0            0

1458           366            0            112          0            0

1459           736           68              0          0            0


      PoolArea PoolQC  Fence MiscFeature  MiscVal  MoSold  YrSold
SaleType  \
1455         0    NaN    NaN         NaN        0       8    2007
WD
1456         0    NaN  MnPrv         NaN        0       2    2010
WD
1457         0    NaN  GdPrv        Shed     2500       5    2010
WD
1458         0    NaN    NaN         NaN        0       4    2010
WD
1459         0    NaN    NaN         NaN        0       6    2008
WD

     SaleCondition  SalePrice
1455         Normal     175000
1456         Normal     210000
1457         Normal     266500
1458         Normal     142125
1459         Normal     147500

data_set2.head()

     Id  MSSubClass MSZoning  LotFrontage  LotArea Street Alley
LotShape  \
0  1461          20       RH         80.0    11622   Pave   NaN
```

```
   Reg
1  1462          20       RL        81.0    14267    Pave    NaN
IR1
2  1463          60       RL        74.0    13830    Pave    NaN
IR1
3  1464          60       RL        78.0     9978    Pave    NaN
IR1
4  1465         120       RL        43.0     5005    Pave    NaN
IR1

  LandContour Utilities LotConfig LandSlope Neighborhood Condition1  \
0         Lvl     AllPub    Inside       Gtl        NAmes     Feedr
1         Lvl     AllPub    Corner       Gtl        NAmes      Norm
2         Lvl     AllPub    Inside       Gtl      Gilbert      Norm
3         Lvl     AllPub    Inside       Gtl      Gilbert      Norm
4         HLS     AllPub    Inside       Gtl      StoneBr      Norm

  Condition2 BldgType HouseStyle  OverallQual  OverallCond  YearBuilt  \
0       Norm     1Fam     1Story            5            6       1961

1       Norm     1Fam     1Story            6            6       1958

2       Norm     1Fam     2Story            5            5       1997

3       Norm     1Fam     2Story            6            6       1998

4       Norm    TwnhsE     1Story            8            5       1992

   YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  \
0          1961     Gable  CompShg     VinylSd     VinylSd        NaN

1          1958       Hip  CompShg     Wd Sdng     Wd Sdng    BrkFace

2          1998     Gable  CompShg     VinylSd     VinylSd        NaN

3          1998     Gable  CompShg     VinylSd     VinylSd    BrkFace

4          1992     Gable  CompShg     HdBoard     HdBoard        NaN

   MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond
BsmtExposure  \
0         0.0        TA        TA     CBlock       TA       TA
No
1       108.0        TA        TA     CBlock       TA       TA
No
2         0.0        TA        TA      PConc       Gd       TA
No
```

```
3        20.0          TA          TA       PConc          TA          TA
No
4         0.0          Gd          TA       PConc          Gd          TA
No

  BsmtFinType1  BsmtFinSF1 BsmtFinType2  BsmtFinSF2  BsmtUnfSF
TotalBsmtSF  \
0          Rec       468.0          LwQ       144.0       270.0
882.0
1          ALQ       923.0          Unf         0.0       406.0
1329.0
2          GLQ       791.0          Unf         0.0       137.0
928.0
3          GLQ       602.0          Unf         0.0       324.0
926.0
4          ALQ       263.0          Unf         0.0      1017.0
1280.0

  Heating HeatingQC CentralAir Electrical  1stFlrSF  2ndFlrSF
LowQualFinSF  \
0    GasA        TA          Y      SBrkr       896         0
0
1    GasA        TA          Y      SBrkr      1329         0
0
2    GasA        Gd          Y      SBrkr       928       701
0
3    GasA        Ex          Y      SBrkr       926       678
0
4    GasA        Ex          Y      SBrkr      1280         0
0

   GrLivArea  BsmtFullBath  BsmtHalfBath  FullBath  HalfBath
BedroomAbvGr  \
0        896           0.0           0.0         1         0
2
1       1329           0.0           0.0         1         1
3
2       1629           0.0           0.0         2         1
3
3       1604           0.0           0.0         2         1
3
4       1280           0.0           0.0         2         0
2

   KitchenAbvGr KitchenQual  TotRmsAbvGrd Functional  Fireplaces
FireplaceQu  \
0             1          TA             5        Typ           0
NaN
1             1          Gd             6        Typ           0
NaN
```

```
2              1         TA          6        Typ          1
TA
3              1         Gd          7        Typ          1
Gd
4              1         Gd          5        Typ          0
NaN

  GarageType  GarageYrBlt GarageFinish  GarageCars  GarageArea
GarageQual  \
0      Attchd       1961.0          Unf         1.0       730.0
TA
1      Attchd       1958.0          Unf         1.0       312.0
TA
2      Attchd       1997.0          Fin         2.0       482.0
TA
3      Attchd       1998.0          Fin         2.0       470.0
TA
4      Attchd       1992.0          RFn         2.0       506.0
TA

  GarageCond PavedDrive  WoodDeckSF  OpenPorchSF  EnclosedPorch
3SsnPorch  \
0         TA          Y         140            0              0
0
1         TA          Y         393           36              0
0
2         TA          Y         212           34              0
0
3         TA          Y         360           36              0
0
4         TA          Y           0           82              0
0

   ScreenPorch  PoolArea PoolQC  Fence MiscFeature  MiscVal  MoSold
YrSold  \
0          120         0    NaN  MnPrv         NaN        0       6
2010
1            0         0    NaN    NaN        Gar2    12500       6
2010
2            0         0    NaN  MnPrv         NaN        0       3
2010
3            0         0    NaN    NaN         NaN        0       6
2010
4          144         0    NaN    NaN         NaN        0       1
2010

  SaleType SaleCondition
0       WD        Normal
1       WD        Normal
2       WD        Normal
```

```
3        WD       Normal
4        WD       Normal
```

data_set2.tail()

```
        Id   MSSubClass MSZoning   LotFrontage   LotArea Street Alley
LotShape  \
1454   2915          160       RM          21.0      1936   Pave   NaN
Reg
1455   2916          160       RM          21.0      1894   Pave   NaN
Reg
1456   2917           20       RL         160.0     20000   Pave   NaN
Reg
1457   2918           85       RL          62.0     10441   Pave   NaN
Reg
1458   2919           60       RL          74.0      9627   Pave   NaN
Reg

     LandContour Utilities LotConfig LandSlope Neighborhood Condition1
\
1454         Lvl    AllPub    Inside       Gtl      MeadowV        Norm

1455         Lvl    AllPub    Inside       Gtl      MeadowV        Norm

1456         Lvl    AllPub    Inside       Gtl      Mitchel        Norm

1457         Lvl    AllPub    Inside       Gtl      Mitchel        Norm

1458         Lvl    AllPub    Inside       Mod      Mitchel        Norm


     Condition2 BldgType HouseStyle  OverallQual  OverallCond
YearBuilt  \
1454       Norm    Twnhs     2Story            4            7
1970
1455       Norm   TwnhsE     2Story            4            5
1970
1456       Norm     1Fam     1Story            5            7
1960
1457       Norm     1Fam      SFoyer           5            5
1992
1458       Norm     1Fam     2Story            7            5
1993

     YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd
MasVnrType  \
1454          1970     Gable  CompShg     CemntBd     CmentBd
NaN
1455          1970     Gable  CompShg     CemntBd     CmentBd
NaN
```

```
1456          1996       Gable   CompShg      VinylSd      VinylSd
NaN
1457          1992       Gable   CompShg      HdBoard      Wd Shng
NaN
1458          1994       Gable   CompShg      HdBoard      HdBoard
BrkFace

      MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  \
1454         0.0        TA        TA     CBlock       TA       TA
1455         0.0        TA        TA     CBlock       TA       TA
1456         0.0        TA        TA     CBlock       TA       TA
1457         0.0        TA        TA      PConc       Gd       TA
1458        94.0        TA        TA      PConc       Gd       TA

      BsmtExposure BsmtFinType1   BsmtFinSF1 BsmtFinType2   BsmtFinSF2  \
1454            No          Unf          0.0          Unf          0.0
1455            No          Rec        252.0          Unf          0.0
1456            No          ALQ       1224.0          Unf          0.0
1457            Av          GLQ        337.0          Unf          0.0
1458            Av          LwQ        758.0          Unf          0.0

      BsmtUnfSF  TotalBsmtSF Heating HeatingQC CentralAir
Electrical  \
1454      546.0        546.0    GasA        Gd          Y       SBrkr

1455      294.0        546.0    GasA        TA          Y       SBrkr

1456        0.0       1224.0    GasA        Ex          Y       SBrkr

1457      575.0        912.0    GasA        TA          Y       SBrkr

1458      238.0        996.0    GasA        Ex          Y       SBrkr


      1stFlrSF  2ndFlrSF  LowQualFinSF  GrLivArea  BsmtFullBath
BsmtHalfBath  \
1454       546       546             0       1092           0.0
0.0
1455       546       546             0       1092           0.0
0.0
1456      1224         0             0       1224           1.0
0.0
1457       970         0             0        970           0.0
1.0
1458       996      1004             0       2000           0.0
0.0

      FullBath  HalfBath  BedroomAbvGr  KitchenAbvGr KitchenQual  \
1454         1         1             3             1          TA
1455         1         1             3             1          TA
```

```
      1456              1         0         4         1        TA
      1457              1         0         3         1        TA
      1458              2         1         3         1        TA

          TotRmsAbvGrd  Functional  Fireplaces  FireplaceQu  GarageType
GarageYrBlt  \
1454               5       Typ           0         NaN         NaN
NaN
1455               6       Typ           0         NaN      CarPort
1970.0
1456               7       Typ           1          TA       Detchd
1960.0
1457               6       Typ           0         NaN         NaN
NaN
1458               9       Typ           1          TA       Attchd
1993.0

          GarageFinish  GarageCars  GarageArea  GarageQual  GarageCond
PavedDrive  \
1454             NaN        0.0         0.0         NaN         NaN
Y
1455             Unf        1.0       286.0          TA          TA
Y
1456             Unf        2.0       576.0          TA          TA
Y
1457             NaN        0.0         0.0         NaN         NaN
Y
1458             Fin        3.0       650.0          TA          TA
Y

          WoodDeckSF  OpenPorchSF  EnclosedPorch  3SsnPorch
ScreenPorch  \
1454             0           0              0          0
0
1455             0          24              0          0
0
1456           474           0              0          0
0
1457            80          32              0          0
0
1458           190          48              0          0
0

          PoolArea  PoolQC  Fence  MiscFeature  MiscVal  MoSold  YrSold
SaleType  \
1454           0     NaN    NaN         NaN         0       6     2006
WD
1455           0     NaN    NaN         NaN         0       4     2006
WD
1456           0     NaN    NaN         NaN         0       9     2006
```

```
WD
1457              0   NaN  MnPrv        Shed      700       7   2006
WD
1458              0   NaN   NaN          NaN        0      11   2006
WD

      SaleCondition
1454         Normal
1455         Abnorml
1456         Abnorml
1457          Normal
1458          Normal

data_set1.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1460 entries, 0 to 1459
Data columns (total 81 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Id             1460 non-null   int64
 1   MSSubClass     1460 non-null   int64
 2   MSZoning       1460 non-null   object
 3   LotFrontage    1201 non-null   float64
 4   LotArea        1460 non-null   int64
 5   Street         1460 non-null   object
 6   Alley          91 non-null     object
 7   LotShape       1460 non-null   object
 8   LandContour    1460 non-null   object
 9   Utilities      1460 non-null   object
 10  LotConfig      1460 non-null   object
 11  LandSlope      1460 non-null   object
 12  Neighborhood   1460 non-null   object
 13  Condition1     1460 non-null   object
 14  Condition2     1460 non-null   object
 15  BldgType       1460 non-null   object
 16  HouseStyle     1460 non-null   object
 17  OverallQual    1460 non-null   int64
 18  OverallCond    1460 non-null   int64
 19  YearBuilt      1460 non-null   int64
 20  YearRemodAdd   1460 non-null   int64
 21  RoofStyle      1460 non-null   object
 22  RoofMatl       1460 non-null   object
 23  Exterior1st    1460 non-null   object
 24  Exterior2nd    1460 non-null   object
 25  MasVnrType     588 non-null    object
 26  MasVnrArea     1452 non-null   float64
 27  ExterQual      1460 non-null   object
 28  ExterCond      1460 non-null   object
 29  Foundation     1460 non-null   object
```

```
30   BsmtQual        1423 non-null    object
31   BsmtCond        1423 non-null    object
32   BsmtExposure    1422 non-null    object
33   BsmtFinType1    1423 non-null    object
34   BsmtFinSF1      1460 non-null    int64
35   BsmtFinType2    1422 non-null    object
36   BsmtFinSF2      1460 non-null    int64
37   BsmtUnfSF       1460 non-null    int64
38   TotalBsmtSF     1460 non-null    int64
39   Heating         1460 non-null    object
40   HeatingQC       1460 non-null    object
41   CentralAir      1460 non-null    object
42   Electrical      1459 non-null    object
43   1stFlrSF        1460 non-null    int64
44   2ndFlrSF        1460 non-null    int64
45   LowQualFinSF    1460 non-null    int64
46   GrLivArea       1460 non-null    int64
47   BsmtFullBath    1460 non-null    int64
48   BsmtHalfBath    1460 non-null    int64
49   FullBath        1460 non-null    int64
50   HalfBath        1460 non-null    int64
51   BedroomAbvGr    1460 non-null    int64
52   KitchenAbvGr    1460 non-null    int64
53   KitchenQual     1460 non-null    object
54   TotRmsAbvGrd    1460 non-null    int64
55   Functional      1460 non-null    object
56   Fireplaces      1460 non-null    int64
57   FireplaceQu     770 non-null     object
58   GarageType      1379 non-null    object
59   GarageYrBlt     1379 non-null    float64
60   GarageFinish    1379 non-null    object
61   GarageCars      1460 non-null    int64
62   GarageArea      1460 non-null    int64
63   GarageQual      1379 non-null    object
64   GarageCond      1379 non-null    object
65   PavedDrive      1460 non-null    object
66   WoodDeckSF      1460 non-null    int64
67   OpenPorchSF     1460 non-null    int64
68   EnclosedPorch   1460 non-null    int64
69   3SsnPorch       1460 non-null    int64
70   ScreenPorch     1460 non-null    int64
71   PoolArea        1460 non-null    int64
72   PoolQC          7 non-null       object
73   Fence           281 non-null     object
74   MiscFeature     54 non-null      object
75   MiscVal         1460 non-null    int64
76   MoSold          1460 non-null    int64
77   YrSold          1460 non-null    int64
78   SaleType        1460 non-null    object
```

```
 79   SaleCondition   1460 non-null    object
 80   SalePrice       1460 non-null    int64
dtypes: float64(3), int64(35), object(43)
memory usage: 924.0+ KB

data_set2.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1459 entries, 0 to 1458
Data columns (total 80 columns):
 #    Column          Non-Null Count   Dtype
---   ------          --------------   -----
 0    Id              1459 non-null    int64
 1    MSSubClass      1459 non-null    int64
 2    MSZoning        1455 non-null    object
 3    LotFrontage     1232 non-null    float64
 4    LotArea         1459 non-null    int64
 5    Street          1459 non-null    object
 6    Alley           107 non-null     object
 7    LotShape        1459 non-null    object
 8    LandContour     1459 non-null    object
 9    Utilities       1457 non-null    object
 10   LotConfig       1459 non-null    object
 11   LandSlope       1459 non-null    object
 12   Neighborhood    1459 non-null    object
 13   Condition1      1459 non-null    object
 14   Condition2      1459 non-null    object
 15   BldgType        1459 non-null    object
 16   HouseStyle      1459 non-null    object
 17   OverallQual     1459 non-null    int64
 18   OverallCond     1459 non-null    int64
 19   YearBuilt       1459 non-null    int64
 20   YearRemodAdd    1459 non-null    int64
 21   RoofStyle       1459 non-null    object
 22   RoofMatl        1459 non-null    object
 23   Exterior1st     1458 non-null    object
 24   Exterior2nd     1458 non-null    object
 25   MasVnrType      565 non-null     object
 26   MasVnrArea      1444 non-null    float64
 27   ExterQual       1459 non-null    object
 28   ExterCond       1459 non-null    object
 29   Foundation      1459 non-null    object
 30   BsmtQual        1415 non-null    object
 31   BsmtCond        1414 non-null    object
 32   BsmtExposure    1415 non-null    object
 33   BsmtFinType1    1417 non-null    object
 34   BsmtFinSF1      1458 non-null    float64
 35   BsmtFinType2    1417 non-null    object
 36   BsmtFinSF2      1458 non-null    float64
 37   BsmtUnfSF       1458 non-null    float64
```

```
 38   TotalBsmtSF     1458 non-null    float64
 39   Heating         1459 non-null    object
 40   HeatingQC       1459 non-null    object
 41   CentralAir      1459 non-null    object
 42   Electrical      1459 non-null    object
 43   1stFlrSF        1459 non-null    int64
 44   2ndFlrSF        1459 non-null    int64
 45   LowQualFinSF    1459 non-null    int64
 46   GrLivArea       1459 non-null    int64
 47   BsmtFullBath    1457 non-null    float64
 48   BsmtHalfBath    1457 non-null    float64
 49   FullBath        1459 non-null    int64
 50   HalfBath        1459 non-null    int64
 51   BedroomAbvGr    1459 non-null    int64
 52   KitchenAbvGr    1459 non-null    int64
 53   KitchenQual     1458 non-null    object
 54   TotRmsAbvGrd    1459 non-null    int64
 55   Functional      1457 non-null    object
 56   Fireplaces      1459 non-null    int64
 57   FireplaceQu     729 non-null     object
 58   GarageType      1383 non-null    object
 59   GarageYrBlt     1381 non-null    float64
 60   GarageFinish    1381 non-null    object
 61   GarageCars      1458 non-null    float64
 62   GarageArea      1458 non-null    float64
 63   GarageQual      1381 non-null    object
 64   GarageCond      1381 non-null    object
 65   PavedDrive      1459 non-null    object
 66   WoodDeckSF      1459 non-null    int64
 67   OpenPorchSF     1459 non-null    int64
 68   EnclosedPorch   1459 non-null    int64
 69   3SsnPorch       1459 non-null    int64
 70   ScreenPorch     1459 non-null    int64
 71   PoolArea        1459 non-null    int64
 72   PoolQC          3 non-null       object
 73   Fence           290 non-null     object
 74   MiscFeature     51 non-null      object
 75   MiscVal         1459 non-null    int64
 76   MoSold          1459 non-null    int64
 77   YrSold          1459 non-null    int64
 78   SaleType        1458 non-null    object
 79   SaleCondition   1459 non-null    object
dtypes: float64(11), int64(26), object(43)
memory usage: 912.0+ KB
```

data integration

```
df=pd.concat([data_set1,data_set2])
```

```
df.head()

    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


  LandContour Utilities LotConfig LandSlope Neighborhood Condition1  \
0         Lvl    AllPub    Inside       Gtl      CollgCr       Norm
1         Lvl    AllPub       FR2       Gtl      Veenker      Feedr
2         Lvl    AllPub    Inside       Gtl      CollgCr       Norm
3         Lvl    AllPub    Corner       Gtl      Crawfor       Norm
4         Lvl    AllPub       FR2       Gtl      NoRidge       Norm

  Condition2 BldgType HouseStyle  OverallQual  OverallCond  YearBuilt
\
0       Norm     1Fam     2Story            7            5       2003

1       Norm     1Fam     1Story            6            8       1976

2       Norm     1Fam     2Story            7            5       2001

3       Norm     1Fam     2Story            7            5       1915

4       Norm     1Fam     2Story            8            5       2000


   YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType
\
0          2003     Gable  CompShg     VinylSd     VinylSd    BrkFace

1          1976     Gable  CompShg     MetalSd     MetalSd        NaN

2          2002     Gable  CompShg     VinylSd     VinylSd    BrkFace

3          1970     Gable  CompShg     Wd Sdng     Wd Shng        NaN

4          2000     Gable  CompShg     VinylSd     VinylSd    BrkFace


   MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond
BsmtExposure  \
0       196.0        Gd        TA      PConc       Gd       TA
```

```
No
1          0.0            TA          TA      CBlock          Gd          TA
Gd
2        162.0            Gd          TA       PConc          Gd          TA
Mn
3          0.0            TA          TA      BrkTil          TA          Gd
No
4        350.0            Gd          TA       PConc          Gd          TA
Av

  BsmtFinType1  BsmtFinSF1 BsmtFinType2  BsmtFinSF2  BsmtUnfSF  \
TotalBsmtSF  \
0          GLQ       706.0          Unf         0.0      150.0
856.0
1          ALQ       978.0          Unf         0.0      284.0
1262.0
2          GLQ       486.0          Unf         0.0      434.0
920.0
3          ALQ       216.0          Unf         0.0      540.0
756.0
4          GLQ       655.0          Unf         0.0      490.0
1145.0

  Heating HeatingQC CentralAir Electrical  1stFlrSF  2ndFlrSF  \
LowQualFinSF  \
0    GasA        Ex          Y      SBrkr       856       854
0
1    GasA        Ex          Y      SBrkr      1262         0
0
2    GasA        Ex          Y      SBrkr       920       866
0
3    GasA        Gd          Y      SBrkr       961       756
0
4    GasA        Ex          Y      SBrkr      1145      1053
0

   GrLivArea  BsmtFullBath  BsmtHalfBath  FullBath  HalfBath  \
BedroomAbvGr  \
0       1710           1.0           0.0         2         1
3
1       1262           0.0           1.0         2         0
3
2       1786           1.0           0.0         2         1
3
3       1717           1.0           0.0         1         0
3
4       2198           1.0           0.0         2         1
4

   KitchenAbvGr KitchenQual  TotRmsAbvGrd Functional  Fireplaces
```

```
   FireplaceQu  \
0            1        Gd          8     Typ            0
NaN
1            1        TA          6     Typ            1
TA
2            1        Gd          6     Typ            1
TA
3            1        Gd          7     Typ            1
Gd
4            1        Gd          9     Typ            1
TA

  GarageType  GarageYrBlt GarageFinish  GarageCars  GarageArea
GarageQual  \
0     Attchd       2003.0          RFn         2.0       548.0
TA
1     Attchd       1976.0          RFn         2.0       460.0
TA
2     Attchd       2001.0          RFn         2.0       608.0
TA
3     Detchd       1998.0          Unf         3.0       642.0
TA
4     Attchd       2000.0          RFn         3.0       836.0
TA

  GarageCond PavedDrive  WoodDeckSF  OpenPorchSF  EnclosedPorch
3SsnPorch  \
0         TA          Y           0           61              0
0
1         TA          Y         298            0              0
0
2         TA          Y           0           42              0
0
3         TA          Y           0           35            272
0
4         TA          Y         192           84              0
0

   ScreenPorch  PoolArea PoolQC Fence MiscFeature  MiscVal  MoSold
YrSold  \
0            0         0    NaN   NaN         NaN        0       2
2008
1            0         0    NaN   NaN         NaN        0       5
2007
2            0         0    NaN   NaN         NaN        0       9
2008
3            0         0    NaN   NaN         NaN        0       2
2006
4            0         0    NaN   NaN         NaN        0      12
2008
```

```
   SaleType SaleCondition  SalePrice
0       WD        Normal   208500.0
1       WD        Normal   181500.0
2       WD        Normal   223500.0
3       WD       Abnorml   140000.0
4       WD        Normal   250000.0

df.info()

<class 'pandas.core.frame.DataFrame'>
Index: 2919 entries, 0 to 1458
Data columns (total 81 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Id             2919 non-null   int64
 1   MSSubClass     2919 non-null   int64
 2   MSZoning       2915 non-null   object
 3   LotFrontage    2433 non-null   float64
 4   LotArea        2919 non-null   int64
 5   Street         2919 non-null   object
 6   Alley           198 non-null   object
 7   LotShape       2919 non-null   object
 8   LandContour    2919 non-null   object
 9   Utilities      2917 non-null   object
 10  LotConfig      2919 non-null   object
 11  LandSlope      2919 non-null   object
 12  Neighborhood   2919 non-null   object
 13  Condition1     2919 non-null   object
 14  Condition2     2919 non-null   object
 15  BldgType       2919 non-null   object
 16  HouseStyle     2919 non-null   object
 17  OverallQual    2919 non-null   int64
 18  OverallCond    2919 non-null   int64
 19  YearBuilt      2919 non-null   int64
 20  YearRemodAdd   2919 non-null   int64
 21  RoofStyle      2919 non-null   object
 22  RoofMatl       2919 non-null   object
 23  Exterior1st    2918 non-null   object
 24  Exterior2nd    2918 non-null   object
 25  MasVnrType     1153 non-null   object
 26  MasVnrArea     2896 non-null   float64
 27  ExterQual      2919 non-null   object
 28  ExterCond      2919 non-null   object
 29  Foundation     2919 non-null   object
 30  BsmtQual       2838 non-null   object
 31  BsmtCond       2837 non-null   object
 32  BsmtExposure   2837 non-null   object
 33  BsmtFinType1   2840 non-null   object
 34  BsmtFinSF1     2918 non-null   float64
```

```
35   BsmtFinType2    2839 non-null    object
36   BsmtFinSF2      2918 non-null    float64
37   BsmtUnfSF       2918 non-null    float64
38   TotalBsmtSF     2918 non-null    float64
39   Heating         2919 non-null    object
40   HeatingQC       2919 non-null    object
41   CentralAir      2919 non-null    object
42   Electrical      2918 non-null    object
43   1stFlrSF        2919 non-null    int64
44   2ndFlrSF        2919 non-null    int64
45   LowQualFinSF    2919 non-null    int64
46   GrLivArea       2919 non-null    int64
47   BsmtFullBath    2917 non-null    float64
48   BsmtHalfBath    2917 non-null    float64
49   FullBath        2919 non-null    int64
50   HalfBath        2919 non-null    int64
51   BedroomAbvGr    2919 non-null    int64
52   KitchenAbvGr    2919 non-null    int64
53   KitchenQual     2918 non-null    object
54   TotRmsAbvGrd    2919 non-null    int64
55   Functional      2917 non-null    object
56   Fireplaces      2919 non-null    int64
57   FireplaceQu     1499 non-null    object
58   GarageType      2762 non-null    object
59   GarageYrBlt     2760 non-null    float64
60   GarageFinish    2760 non-null    object
61   GarageCars      2918 non-null    float64
62   GarageArea      2918 non-null    float64
63   GarageQual      2760 non-null    object
64   GarageCond      2760 non-null    object
65   PavedDrive      2919 non-null    object
66   WoodDeckSF      2919 non-null    int64
67   OpenPorchSF     2919 non-null    int64
68   EnclosedPorch   2919 non-null    int64
69   3SsnPorch       2919 non-null    int64
70   ScreenPorch     2919 non-null    int64
71   PoolArea        2919 non-null    int64
72   PoolQC          10 non-null      object
73   Fence           571 non-null     object
74   MiscFeature     105 non-null     object
75   MiscVal         2919 non-null    int64
76   MoSold          2919 non-null    int64
77   YrSold          2919 non-null    int64
78   SaleType        2918 non-null    object
79   SaleCondition   2919 non-null    object
80   SalePrice       1460 non-null    float64
dtypes: float64(12), int64(26), object(43)
memory usage: 1.8+ MB
```

#get the statistical information of the numerical features

```
df.describe()
```

```
                  Id    MSSubClass    LotFrontage         LotArea
OverallQual  \
count   2919.000000   2919.000000    2433.000000     2919.000000
2919.000000
mean    1460.000000     57.137718      69.305795    10168.114080
6.089072
std      842.787043     42.517628      23.344905     7886.996359
1.409947
min        1.000000     20.000000      21.000000     1300.000000
1.000000
25%      730.500000     20.000000      59.000000     7478.000000
5.000000
50%     1460.000000     50.000000      68.000000     9453.000000
6.000000
75%     2189.500000     70.000000      80.000000    11570.000000
7.000000
max     2919.000000    190.000000     313.000000   215245.000000
10.000000

        OverallCond     YearBuilt   YearRemodAdd     MasVnrArea
BsmtFinSF1  \
count   2919.000000   2919.000000    2919.000000    2896.000000
2918.000000
mean       5.564577   1971.312778    1984.264474     102.201312
441.423235
std        1.113131     30.291442      20.894344     179.334253
455.610826
min        1.000000   1872.000000    1950.000000       0.000000
0.000000
25%        5.000000   1953.500000    1965.000000       0.000000
0.000000
50%        5.000000   1973.000000    1993.000000       0.000000
368.500000
75%        6.000000   2001.000000    2004.000000     164.000000
733.000000
max        9.000000   2010.000000    2010.000000    1600.000000
5644.000000

        BsmtFinSF2     BsmtUnfSF    TotalBsmtSF       1stFlrSF       2ndFlrSF
\
count   2918.000000   2918.000000    2918.000000    2919.000000    2919.000000

mean      49.582248    560.772104    1051.777587    1159.581706     336.483727

std      169.205611    439.543659     440.766258     392.362079     428.701456
```

min	0.000000	0.000000	0.000000	334.000000	0.000000
25%	0.000000	220.000000	793.000000	876.000000	0.000000
50%	0.000000	467.000000	989.500000	1082.000000	0.000000
75%	0.000000	805.500000	1302.000000	1387.500000	704.000000
max	1526.000000	2336.000000	6110.000000	5095.000000	2065.000000

	LowQualFinSF	GrLivArea	BsmtFullBath	BsmtHalfBath	FullBath \
count	2919.000000	2919.000000	2917.000000	2917.000000	2919.000000
mean	4.694416	1500.759849	0.429894	0.061364	1.568003
std	46.396825	506.051045	0.524736	0.245687	0.552969
min	0.000000	334.000000	0.000000	0.000000	0.000000
25%	0.000000	1126.000000	0.000000	0.000000	1.000000
50%	0.000000	1444.000000	0.000000	0.000000	2.000000
75%	0.000000	1743.500000	1.000000	0.000000	2.000000
max	1064.000000	5642.000000	3.000000	2.000000	4.000000

	HalfBath	BedroomAbvGr	KitchenAbvGr	TotRmsAbvGrd	Fireplaces \
count	2919.000000	2919.000000	2919.000000	2919.000000	2919.000000
mean	0.380267	2.860226	1.044536	6.451524	0.597122
std	0.502872	0.822693	0.214462	1.569379	0.646129
min	0.000000	0.000000	0.000000	2.000000	0.000000
25%	0.000000	2.000000	1.000000	5.000000	0.000000
50%	0.000000	3.000000	1.000000	6.000000	1.000000
75%	1.000000	3.000000	1.000000	7.000000	1.000000
max	2.000000	8.000000	3.000000	15.000000	4.000000

	GarageYrBlt	GarageCars	GarageArea	WoodDeckSF	OpenPorchSF

```
\
count  2760.000000   2918.000000   2918.000000   2919.000000   2919.000000

mean   1978.113406      1.766621    472.874572     93.709832     47.486811

std      25.574285      0.761624    215.394815    126.526589     67.575493

min    1895.000000      0.000000      0.000000      0.000000      0.000000

25%    1960.000000      1.000000    320.000000      0.000000      0.000000

50%    1979.000000      2.000000    480.000000      0.000000     26.000000

75%    2002.000000      2.000000    576.000000    168.000000     70.000000

max    2207.000000      5.000000   1488.000000   1424.000000    742.000000


        EnclosedPorch    3SsnPorch   ScreenPorch      PoolArea
MiscVal  \
count     2919.000000  2919.000000   2919.000000   2919.000000
2919.000000
mean        23.098321     2.602261     16.062350      2.251799
50.825968
std         64.244246    25.188169     56.184365     35.663946
567.402211
min          0.000000     0.000000      0.000000      0.000000
0.000000
25%          0.000000     0.000000      0.000000      0.000000
0.000000
50%          0.000000     0.000000      0.000000      0.000000
0.000000
75%          0.000000     0.000000      0.000000      0.000000
0.000000
max       1012.000000   508.000000    576.000000    800.000000
17000.000000

            MoSold        YrSold      SalePrice
count   2919.000000  2919.000000    1460.000000
mean       6.213087  2007.792737  180921.195890
std        2.714762     1.314964   79442.502883
min        1.000000  2006.000000   34900.000000
25%        4.000000  2007.000000  129975.000000
50%        6.000000  2008.000000  163000.000000
75%        8.000000  2009.000000  214000.000000
max       12.000000  2010.000000  755000.000000

df.describe().shape

(8, 38)
```

handling missing values

```python
plt.figure(figsize=(16,9))
sns.heatmap(df.isnull())
plt.show()
plt.savefig("heatmap_of_df_null_values")
```



```
<Figure size 640x480 with 0 Axes>
```
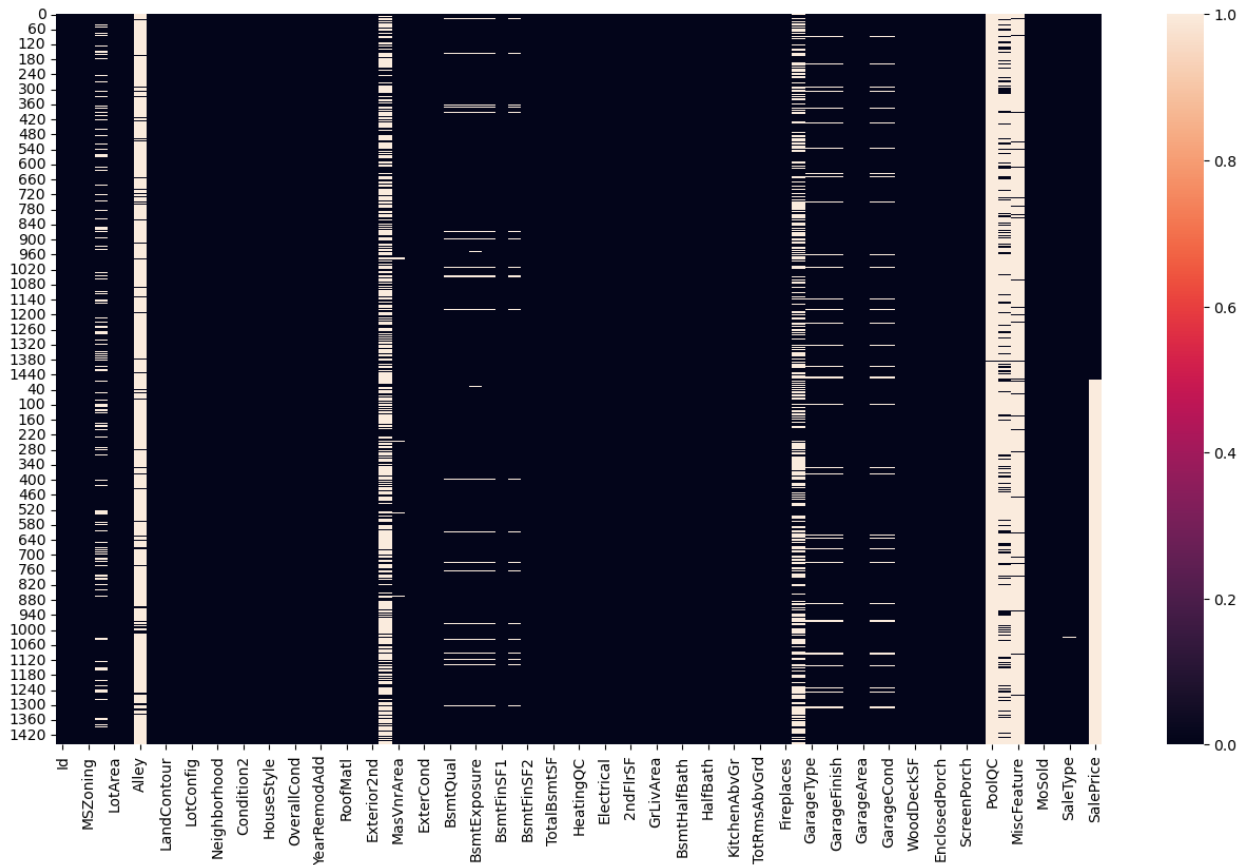
#measure of null values

#data cleaning

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

```
Id                 0
MSSubClass         0
MSZoning           4
LotFrontage      486
LotArea            0
                ...
MoSold             0
YrSold             0
```

```
SaleType             1
SaleCondition        0
SalePrice         1459
Length: 81, dtype: int64

percentage_of_missing_value_in_df=df.isnull().sum()/df.shape[0]*100
pd.set_option('display.max_rows', None)
print(percentage_of_missing_value_in_df)

Id                  0.000000
MSSubClass          0.000000
MSZoning            0.137033
LotFrontage        16.649538
LotArea             0.000000
Street              0.000000
Alley              93.216855
LotShape            0.000000
LandContour         0.000000
Utilities           0.068517
LotConfig           0.000000
LandSlope           0.000000
Neighborhood        0.000000
Condition1          0.000000
Condition2          0.000000
BldgType            0.000000
HouseStyle          0.000000
OverallQual         0.000000
OverallCond         0.000000
YearBuilt           0.000000
YearRemodAdd        0.000000
RoofStyle           0.000000
RoofMatl            0.000000
Exterior1st         0.034258
Exterior2nd         0.034258
MasVnrType         60.500171
MasVnrArea          0.787941
ExterQual           0.000000
ExterCond           0.000000
Foundation          0.000000
BsmtQual            2.774923
BsmtCond            2.809181
BsmtExposure        2.809181
BsmtFinType1        2.706406
BsmtFinSF1          0.034258
BsmtFinType2        2.740665
BsmtFinSF2          0.034258
BsmtUnfSF           0.034258
TotalBsmtSF         0.034258
Heating             0.000000
HeatingQC           0.000000
```

```
CentralAir          0.000000
Electrical          0.034258
1stFlrSF            0.000000
2ndFlrSF            0.000000
LowQualFinSF        0.000000
GrLivArea           0.000000
BsmtFullBath        0.068517
BsmtHalfBath        0.068517
FullBath            0.000000
HalfBath            0.000000
BedroomAbvGr        0.000000
KitchenAbvGr        0.000000
KitchenQual         0.034258
TotRmsAbvGrd        0.000000
Functional          0.068517
Fireplaces          0.000000
FireplaceQu         48.646797
GarageType           5.378554
GarageYrBlt          5.447071
GarageFinish         5.447071
GarageCars          0.034258
GarageArea          0.034258
GarageQual           5.447071
GarageCond           5.447071
PavedDrive          0.000000
WoodDeckSF          0.000000
OpenPorchSF         0.000000
EnclosedPorch       0.000000
3SsnPorch           0.000000
ScreenPorch         0.000000
PoolArea            0.000000
PoolQC              99.657417
Fence               80.438506
MiscFeature         96.402878
MiscVal             0.000000
MoSold              0.000000
YrSold              0.000000
SaleType            0.034258
SaleCondition       0.000000
SalePrice           49.982871
dtype: float64
```

```python
# Optionally, sort the values
sorted_percentage_of_missing_value_in_df =
percentage_of_missing_value_in_df.sort_values(ascending=False)
print(sorted_percentage_of_missing_value_in_df)
```

```
PoolQC              99.657417
MiscFeature         96.402878
Alley               93.216855
```

```
Fence            80.438506
MasVnrType       60.500171
SalePrice        49.982871
FireplaceQu      48.646797
LotFrontage      16.649538
GarageYrBlt       5.447071
GarageFinish      5.447071
GarageQual        5.447071
GarageCond        5.447071
GarageType        5.378554
BsmtExposure      2.809181
BsmtCond          2.809181
BsmtQual          2.774923
BsmtFinType2      2.740665
BsmtFinType1      2.706406
MasVnrArea        0.787941
MSZoning          0.137033
Functional        0.068517
BsmtFullBath      0.068517
Utilities         0.068517
BsmtHalfBath      0.068517
Electrical        0.034258
TotalBsmtSF       0.034258
BsmtUnfSF         0.034258
KitchenQual       0.034258
BsmtFinSF2        0.034258
BsmtFinSF1        0.034258
SaleType          0.034258
GarageCars        0.034258
Exterior2nd       0.034258
Exterior1st       0.034258
GarageArea        0.034258
YrSold            0.000000
Fireplaces        0.000000
MoSold            0.000000
MiscVal           0.000000
SaleCondition     0.000000
TotRmsAbvGrd      0.000000
PoolArea          0.000000
3SsnPorch         0.000000
ScreenPorch       0.000000
EnclosedPorch     0.000000
OpenPorchSF       0.000000
WoodDeckSF        0.000000
PavedDrive        0.000000
BedroomAbvGr      0.000000
KitchenAbvGr      0.000000
Id                0.000000
HalfBath          0.000000
```

```
FullBath              0.000000
LotArea               0.000000
Street                0.000000
LotShape              0.000000
LandContour           0.000000
LotConfig             0.000000
LandSlope             0.000000
Neighborhood          0.000000
Condition1            0.000000
Condition2            0.000000
BldgType              0.000000
HouseStyle            0.000000
OverallQual           0.000000
OverallCond           0.000000
YearBuilt             0.000000
YearRemodAdd          0.000000
RoofStyle             0.000000
RoofMatl              0.000000
ExterQual             0.000000
ExterCond             0.000000
Foundation            0.000000
Heating               0.000000
MSSubClass            0.000000
CentralAir            0.000000
1stFlrSF              0.000000
2ndFlrSF              0.000000
LowQualFinSF          0.000000
GrLivArea             0.000000
HeatingQC             0.000000
dtype: float64
```

```
missing_value_feature=percentage_of_missing_value_in_df[percentage_of_
missing_value_in_df>0].keys()
missing_value_feature
```

```
Index(['MSZoning', 'LotFrontage', 'Alley', 'Utilities', 'Exterior1st',
       'Exterior2nd', 'MasVnrType', 'MasVnrArea', 'BsmtQual',
'BsmtCond',
       'BsmtExposure', 'BsmtFinType1', 'BsmtFinSF1', 'BsmtFinType2',
       'BsmtFinSF2', 'BsmtUnfSF', 'TotalBsmtSF', 'Electrical',
'BsmtFullBath',
       'BsmtHalfBath', 'KitchenQual', 'Functional', 'FireplaceQu',
       'GarageType', 'GarageYrBlt', 'GarageFinish', 'GarageCars',
'GarageArea',
       'GarageQual', 'GarageCond', 'PoolQC', 'Fence', 'MiscFeature',
       'SaleType', 'SalePrice'],
      dtype='object')
```

#handing garage values

```
df_mvi=df.copy()

num_garage_feat=["GarageType","GarageFinish","GarageQual","GarageCond"
]
cat_garage_feat=["GarageYrBlt","GarageCars","GarageArea"]

df_garage=df_mvi[num_garage_feat+cat_garage_feat]

plt.figure(figsize=(16,9))
sns.heatmap(df_garage.isnull())
plt.show()
```
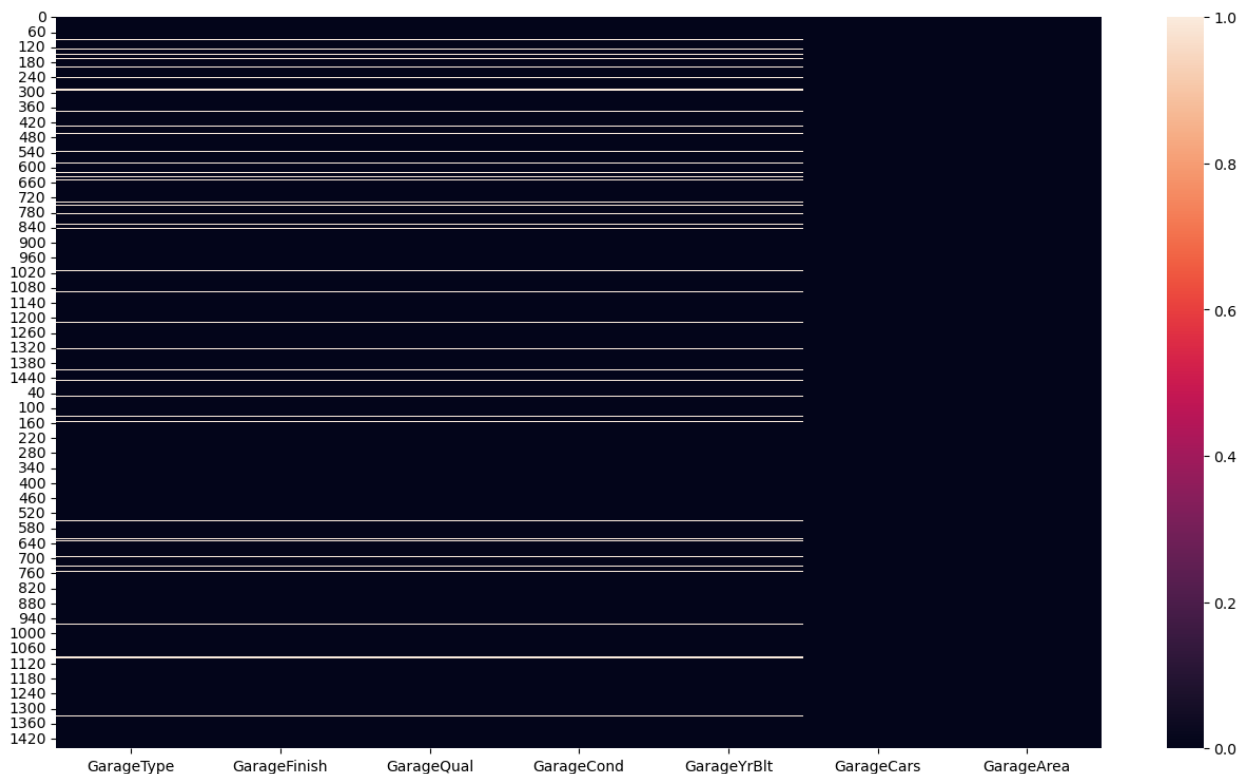


```
garage_const="NA"
for feat in cat_garage_feat:
    df_mvi[feat].replace(np.nan,garage_const,inplace=True)
df_mvi[cat_garage_feat].isnull().sum()

GarageYrBlt    0
GarageCars     0
GarageArea     0
dtype: int64

garage_num=0
for feat in num_garage_feat:
    df_mvi[feat].replace(np.nan,garage_num,inplace=True)
df_mvi[num_garage_feat].isnull().sum()
```

```
GarageType      0
GarageFinish    0
GarageQual      0
GarageCond      0
dtype: int64
```

#handling bsmt values

```
cat_bsmt_feat=["BsmtQual","BsmtCond","BsmtExposure","BsmtFinType1","Bs
mtFinType2"]

num_bsmt_feat=["BsmtFinSF1","BsmtFinSF2","BsmtUnfSF","TotalBsmtSF","Bs
mtFullBath","BsmtHalfBath"]

df_bsmt=df_mvi[cat_bsmt_feat+num_bsmt_feat]

plt.figure(figsize=(16,9))
sns.heatmap(df_bsmt.isnull())
plt.show()
```
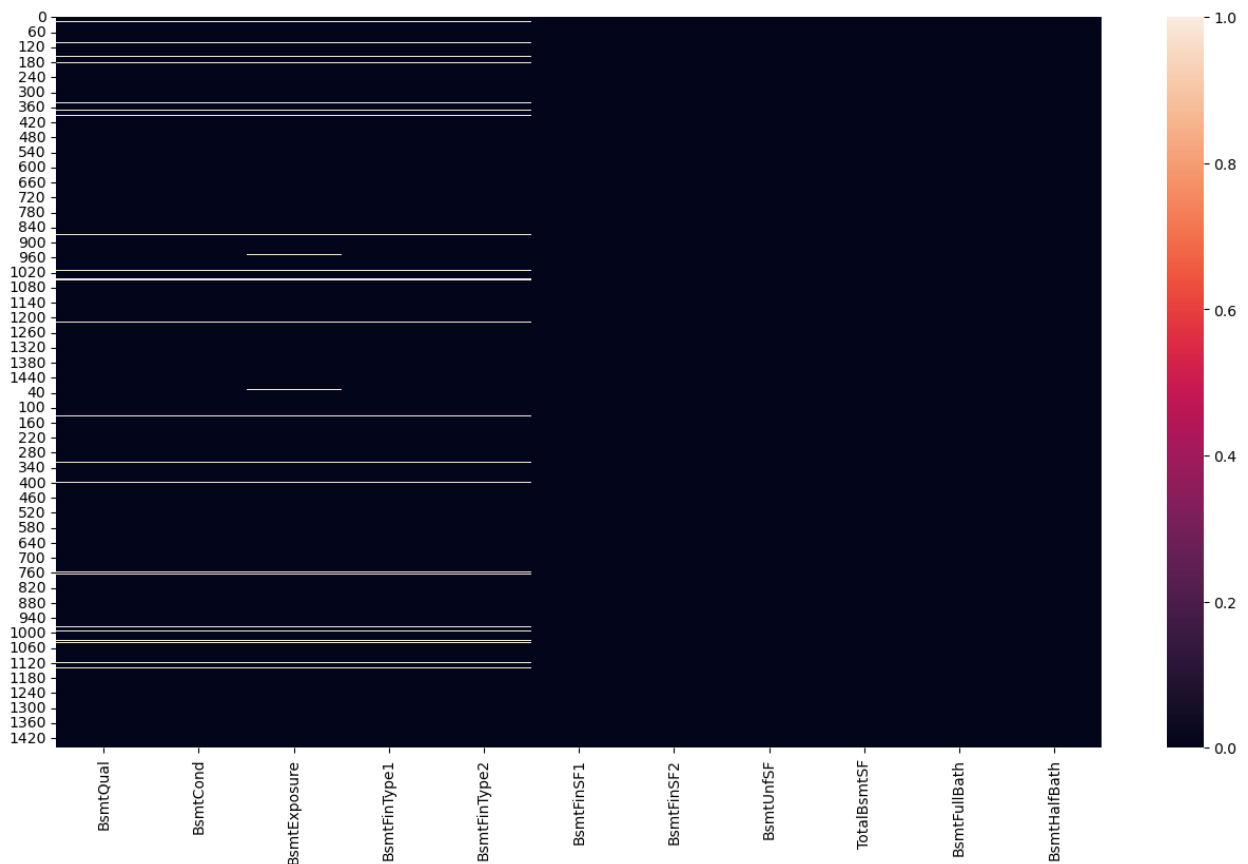


```
bsmt_const="NA"
for feat in cat_bsmt_feat:
```

```python
    df_mvi[feat].replace(np.nan,bsmt_const,inplace=True)
df_mvi[cat_bsmt_feat].isnull().sum()
```

```
BsmtQual        0
BsmtCond        0
BsmtExposure    0
BsmtFinType1    0
BsmtFinType2    0
dtype: int64
```

```python
bsmt_mean=df_mvi[num_bsmt_feat].mean()

for feat in num_bsmt_feat:
    df_mvi[feat].replace(np.nan,bsmt_mean[feat],inplace=True)
df_mvi[num_bsmt_feat].isnull().sum()
```

```
BsmtFinSF1      0
BsmtFinSF2      0
BsmtUnfSF       0
TotalBsmtSF     0
BsmtFullBath    0
BsmtHalfBath    0
dtype: int64
```

```python
FireplaceQu_const="NA"
df_mvi["FireplaceQu"].replace(np.nan,FireplaceQu_const,inplace=True)
df_mvi["FireplaceQu"].isnull().sum()
```

```
0
```

```python
lotfrontage_mean=df["LotFrontage"].mean()
df_mvi["LotFrontage"].replace(np.nan,lotfrontage_mean,inplace=True)
df_mvi["LotFrontage"].isnull().sum()
```

```
0
```

```python
def OldNewBoxHistPlot(df, df_new, feature):

    plt.figure(figsize=(12, 10))

    # Old data boxplot
    plt.subplot(221)
    sns.boxplot(x=df[feature])
    plt.title("Old Data - Boxplot")

    # Old data histogram
    plt.subplot(222)
    sns.histplot(df[feature], kde=True)
    plt.title("Old Data - Histogram")

    # New data boxplot
    plt.subplot(223)
```

```python
    sns.boxplot(x=df_new[feature])
    plt.title("New Data - Boxplot")

    # New data histogram
    plt.subplot(224)
    sns.histplot(df_new[feature], kde=True)
    plt.title("New Data - Histogram")

    plt.tight_layout()
    plt.show()

OldNewBoxHistPlot(df,df_mvi,"LotFrontage")
```

```
C:\Users\adity\anaconda3\Lib\site-packages\seaborn\_oldcore.py:1119:
FutureWarning: use_inf_as_na option is deprecated and will be removed
in a future version. Convert inf values to NaN before operating
instead.
  with pd.option_context('mode.use_inf_as_na', True):
C:\Users\adity\anaconda3\Lib\site-packages\seaborn\_oldcore.py:1119:
FutureWarning: use_inf_as_na option is deprecated and will be removed
in a future version. Convert inf values to NaN before operating
instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

Old Data - Boxplot | Old Data - Histogram

New Data - Boxplot | New Data - Histogram
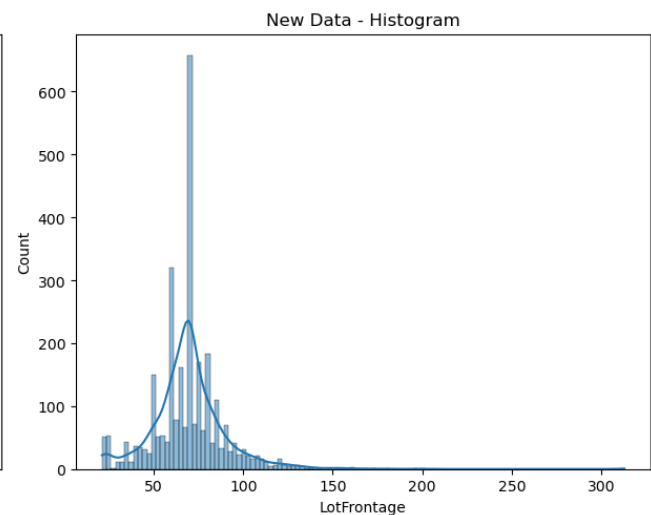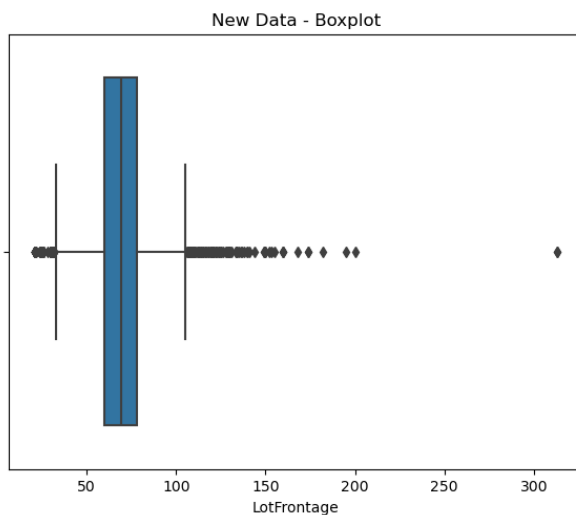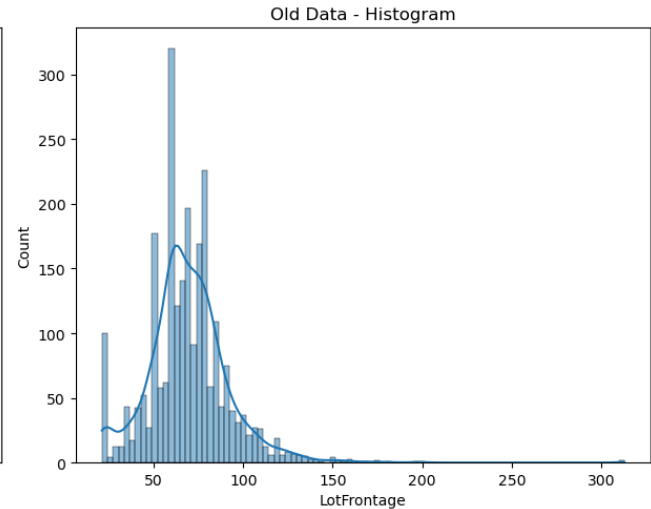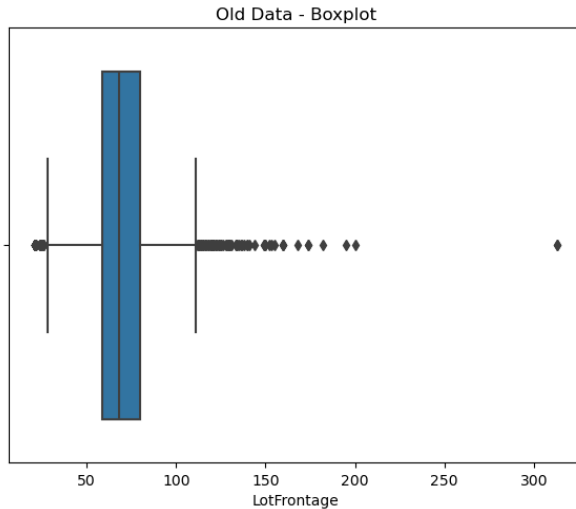
```
saleprice_mean=df_mvi["SalePrice"].mean()
saleprice_mean
```

```
180921.19589041095
```

```
df_mvi["SalePrice"].replace(np.nan,saleprice_mean,inplace=True)
df_mvi["SalePrice"].isnull().sum()
```

```
0
```

#handling Exterior2nd & Exterior1st

```
exterior1st_mode=df_mvi["Exterior1st"].mode()[0]
df_mvi["Exterior1st"].replace(np.nan,exterior1st_mode,inplace=True)
df_mvi["Exterior1st"].isnull().sum()
```

```
0
```

```python
exterior2nd_mode=df_mvi["Exterior2nd"].mode()[0]
df_mvi["Exterior2nd"].replace(np.nan,exterior2nd_mode,inplace=True)
df_mvi["Exterior2nd"].isnull().sum()
```

```
0
```

```python
MasVnrArea_mean=df_mvi["MasVnrArea"].mean()
df_mvi["MasVnrArea"].replace(np.nan,MasVnrArea_mean,inplace=True)
df_mvi["MasVnrArea"].isnull().sum()
```

```
0
```

```python
MSZoning_mode=df_mvi["MSZoning"].mode()[0]
df_mvi["MSZoning"].replace(np.nan,MSZoning_mode,inplace=True)
df_mvi["MSZoning"].isnull().sum()
```

```
0
```

```python
Functional_mode=df_mvi["Functional"].mode()[0]
df_mvi["Functional"].replace(np.nan,Functional_mode,inplace=True)
df_mvi["Functional"].isnull().sum()
```

```
0
```

```python
Utilities_mode=df_mvi["Utilities"].mode()[0]
df_mvi["Utilities"].replace(np.nan,Utilities_mode,inplace=True)
df_mvi["Utilities"].isnull().sum()
```

```
0
```

```python
Electrical_mode=df_mvi["Electrical"].mode()[0]
df_mvi["Electrical"].replace(np.nan,Electrical_mode,inplace=True)
df_mvi["Electrical"].isnull().sum()
```

```
0
```

```python
KitchenQual_mode=df_mvi["KitchenQual"].mode()[0]
df_mvi["KitchenQual"].replace(np.nan,KitchenQual_mode,inplace=True)
df_mvi["KitchenQual"].isnull().sum()
```

```
0
```

```python
SaleType_mode=df_mvi["SaleType"].mode()[0]
df_mvi["SaleType"].replace(np.nan,SaleType_mode,inplace=True)
df_mvi["SaleType"].isnull().sum()
```

```
0
```

```python
df_mvi.isnull().sum()
```

```
Id               0
MSSubClass       0
MSZoning         0
```

```
LotFrontage          0
LotArea              0
Street               0
Alley             2721
LotShape             0
LandContour          0
Utilities            0
LotConfig            0
LandSlope            0
Neighborhood         0
Condition1           0
Condition2           0
BldgType             0
HouseStyle           0
OverallQual          0
OverallCond          0
YearBuilt            0
YearRemodAdd         0
RoofStyle            0
RoofMatl             0
Exterior1st          0
Exterior2nd          0
MasVnrType        1766
MasVnrArea           0
ExterQual            0
ExterCond            0
Foundation           0
BsmtQual             0
BsmtCond             0
BsmtExposure         0
BsmtFinType1         0
BsmtFinSF1           0
BsmtFinType2         0
BsmtFinSF2           0
BsmtUnfSF            0
TotalBsmtSF          0
Heating              0
HeatingQC            0
CentralAir           0
Electrical           0
1stFlrSF             0
2ndFlrSF             0
LowQualFinSF         0
GrLivArea            0
BsmtFullBath         0
BsmtHalfBath         0
FullBath             0
HalfBath             0
BedroomAbvGr         0
```

```
KitchenAbvGr          0
KitchenQual           0
TotRmsAbvGrd          0
Functional            0
Fireplaces            0
FireplaceQu           0
GarageType            0
GarageYrBlt           0
GarageFinish          0
GarageCars            0
GarageArea            0
GarageQual            0
GarageCond            0
PavedDrive            0
WoodDeckSF            0
OpenPorchSF           0
EnclosedPorch         0
3SsnPorch             0
ScreenPorch           0
PoolArea              0
PoolQC             2909
Fence              2348
MiscFeature        2814
MiscVal               0
MoSold                0
YrSold                0
SaleType              0
SaleCondition         0
SalePrice             0
dtype: int64
```

```
percentage_of_features_dfmvi=df_mvi.isnull().sum()/df_mvi.shape[0]*100
percentage_of_features_dfmvi
```

```
Id              0.000000
MSSubClass      0.000000
MSZoning        0.000000
LotFrontage     0.000000
LotArea         0.000000
Street          0.000000
Alley          93.216855
LotShape        0.000000
LandContour     0.000000
Utilities       0.000000
LotConfig       0.000000
LandSlope       0.000000
Neighborhood    0.000000
Condition1      0.000000
Condition2      0.000000
BldgType        0.000000
```

```
HouseStyle          0.000000
OverallQual         0.000000
OverallCond         0.000000
YearBuilt           0.000000
YearRemodAdd        0.000000
RoofStyle           0.000000
RoofMatl            0.000000
Exterior1st         0.000000
Exterior2nd         0.000000
MasVnrType         60.500171
MasVnrArea          0.000000
ExterQual           0.000000
ExterCond           0.000000
Foundation          0.000000
BsmtQual            0.000000
BsmtCond            0.000000
BsmtExposure        0.000000
BsmtFinType1        0.000000
BsmtFinSF1          0.000000
BsmtFinType2        0.000000
BsmtFinSF2          0.000000
BsmtUnfSF           0.000000
TotalBsmtSF         0.000000
Heating             0.000000
HeatingQC           0.000000
CentralAir          0.000000
Electrical          0.000000
1stFlrSF            0.000000
2ndFlrSF            0.000000
LowQualFinSF        0.000000
GrLivArea           0.000000
BsmtFullBath        0.000000
BsmtHalfBath        0.000000
FullBath            0.000000
HalfBath            0.000000
BedroomAbvGr        0.000000
KitchenAbvGr        0.000000
KitchenQual         0.000000
TotRmsAbvGrd        0.000000
Functional          0.000000
Fireplaces          0.000000
FireplaceQu         0.000000
GarageType          0.000000
GarageYrBlt         0.000000
GarageFinish        0.000000
GarageCars          0.000000
GarageArea          0.000000
GarageQual          0.000000
GarageCond          0.000000
```

```
PavedDrive         0.000000
WoodDeckSF         0.000000
OpenPorchSF        0.000000
EnclosedPorch      0.000000
3SsnPorch          0.000000
ScreenPorch        0.000000
PoolArea           0.000000
PoolQC            99.657417
Fence             80.438506
MiscFeature       96.402878
MiscVal            0.000000
MoSold             0.000000
YrSold             0.000000
SaleType           0.000000
SaleCondition      0.000000
SalePrice          0.000000
dtype: float64

percentage_of_features_more_than_50_per_dfmvi=percentage_of_features_d
fmvi[percentage_of_features_dfmvi>50].index.tolist()
percentage_of_features_more_than_50_per_dfmvi

['Alley', 'MasVnrType', 'PoolQC', 'Fence', 'MiscFeature']
```

#drop the features more than 50 percentage

```
df_mv=df_mvi.drop(columns=percentage_of_features_more_than_50_per_dfmv
i)

plt.figure(figsize=(16,9))
plt.subplot(1,2,1)
sns.heatmap(df.isnull())
plt.subplot(1,2,2)
sns.heatmap(df_mv.isnull())
plt.show()
```
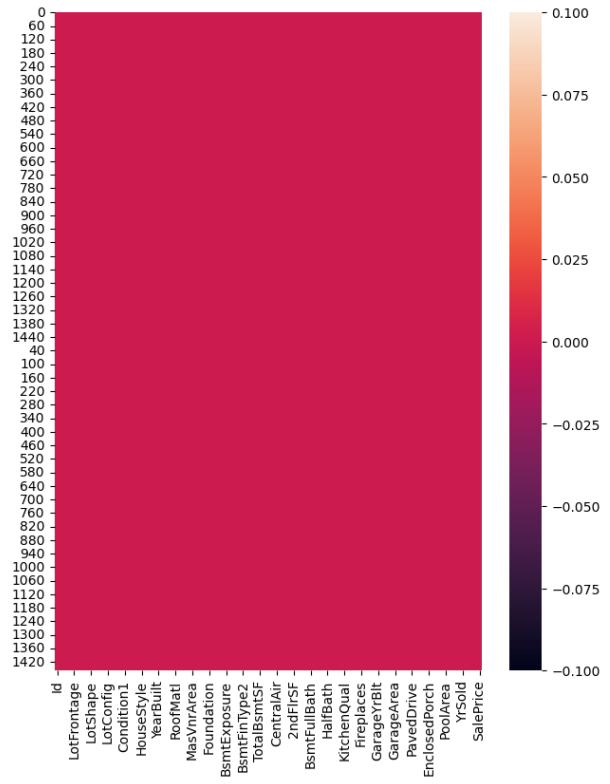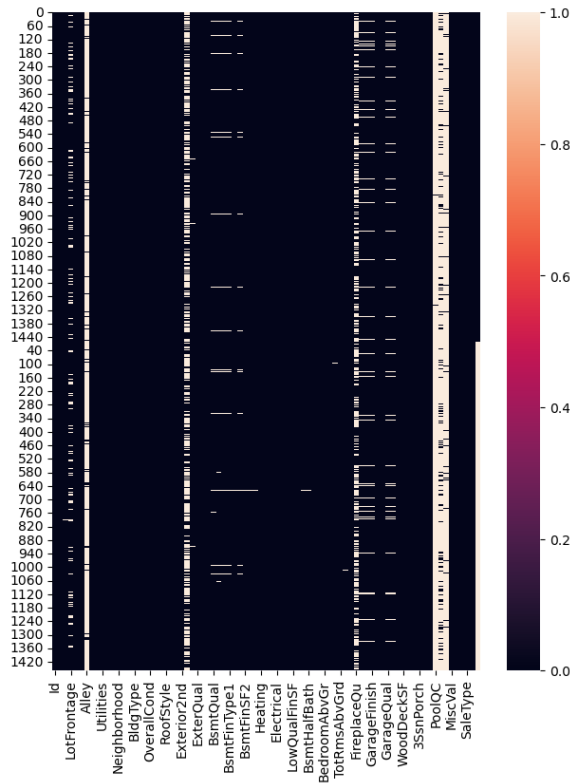
```
df_mv.head()
```

```
    Id  MSSubClass MSZoning  LotFrontage  LotArea Street LotShape
LandContour  \
0   1          60       RL         65.0     8450   Pave      Reg
Lvl
1   2          20       RL         80.0     9600   Pave      Reg
Lvl
2   3          60       RL         68.0    11250   Pave      IR1
Lvl
3   4          70       RL         60.0     9550   Pave      IR1
Lvl
4   5          60       RL         84.0    14260   Pave      IR1
Lvl


  Utilities LotConfig LandSlope Neighborhood Condition1 Condition2
BldgType  \
0   AllPub    Inside       Gtl      CollgCr       Norm       Norm
1Fam
1   AllPub       FR2       Gtl      Veenker      Feedr       Norm
1Fam
2   AllPub    Inside       Gtl      CollgCr       Norm       Norm
1Fam
3   AllPub    Corner       Gtl      Crawfor       Norm       Norm
1Fam
4   AllPub       FR2       Gtl      NoRidge       Norm       Norm
```

```
1Fam

  HouseStyle  OverallQual  OverallCond  YearBuilt  YearRemodAdd
RoofStyle  \
0      2Story            7            5       2003          2003
Gable
1      1Story            6            8       1976          1976
Gable
2      2Story            7            5       2001          2002
Gable
3      2Story            7            5       1915          1970
Gable
4      2Story            8            5       2000          2000
Gable

  RoofMatl Exterior1st Exterior2nd  MasVnrArea ExterQual ExterCond
Foundation  \
0  CompShg     VinylSd     VinylSd       196.0        Gd        TA
PConc
1  CompShg     MetalSd     MetalSd         0.0        TA        TA
CBlock
2  CompShg     VinylSd     VinylSd       162.0        Gd        TA
PConc
3  CompShg     Wd Sdng     Wd Shng         0.0        TA        TA
BrkTil
4  CompShg     VinylSd     VinylSd       350.0        Gd        TA
PConc

  BsmtQual BsmtCond BsmtExposure BsmtFinType1  BsmtFinSF1 BsmtFinType2
\
0      Gd       TA           No          GLQ       706.0          Unf

1      Gd       TA           Gd          ALQ       978.0          Unf

2      Gd       TA           Mn          GLQ       486.0          Unf

3      TA       Gd           No          ALQ       216.0          Unf

4      Gd       TA           Av          GLQ       655.0          Unf


   BsmtFinSF2  BsmtUnfSF  TotalBsmtSF Heating HeatingQC CentralAir
Electrical  \
0         0.0      150.0        856.0    GasA        Ex          Y
SBrkr
1         0.0      284.0       1262.0    GasA        Ex          Y
SBrkr
2         0.0      434.0        920.0    GasA        Ex          Y
SBrkr
3         0.0      540.0        756.0    GasA        Gd          Y
```

```
SBrkr
4           0.0      490.0       1145.0      GasA           Ex            Y
SBrkr

    1stFlrSF  2ndFlrSF  LowQualFinSF  GrLivArea  BsmtFullBath  \
BsmtHalfBath  \
0        856       854             0       1710           1.0
0.0
1       1262         0             0       1262           0.0
1.0
2        920       866             0       1786           1.0
0.0
3        961       756             0       1717           1.0
0.0
4       1145      1053             0       2198           1.0
0.0

    FullBath  HalfBath  BedroomAbvGr  KitchenAbvGr KitchenQual
TotRmsAbvGrd  \
0         2         1             3             1          Gd
8
1         2         0             3             1          TA
6
2         2         1             3             1          Gd
6
3         1         0             3             1          Gd
7
4         2         1             4             1          Gd
9

    Functional  Fireplaces FireplaceQu GarageType  GarageYrBlt
GarageFinish  \
0        Typ           0          NA     Attchd       2003.0
RFn
1        Typ           1          TA     Attchd       1976.0
RFn
2        Typ           1          TA     Attchd       2001.0
RFn
3        Typ           1          Gd     Detchd       1998.0
Unf
4        Typ           1          TA     Attchd       2000.0
RFn

    GarageCars GarageArea GarageQual GarageCond PavedDrive
WoodDeckSF  \
0        2.0      548.0         TA         TA          Y            0

1        2.0      460.0         TA         TA          Y          298

2        2.0      608.0         TA         TA          Y            0
```

	3.0	642.0	TA	TA	Y	0
3	3.0	642.0	TA	TA	Y	0
4	3.0	836.0	TA	TA	Y	192

	OpenPorchSF	EnclosedPorch	3SsnPorch	ScreenPorch	PoolArea	MiscVal \
0	61	0	0	0	0	0
1	0	0	0	0	0	0
2	42	0	0	0	0	0
3	35	272	0	0	0	0
4	84	0	0	0	0	0

	MoSold	YrSold	SaleType	SaleCondition	SalePrice
0	2	2008	WD	Normal	208500.0
1	5	2007	WD	Normal	181500.0
2	9	2008	WD	Normal	223500.0
3	2	2006	WD	Abnorml	140000.0
4	12	2008	WD	Normal	250000.0

```python
#One Hot Encoder

from sklearn.preprocessing import OneHotEncoder

Encoder=OneHotEncoder(sparse_output=False)

catagorical_data=df_mv.select_dtypes(include=['object']).columns.tolist()

catagorical_data
```

```
['MSZoning',
 'Street',
 'LotShape',
 'LandContour',
 'Utilities',
 'LotConfig',
 'LandSlope',
 'Neighborhood',
 'Condition1',
 'Condition2',
 'BldgType',
 'HouseStyle',
 'RoofStyle',
 'RoofMatl',
```

```
 'Exterior1st',
 'Exterior2nd',
 'ExterQual',
 'ExterCond',
 'Foundation',
 'BsmtQual',
 'BsmtCond',
 'BsmtExposure',
 'BsmtFinType1',
 'BsmtFinType2',
 'Heating',
 'HeatingQC',
 'CentralAir',
 'Electrical',
 'KitchenQual',
 'Functional',
 'FireplaceQu',
 'GarageType',
 'GarageYrBlt',
 'GarageFinish',
 'GarageCars',
 'GarageArea',
 'GarageQual',
 'GarageCond',
 'PavedDrive',
 'SaleType',
 'SaleCondition']

df_mv[catagorical_data] = df_mv[catagorical_data].astype(str)

one_hot_encoder=Encoder.fit_transform(df_mv[catagorical_data])

one_hot_encoded_df = pd.DataFrame(one_hot_encoder,
columns=Encoder.get_feature_names_out(catagorical_data))

df_mv.reset_index(drop=True, inplace=True)
one_hot_encoded_df.reset_index(drop=True, inplace=True)

df_mv = df_mv.drop(columns=catagorical_data)

finalencoded_df = pd.concat([df_mv, one_hot_encoded_df], axis=1)

finalencoded_df.head()
```

```
    Id  MSSubClass  LotFrontage  LotArea  OverallQual  OverallCond
YearBuilt  \
0   1          60         65.0     8450            7            5
2003
1   2          20         80.0     9600            6            8
1976
2   3          60         68.0    11250            7            5
```

```
    2001
3   4              70          60.0      9550                 7               5
    1915
4   5              60          84.0     14260                 8               5
    2000

    YearRemodAdd   MasVnrArea   BsmtFinSF1   BsmtFinSF2   BsmtUnfSF
TotalBsmtSF  \
0           2003        196.0        706.0          0.0        150.0
856.0
1           1976          0.0        978.0          0.0        284.0
1262.0
2           2002        162.0        486.0          0.0        434.0
920.0
3           1970          0.0        216.0          0.0        540.0
756.0
4           2000        350.0        655.0          0.0        490.0
1145.0

    1stFlrSF   2ndFlrSF   LowQualFinSF   GrLivArea   BsmtFullBath
BsmtHalfBath  \
0        856        854              0        1710            1.0
0.0
1       1262          0              0        1262            0.0
1.0
2        920        866              0        1786            1.0
0.0
3        961        756              0        1717            1.0
0.0
4       1145       1053              0        2198            1.0
0.0

    FullBath   HalfBath   BedroomAbvGr   KitchenAbvGr   TotRmsAbvGrd
Fireplaces  \
0          2          1              3              1              8
0
1          2          0              3              1              6
1
2          2          1              3              1              6
1
3          1          0              3              1              7
1
4          2          1              4              1              9
1

    WoodDeckSF   OpenPorchSF   EnclosedPorch   3SsnPorch   ScreenPorch
PoolArea  \
0            0            61               0           0             0
0
1          298             0               0           0             0
```

```
0
2             0            42                0             0             0
0
3             0            35              272             0             0
0
4           192            84                0             0             0
0

   MiscVal  MoSold  YrSold  SalePrice  MSZoning_C (all)  \
MSZoning_FV  \
0        0       2    2008   208500.0               0.0           0.0

1        0       5    2007   181500.0               0.0           0.0

2        0       9    2008   223500.0               0.0           0.0

3        0       2    2006   140000.0               0.0           0.0

4        0      12    2008   250000.0               0.0           0.0


   MSZoning_RH  MSZoning_RL  MSZoning_RM  Street_Grvl  Street_Pave  \
0          0.0          1.0          0.0          0.0          1.0
1          0.0          1.0          0.0          0.0          1.0
2          0.0          1.0          0.0          0.0          1.0
3          0.0          1.0          0.0          0.0          1.0
4          0.0          1.0          0.0          0.0          1.0

   LotShape_IR1  LotShape_IR2  LotShape_IR3  LotShape_Reg
LandContour_Bnk  \
0          0.0           0.0           0.0           1.0
0.0
1          0.0           0.0           0.0           1.0
0.0
2          1.0           0.0           0.0           0.0
0.0
3          1.0           0.0           0.0           0.0
0.0
4          1.0           0.0           0.0           0.0
0.0

   LandContour_HLS  LandContour_Low  LandContour_Lvl  Utilities_AllPub
\
0              0.0              0.0              1.0               1.0

1              0.0              0.0              1.0               1.0

2              0.0              0.0              1.0               1.0

3              0.0              0.0              1.0               1.0
```

```
4                  0.0                0.0                1.0                1.0


    Utilities_NoSeWa  LotConfig_Corner  LotConfig_CulDSac  \
LotConfig_FR2  \
0               0.0               0.0                0.0
0.0
1               0.0               0.0                0.0
1.0
2               0.0               0.0                0.0
0.0
3               0.0               1.0                0.0
0.0
4               0.0               0.0                0.0
1.0

    LotConfig_FR3  LotConfig_Inside  LandSlope_Gtl  LandSlope_Mod  \
0             0.0               1.0            1.0            0.0
1             0.0               0.0            1.0            0.0
2             0.0               1.0            1.0            0.0
3             0.0               0.0            1.0            0.0
4             0.0               0.0            1.0            0.0

    LandSlope_Sev  Neighborhood_Blmngtn  Neighborhood_Blueste  \
0             0.0                   0.0                   0.0
1             0.0                   0.0                   0.0
2             0.0                   0.0                   0.0
3             0.0                   0.0                   0.0
4             0.0                   0.0                   0.0

    Neighborhood_BrDale  Neighborhood_BrkSide  Neighborhood_ClearCr  \
0                   0.0                   0.0                   0.0
1                   0.0                   0.0                   0.0
2                   0.0                   0.0                   0.0
3                   0.0                   0.0                   0.0
4                   0.0                   0.0                   0.0

    Neighborhood_CollgCr  Neighborhood_Crawfor  Neighborhood_Edwards  \
0                   1.0                   0.0                   0.0
1                   0.0                   0.0                   0.0
2                   1.0                   0.0                   0.0
3                   0.0                   1.0                   0.0
4                   0.0                   0.0                   0.0

    Neighborhood_Gilbert  Neighborhood_IDOTRR  Neighborhood_MeadowV  \
0                   0.0                   0.0                   0.0
1                   0.0                   0.0                   0.0
2                   0.0                   0.0                   0.0
3                   0.0                   0.0                   0.0
```

```
4                              0.0                           0.0                              0.0

    Neighborhood_Mitchel  Neighborhood_NAmes  Neighborhood_NPkVill  \
0                    0.0                 0.0                   0.0
1                    0.0                 0.0                   0.0
2                    0.0                 0.0                   0.0
3                    0.0                 0.0                   0.0
4                    0.0                 0.0                   0.0

    Neighborhood_NWAmes  Neighborhood_NoRidge  Neighborhood_NridgHt  \
0                   0.0                   0.0                   0.0
1                   0.0                   0.0                   0.0
2                   0.0                   0.0                   0.0
3                   0.0                   0.0                   0.0
4                   0.0                   1.0                   0.0

    Neighborhood_OldTown  Neighborhood_SWISU  Neighborhood_Sawyer  \
0                    0.0                 0.0                  0.0
1                    0.0                 0.0                  0.0
2                    0.0                 0.0                  0.0
3                    0.0                 0.0                  0.0
4                    0.0                 0.0                  0.0

    Neighborhood_SawyerW  Neighborhood_Somerst  Neighborhood_StoneBr  \
0                    0.0                   0.0                   0.0
1                    0.0                   0.0                   0.0
2                    0.0                   0.0                   0.0
3                    0.0                   0.0                   0.0
4                    0.0                   0.0                   0.0

    Neighborhood_Timber  Neighborhood_Veenker  Condition1_Artery  \
0                   0.0                   0.0                0.0
1                   0.0                   1.0                0.0
2                   0.0                   0.0                0.0
3                   0.0                   0.0                0.0
4                   0.0                   0.0                0.0

    Condition1_Feedr  Condition1_Norm  Condition1_PosA  Condition1_PosN
\
0                0.0              1.0              0.0              0.0

1                1.0              0.0              0.0              0.0

2                0.0              1.0              0.0              0.0

3                0.0              1.0              0.0              0.0

4                0.0              1.0              0.0              0.0
```

```
   Condition1_RRAe  Condition1_RRAn  Condition1_RRNe  Condition1_RRNn  \
0              0.0              0.0              0.0              0.0

1              0.0              0.0              0.0              0.0

2              0.0              0.0              0.0              0.0

3              0.0              0.0              0.0              0.0

4              0.0              0.0              0.0              0.0


   Condition2_Artery  Condition2_Feedr  Condition2_Norm  Condition2_PosA  \
0                0.0               0.0              1.0
0.0
1                0.0               0.0              1.0
0.0
2                0.0               0.0              1.0
0.0
3                0.0               0.0              1.0
0.0
4                0.0               0.0              1.0
0.0

   Condition2_PosN  Condition2_RRAe  Condition2_RRAn  Condition2_RRNn  \
0              0.0              0.0              0.0              0.0

1              0.0              0.0              0.0              0.0

2              0.0              0.0              0.0              0.0

3              0.0              0.0              0.0              0.0

4              0.0              0.0              0.0              0.0


   BldgType_1Fam  BldgType_2fmCon  BldgType_Duplex  BldgType_Twnhs  \
0            1.0              0.0              0.0             0.0
1            1.0              0.0              0.0             0.0
2            1.0              0.0              0.0             0.0
3            1.0              0.0              0.0             0.0
4            1.0              0.0              0.0             0.0

   BldgType_TwnhsE  HouseStyle_1.5Fin  HouseStyle_1.5Unf  HouseStyle_1Story  \
0              0.0                0.0                0.0
0.0
1              0.0                0.0                0.0
```

```
1.0
2                   0.0                 0.0                 0.0
0.0
3                   0.0                 0.0                 0.0
0.0
4                   0.0                 0.0                 0.0
0.0

   HouseStyle_2.5Fin  HouseStyle_2.5Unf  HouseStyle_2Story
HouseStyle_SFoyer  \
0                0.0                0.0                1.0
0.0
1                0.0                0.0                0.0
0.0
2                0.0                0.0                1.0
0.0
3                0.0                0.0                1.0
0.0
4                0.0                0.0                1.0
0.0

   HouseStyle_SLvl  RoofStyle_Flat  RoofStyle_Gable  RoofStyle_Gambrel
\
0              0.0             0.0              1.0                0.0

1              0.0             0.0              1.0                0.0

2              0.0             0.0              1.0                0.0

3              0.0             0.0              1.0                0.0

4              0.0             0.0              1.0                0.0


   RoofStyle_Hip  RoofStyle_Mansard  RoofStyle_Shed  RoofMatl_ClyTile
\
0            0.0                0.0             0.0               0.0

1            0.0                0.0             0.0               0.0

2            0.0                0.0             0.0               0.0

3            0.0                0.0             0.0               0.0

4            0.0                0.0             0.0               0.0


   RoofMatl_CompShg  RoofMatl_Membran  RoofMatl_Metal
RoofMatl_Roll  \
0               1.0               0.0             0.0               0.0
```

		1.0	0.0	0.0	0.0
1		1.0	0.0	0.0	0.0
2		1.0	0.0	0.0	0.0
3		1.0	0.0	0.0	0.0
4		1.0	0.0	0.0	0.0

	RoofMatl_Tar&Grv	RoofMatl_WdShake	RoofMatl_WdShngl	Exterior1st_AsbShng \
0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

	Exterior1st_AsphShn	Exterior1st_BrkComm	Exterior1st_BrkFace \
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0

	Exterior1st_CBlock	Exterior1st_CemntBd	Exterior1st_HdBoard \
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0

	Exterior1st_ImStucc	Exterior1st_MetalSd	Exterior1st_Plywood \
0	0.0	0.0	0.0
1	0.0	1.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0

	Exterior1st_Stone	Exterior1st_Stucco	Exterior1st_VinylSd \
0	0.0	0.0	1.0
1	0.0	0.0	0.0
2	0.0	0.0	1.0
3	0.0	0.0	0.0
4	0.0	0.0	1.0

	Exterior1st_Wd Sdng	Exterior1st_WdShing	Exterior2nd_AsbShng \
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	1.0	0.0	0.0
4	0.0	0.0	0.0

	Exterior2nd_AsphShn	Exterior2nd_Brk Cmn	Exterior2nd_BrkFace \
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0

	Exterior2nd_CBlock	Exterior2nd_CmentBd	Exterior2nd_HdBoard \
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0

	Exterior2nd_ImStucc	Exterior2nd_MetalSd	Exterior2nd_Other \
0	0.0	0.0	0.0
1	0.0	1.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0

	Exterior2nd_Plywood	Exterior2nd_Stone	Exterior2nd_Stucco \
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0

	Exterior2nd_VinylSd	Exterior2nd_Wd Sdng	Exterior2nd_Wd Shng \
0	1.0	0.0	0.0
1	0.0	0.0	0.0
2	1.0	0.0	0.0
3	0.0	0.0	1.0
4	1.0	0.0	0.0

	ExterQual_Ex	ExterQual_Fa	ExterQual_Gd	ExterQual_TA	ExterCond_Ex \
0	0.0	0.0	1.0	0.0	0.0
1	0.0	0.0	0.0	1.0	0.0
2	0.0	0.0	1.0	0.0	0.0

```
3             0.0              0.0              0.0              1.0
0.0
4             0.0              0.0              1.0              0.0
0.0

    ExterCond_Fa  ExterCond_Gd  ExterCond_Po  ExterCond_TA
Foundation_BrkTil  \
0             0.0              0.0              0.0              1.0
0.0
1             0.0              0.0              0.0              1.0
0.0
2             0.0              0.0              0.0              1.0
0.0
3             0.0              0.0              0.0              1.0
1.0
4             0.0              0.0              0.0              1.0
0.0

    Foundation_CBlock  Foundation_PConc  Foundation_Slab
Foundation_Stone   \
0                 0.0              1.0              0.0
0.0
1                 1.0              0.0              0.0
0.0
2                 0.0              1.0              0.0
0.0
3                 0.0              0.0              0.0
0.0
4                 0.0              1.0              0.0
0.0

    Foundation_Wood  BsmtQual_Ex  BsmtQual_Fa  BsmtQual_Gd  BsmtQual_NA
\
0                0.0              0.0              0.0              1.0              0.0

1                0.0              0.0              0.0              1.0              0.0

2                0.0              0.0              0.0              1.0              0.0

3                0.0              0.0              0.0              0.0              0.0

4                0.0              0.0              0.0              1.0              0.0


    BsmtQual_TA  BsmtCond_Fa  BsmtCond_Gd  BsmtCond_NA  BsmtCond_Po  \
0          0.0              0.0              0.0              0.0              0.0
1          0.0              0.0              0.0              0.0              0.0
2          0.0              0.0              0.0              0.0              0.0
3          1.0              0.0              1.0              0.0              0.0
4          0.0              0.0              0.0              0.0              0.0
```

```
    BsmtCond_TA  BsmtExposure_Av  BsmtExposure_Gd  BsmtExposure_Mn  \
0           1.0              0.0              0.0              0.0
1           1.0              0.0              1.0              0.0
2           1.0              0.0              0.0              1.0
3           0.0              0.0              0.0              0.0
4           1.0              1.0              0.0              0.0

   BsmtExposure_NA  BsmtExposure_No  BsmtFinType1_ALQ  BsmtFinType1_BLQ  \
0              0.0              1.0               0.0               0.0
1              0.0              0.0               1.0               0.0
2              0.0              0.0               0.0               0.0
3              0.0              1.0               1.0               0.0
4              0.0              0.0               0.0               0.0

   BsmtFinType1_GLQ  BsmtFinType1_LwQ  BsmtFinType1_NA  BsmtFinType1_Rec  \
0               1.0               0.0              0.0               0.0
1               0.0               0.0              0.0               0.0
2               1.0               0.0              0.0               0.0
3               0.0               0.0              0.0               0.0
4               1.0               0.0              0.0               0.0

   BsmtFinType1_Unf  BsmtFinType2_ALQ  BsmtFinType2_BLQ  BsmtFinType2_GLQ  \
0               0.0               0.0               0.0               0.0
1               0.0               0.0               0.0               0.0
2               0.0               0.0               0.0               0.0
3               0.0               0.0               0.0               0.0
4               0.0               0.0               0.0               0.0

   BsmtFinType2_LwQ  BsmtFinType2_NA  BsmtFinType2_Rec  BsmtFinType2_Unf  \
0               0.0              0.0               0.0
```

```
1.0
1                  0.0              0.0              0.0
1.0
2                  0.0              0.0              0.0
1.0
3                  0.0              0.0              0.0
1.0
4                  0.0              0.0              0.0
1.0

   Heating_Floor  Heating_GasA  Heating_GasW  Heating_Grav  \
Heating_OthW  \
0            0.0           1.0           0.0           0.0
0.0
1            0.0           1.0           0.0           0.0
0.0
2            0.0           1.0           0.0           0.0
0.0
3            0.0           1.0           0.0           0.0
0.0
4            0.0           1.0           0.0           0.0
0.0

   Heating_Wall  HeatingQC_Ex  HeatingQC_Fa  HeatingQC_Gd  \
HeatingQC_Po  \
0           0.0           1.0           0.0           0.0
0.0
1           0.0           1.0           0.0           0.0
0.0
2           0.0           1.0           0.0           0.0
0.0
3           0.0           0.0           0.0           1.0
0.0
4           0.0           1.0           0.0           0.0
0.0

   HeatingQC_TA  CentralAir_N  CentralAir_Y  Electrical_FuseA  \
0           0.0           0.0           1.0               0.0
1           0.0           0.0           1.0               0.0
2           0.0           0.0           1.0               0.0
3           0.0           0.0           1.0               0.0
4           0.0           0.0           1.0               0.0

   Electrical_FuseF  Electrical_FuseP  Electrical_Mix  \
Electrical_SBrkr  \
0               0.0               0.0             0.0
1.0
1               0.0               0.0             0.0
1.0
2               0.0               0.0             0.0
```

```
1.0
3                0.0                0.0                0.0
1.0
4                0.0                0.0                0.0
1.0

   KitchenQual_Ex  KitchenQual_Fa  KitchenQual_Gd  KitchenQual_TA  \
0            0.0             0.0             1.0             0.0
1            0.0             0.0             0.0             1.0
2            0.0             0.0             1.0             0.0
3            0.0             0.0             1.0             0.0
4            0.0             0.0             1.0             0.0

   Functional_Maj1  Functional_Maj2  Functional_Min1  Functional_Min2
\
0              0.0              0.0              0.0              0.0

1              0.0              0.0              0.0              0.0

2              0.0              0.0              0.0              0.0

3              0.0              0.0              0.0              0.0

4              0.0              0.0              0.0              0.0


   Functional_Mod  Functional_Sev  Functional_Typ  FireplaceQu_Ex  \
0            0.0             0.0             1.0             0.0
1            0.0             0.0             1.0             0.0
2            0.0             0.0             1.0             0.0
3            0.0             0.0             1.0             0.0
4            0.0             0.0             1.0             0.0

   FireplaceQu_Fa  FireplaceQu_Gd  FireplaceQu_NA  FireplaceQu_Po  \
0            0.0             0.0             1.0             0.0
1            0.0             0.0             0.0             0.0
2            0.0             0.0             0.0             0.0
3            0.0             1.0             0.0             0.0
4            0.0             0.0             0.0             0.0

   FireplaceQu_TA  GarageType_0  GarageType_2Types  GarageType_Attchd
\
0            0.0           0.0                0.0                1.0

1            1.0           0.0                0.0                1.0

2            1.0           0.0                0.0                1.0

3            0.0           0.0                0.0                0.0

4            1.0           0.0                0.0                1.0
```

	GarageType_Basment	GarageType_BuiltIn	GarageType_CarPort	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageType_Detchd	GarageYrBlt_1895.0	GarageYrBlt_1896.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	1.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1900.0	GarageYrBlt_1906.0	GarageYrBlt_1908.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1910.0	GarageYrBlt_1914.0	GarageYrBlt_1915.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1916.0	GarageYrBlt_1917.0	GarageYrBlt_1918.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1919.0	GarageYrBlt_1920.0	GarageYrBlt_1921.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1922.0	GarageYrBlt_1923.0	GarageYrBlt_1924.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1925.0	GarageYrBlt_1926.0	GarageYrBlt_1927.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1928.0	GarageYrBlt_1929.0	GarageYrBlt_1930.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1931.0	GarageYrBlt_1932.0	GarageYrBlt_1933.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1934.0	GarageYrBlt_1935.0	GarageYrBlt_1936.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1937.0	GarageYrBlt_1938.0	GarageYrBlt_1939.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1940.0	GarageYrBlt_1941.0	GarageYrBlt_1942.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1943.0	GarageYrBlt_1945.0	GarageYrBlt_1946.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1947.0	GarageYrBlt_1948.0	GarageYrBlt_1949.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1950.0	GarageYrBlt_1951.0	GarageYrBlt_1952.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1953.0	GarageYrBlt_1954.0	GarageYrBlt_1955.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1956.0	GarageYrBlt_1957.0	GarageYrBlt_1958.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1959.0	GarageYrBlt_1960.0	GarageYrBlt_1961.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1962.0	GarageYrBlt_1963.0	GarageYrBlt_1964.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1965.0	GarageYrBlt_1966.0	GarageYrBlt_1967.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1968.0	GarageYrBlt_1969.0	GarageYrBlt_1970.0	\

0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0

	GarageYrBlt_1971.0	GarageYrBlt_1972.0	GarageYrBlt_1973.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1974.0	GarageYrBlt_1975.0	GarageYrBlt_1976.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	1.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1977.0	GarageYrBlt_1978.0	GarageYrBlt_1979.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1980.0	GarageYrBlt_1981.0	GarageYrBlt_1982.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1983.0	GarageYrBlt_1984.0	GarageYrBlt_1985.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1986.0	GarageYrBlt_1987.0	GarageYrBlt_1988.0	\
0	0.0	0.0	0.0	
1	0.0	0.0	0.0	
2	0.0	0.0	0.0	
3	0.0	0.0	0.0	
4	0.0	0.0	0.0	

	GarageYrBlt_1989.0	GarageYrBlt_1990.0	GarageYrBlt_1991.0	\
0	0.0	0.0	0.0	

```
1                   0.0                   0.0                   0.0
2                   0.0                   0.0                   0.0
3                   0.0                   0.0                   0.0
4                   0.0                   0.0                   0.0

   GarageYrBlt_1992.0  GarageYrBlt_1993.0  GarageYrBlt_1994.0  \
0                 0.0                 0.0                 0.0
1                 0.0                 0.0                 0.0
2                 0.0                 0.0                 0.0
3                 0.0                 0.0                 0.0
4                 0.0                 0.0                 0.0

   GarageYrBlt_1995.0  GarageYrBlt_1996.0  GarageYrBlt_1997.0  \
0                 0.0                 0.0                 0.0
1                 0.0                 0.0                 0.0
2                 0.0                 0.0                 0.0
3                 0.0                 0.0                 0.0
4                 0.0                 0.0                 0.0

   GarageYrBlt_1998.0  GarageYrBlt_1999.0  GarageYrBlt_2000.0  \
0                 0.0                 0.0                 0.0
1                 0.0                 0.0                 0.0
2                 0.0                 0.0                 0.0
3                 1.0                 0.0                 0.0
4                 0.0                 0.0                 1.0

   GarageYrBlt_2001.0  GarageYrBlt_2002.0  GarageYrBlt_2003.0  \
0                 0.0                 0.0                 1.0
1                 0.0                 0.0                 0.0
2                 1.0                 0.0                 0.0
3                 0.0                 0.0                 0.0
4                 0.0                 0.0                 0.0

   GarageYrBlt_2004.0  GarageYrBlt_2005.0  GarageYrBlt_2006.0  \
0                 0.0                 0.0                 0.0
1                 0.0                 0.0                 0.0
2                 0.0                 0.0                 0.0
3                 0.0                 0.0                 0.0
4                 0.0                 0.0                 0.0

   GarageYrBlt_2007.0  GarageYrBlt_2008.0  GarageYrBlt_2009.0  \
0                 0.0                 0.0                 0.0
1                 0.0                 0.0                 0.0
2                 0.0                 0.0                 0.0
3                 0.0                 0.0                 0.0
4                 0.0                 0.0                 0.0

   GarageYrBlt_2010.0  GarageYrBlt_2207.0  GarageYrBlt_NA
GarageFinish_0  \
0                 0.0                 0.0                 0.0
```

```
0.0
1                   0.0              0.0           0.0
0.0
2                   0.0              0.0           0.0
0.0
3                   0.0              0.0           0.0
0.0
4                   0.0              0.0           0.0
0.0

   GarageFinish_Fin  GarageFinish_RFn  GarageFinish_Unf
GarageCars_0.0  \
0               0.0              1.0               0.0
0.0
1               0.0              1.0               0.0
0.0
2               0.0              1.0               0.0
0.0
3               0.0              0.0               1.0
0.0
4               0.0              1.0               0.0
0.0

   GarageCars_1.0  GarageCars_2.0  GarageCars_3.0  GarageCars_4.0  \
0            0.0             1.0             0.0             0.0
1            0.0             1.0             0.0             0.0
2            0.0             1.0             0.0             0.0
3            0.0             0.0             1.0             0.0
4            0.0             0.0             1.0             0.0

   GarageCars_5.0  GarageCars_NA  GarageArea_0.0  GarageArea_100.0  \
0            0.0            0.0             0.0               0.0
1            0.0            0.0             0.0               0.0
2            0.0            0.0             0.0               0.0
3            0.0            0.0             0.0               0.0
4            0.0            0.0             0.0               0.0

   GarageArea_1003.0  GarageArea_1008.0  GarageArea_1014.0
GarageArea_1017.0  \
0                0.0                0.0                0.0
0.0
1                0.0                0.0                0.0
0.0
2                0.0                0.0                0.0
0.0
3                0.0                0.0                0.0
0.0
4                0.0                0.0                0.0
0.0
```

```
      GarageArea_1020.0   GarageArea_1025.0   GarageArea_1040.0
GarageArea_1041.0  \
0                 0.0                  0.0                  0.0
0.0
1                 0.0                  0.0                  0.0
0.0
2                 0.0                  0.0                  0.0
0.0
3                 0.0                  0.0                  0.0
0.0
4                 0.0                  0.0                  0.0
0.0

      GarageArea_1043.0   GarageArea_1052.0   GarageArea_1053.0
GarageArea_1069.0  \
0                 0.0                  0.0                  0.0
0.0
1                 0.0                  0.0                  0.0
0.0
2                 0.0                  0.0                  0.0
0.0
3                 0.0                  0.0                  0.0
0.0
4                 0.0                  0.0                  0.0
0.0

      GarageArea_1085.0   GarageArea_1092.0   GarageArea_1105.0
GarageArea_1110.0  \
0                 0.0                  0.0                  0.0
0.0
1                 0.0                  0.0                  0.0
0.0
2                 0.0                  0.0                  0.0
0.0
3                 0.0                  0.0                  0.0
0.0
4                 0.0                  0.0                  0.0
0.0

      GarageArea_1134.0   GarageArea_1138.0   GarageArea_1150.0
GarageArea_1154.0  \
0                 0.0                  0.0                  0.0
0.0
1                 0.0                  0.0                  0.0
0.0
2                 0.0                  0.0                  0.0
0.0
3                 0.0                  0.0                  0.0
0.0
4                 0.0                  0.0                  0.0
```

```
0.0

    GarageArea_1166.0  GarageArea_1174.0  GarageArea_1184.0  \
GarageArea_1200.0
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

    GarageArea_1220.0  GarageArea_1231.0  GarageArea_1248.0  \
GarageArea_1314.0
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

    GarageArea_1348.0  GarageArea_1356.0  GarageArea_1390.0  \
GarageArea_1418.0
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

    GarageArea_1488.0  GarageArea_160.0  GarageArea_162.0  \
GarageArea_164.0
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
```

```
0.0
4                     0.0                    0.0                    0.0
0.0

     GarageArea_180.0   GarageArea_184.0   GarageArea_185.0
GarageArea_186.0  \
0                     0.0                    0.0                    0.0
0.0
1                     0.0                    0.0                    0.0
0.0
2                     0.0                    0.0                    0.0
0.0
3                     0.0                    0.0                    0.0
0.0
4                     0.0                    0.0                    0.0
0.0

     GarageArea_189.0   GarageArea_192.0   GarageArea_195.0
GarageArea_198.0  \
0                     0.0                    0.0                    0.0
0.0
1                     0.0                    0.0                    0.0
0.0
2                     0.0                    0.0                    0.0
0.0
3                     0.0                    0.0                    0.0
0.0
4                     0.0                    0.0                    0.0
0.0

     GarageArea_200.0   GarageArea_205.0   GarageArea_207.0
GarageArea_208.0  \
0                     0.0                    0.0                    0.0
0.0
1                     0.0                    0.0                    0.0
0.0
2                     0.0                    0.0                    0.0
0.0
3                     0.0                    0.0                    0.0
0.0
4                     0.0                    0.0                    0.0
0.0

     GarageArea_209.0   GarageArea_210.0   GarageArea_213.0
GarageArea_215.0  \
0                     0.0                    0.0                    0.0
0.0
1                     0.0                    0.0                    0.0
0.0
2                     0.0                    0.0                    0.0
```

```
0.0
3                    0.0              0.0              0.0
0.0
4                    0.0              0.0              0.0
0.0

    GarageArea_216.0   GarageArea_217.0   GarageArea_220.0
GarageArea_224.0  \
0                    0.0              0.0              0.0
0.0
1                    0.0              0.0              0.0
0.0
2                    0.0              0.0              0.0
0.0
3                    0.0              0.0              0.0
0.0
4                    0.0              0.0              0.0
0.0

    GarageArea_225.0   GarageArea_226.0   GarageArea_228.0
GarageArea_230.0  \
0                    0.0              0.0              0.0
0.0
1                    0.0              0.0              0.0
0.0
2                    0.0              0.0              0.0
0.0
3                    0.0              0.0              0.0
0.0
4                    0.0              0.0              0.0
0.0

    GarageArea_231.0   GarageArea_234.0   GarageArea_240.0
GarageArea_242.0  \
0                    0.0              0.0              0.0
0.0
1                    0.0              0.0              0.0
0.0
2                    0.0              0.0              0.0
0.0
3                    0.0              0.0              0.0
0.0
4                    0.0              0.0              0.0
0.0

    GarageArea_244.0   GarageArea_246.0   GarageArea_248.0
GarageArea_249.0  \
0                    0.0              0.0              0.0
0.0
1                    0.0              0.0              0.0
```

```
    0.0
2                   0.0                    0.0                    0.0
    0.0
3                   0.0                    0.0                    0.0
    0.0
4                   0.0                    0.0                    0.0
    0.0

    GarageArea_250.0   GarageArea_252.0   GarageArea_253.0
GarageArea_254.0  \
0                   0.0                    0.0                    0.0
    0.0
1                   0.0                    0.0                    0.0
    0.0
2                   0.0                    0.0                    0.0
    0.0
3                   0.0                    0.0                    0.0
    0.0
4                   0.0                    0.0                    0.0
    0.0

    GarageArea_255.0   GarageArea_256.0   GarageArea_257.0
GarageArea_258.0  \
0                   0.0                    0.0                    0.0
    0.0
1                   0.0                    0.0                    0.0
    0.0
2                   0.0                    0.0                    0.0
    0.0
3                   0.0                    0.0                    0.0
    0.0
4                   0.0                    0.0                    0.0
    0.0

    GarageArea_260.0   GarageArea_261.0   GarageArea_263.0
GarageArea_264.0  \
0                   0.0                    0.0                    0.0
    0.0
1                   0.0                    0.0                    0.0
    0.0
2                   0.0                    0.0                    0.0
    0.0
3                   0.0                    0.0                    0.0
    0.0
4                   0.0                    0.0                    0.0
    0.0

    GarageArea_265.0   GarageArea_266.0   GarageArea_267.0
GarageArea_270.0  \
0                   0.0                    0.0                    0.0
```

```
0.0
1                    0.0                 0.0                 0.0
0.0
2                    0.0                 0.0                 0.0
0.0
3                    0.0                 0.0                 0.0
0.0
4                    0.0                 0.0                 0.0
0.0

   GarageArea_271.0  GarageArea_272.0  GarageArea_273.0
GarageArea_275.0  \
0                    0.0                 0.0                 0.0
0.0
1                    0.0                 0.0                 0.0
0.0
2                    0.0                 0.0                 0.0
0.0
3                    0.0                 0.0                 0.0
0.0
4                    0.0                 0.0                 0.0
0.0

   GarageArea_276.0  GarageArea_280.0  GarageArea_281.0
GarageArea_282.0  \
0                    0.0                 0.0                 0.0
0.0
1                    0.0                 0.0                 0.0
0.0
2                    0.0                 0.0                 0.0
0.0
3                    0.0                 0.0                 0.0
0.0
4                    0.0                 0.0                 0.0
0.0

   GarageArea_283.0  GarageArea_284.0  GarageArea_286.0
GarageArea_287.0  \
0                    0.0                 0.0                 0.0
0.0
1                    0.0                 0.0                 0.0
0.0
2                    0.0                 0.0                 0.0
0.0
3                    0.0                 0.0                 0.0
0.0
4                    0.0                 0.0                 0.0
0.0

   GarageArea_288.0  GarageArea_290.0  GarageArea_292.0
```

```
     GarageArea_293.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

     GarageArea_294.0  GarageArea_295.0  GarageArea_296.0
GarageArea_297.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

     GarageArea_299.0  GarageArea_300.0  GarageArea_301.0
GarageArea_303.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

     GarageArea_304.0  GarageArea_305.0  GarageArea_306.0
GarageArea_307.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0
```

```
     GarageArea_308.0  GarageArea_309.0  GarageArea_310.0
GarageArea_311.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

     GarageArea_312.0  GarageArea_313.0  GarageArea_315.0
GarageArea_316.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

     GarageArea_317.0  GarageArea_318.0  GarageArea_319.0
GarageArea_320.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

     GarageArea_322.0  GarageArea_323.0  GarageArea_324.0
GarageArea_325.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
```

```
4                   0.0                 0.0                 0.0
0.0

     GarageArea_326.0  GarageArea_327.0  GarageArea_328.0
GarageArea_330.0  \
0                   0.0                 0.0                 0.0
0.0
1                   0.0                 0.0                 0.0
0.0
2                   0.0                 0.0                 0.0
0.0
3                   0.0                 0.0                 0.0
0.0
4                   0.0                 0.0                 0.0
0.0

     GarageArea_331.0  GarageArea_332.0  GarageArea_336.0
GarageArea_338.0  \
0                   0.0                 0.0                 0.0
0.0
1                   0.0                 0.0                 0.0
0.0
2                   0.0                 0.0                 0.0
0.0
3                   0.0                 0.0                 0.0
0.0
4                   0.0                 0.0                 0.0
0.0

     GarageArea_340.0  GarageArea_342.0  GarageArea_343.0
GarageArea_344.0  \
0                   0.0                 0.0                 0.0
0.0
1                   0.0                 0.0                 0.0
0.0
2                   0.0                 0.0                 0.0
0.0
3                   0.0                 0.0                 0.0
0.0
4                   0.0                 0.0                 0.0
0.0

     GarageArea_345.0  GarageArea_349.0  GarageArea_350.0
GarageArea_351.0  \
0                   0.0                 0.0                 0.0
0.0
1                   0.0                 0.0                 0.0
0.0
2                   0.0                 0.0                 0.0
0.0
```

```
3                 0.0              0.0              0.0
0.0
4                 0.0              0.0              0.0
0.0

    GarageArea_352.0  GarageArea_353.0  GarageArea_354.0
GarageArea_355.0  \
0                 0.0              0.0              0.0
0.0
1                 0.0              0.0              0.0
0.0
2                 0.0              0.0              0.0
0.0
3                 0.0              0.0              0.0
0.0
4                 0.0              0.0              0.0
0.0

    GarageArea_356.0  GarageArea_357.0  GarageArea_358.0
GarageArea_360.0   \
0                 0.0              0.0              0.0
0.0
1                 0.0              0.0              0.0
0.0
2                 0.0              0.0              0.0
0.0
3                 0.0              0.0              0.0
0.0
4                 0.0              0.0              0.0
0.0

    GarageArea_363.0  GarageArea_364.0  GarageArea_365.0
GarageArea_366.0   \
0                 0.0              0.0              0.0
0.0
1                 0.0              0.0              0.0
0.0
2                 0.0              0.0              0.0
0.0
3                 0.0              0.0              0.0
0.0
4                 0.0              0.0              0.0
0.0

    GarageArea_367.0  GarageArea_368.0  GarageArea_369.0
GarageArea_370.0   \
0                 0.0              0.0              0.0
0.0
1                 0.0              0.0              0.0
0.0
```

```
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

   GarageArea_371.0  GarageArea_372.0  GarageArea_373.0
GarageArea_374.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

   GarageArea_375.0  GarageArea_377.0  GarageArea_378.0
GarageArea_379.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

   GarageArea_380.0  GarageArea_384.0  GarageArea_386.0
GarageArea_388.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

   GarageArea_389.0  GarageArea_390.0  GarageArea_392.0
GarageArea_393.0  \
0                  0.0               0.0               0.0
0.0
```

	GarageArea_...	GarageArea_...	GarageArea_...	GarageArea_...
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

	GarageArea_394.0	GarageArea_396.0	GarageArea_397.0	GarageArea_398.0 \
0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

	GarageArea_399.0	GarageArea_400.0	GarageArea_401.0	GarageArea_402.0 \
0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

	GarageArea_403.0	GarageArea_404.0	GarageArea_405.0	GarageArea_406.0 \
0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

	GarageArea_408.0	GarageArea_409.0	GarageArea_410.0	GarageArea_412.0 \

```
                          0.0                  0.0                  0.0
0      0.0
                          0.0                  0.0                  0.0
1      0.0
                          0.0                  0.0                  0.0
2      0.0
                          0.0                  0.0                  0.0
3      0.0
                          0.0                  0.0                  0.0
4      0.0

    GarageArea_413.0  GarageArea_414.0  GarageArea_416.0
GarageArea_418.0  \
0                0.0               0.0               0.0
0.0
1                0.0               0.0               0.0
0.0
2                0.0               0.0               0.0
0.0
3                0.0               0.0               0.0
0.0
4                0.0               0.0               0.0
0.0

    GarageArea_420.0  GarageArea_422.0  GarageArea_423.0
GarageArea_424.0  \
0                0.0               0.0               0.0
0.0
1                0.0               0.0               0.0
0.0
2                0.0               0.0               0.0
0.0
3                0.0               0.0               0.0
0.0
4                0.0               0.0               0.0
0.0

    GarageArea_425.0  GarageArea_426.0  GarageArea_427.0
GarageArea_428.0  \
0                0.0               0.0               0.0
0.0
1                0.0               0.0               0.0
0.0
2                0.0               0.0               0.0
0.0
3                0.0               0.0               0.0
0.0
4                0.0               0.0               0.0
0.0
```

```
     GarageArea_429.0  GarageArea_430.0  GarageArea_431.0
GarageArea_432.0  \
0               0.0               0.0               0.0
0.0
1               0.0               0.0               0.0
0.0
2               0.0               0.0               0.0
0.0
3               0.0               0.0               0.0
0.0
4               0.0               0.0               0.0
0.0

     GarageArea_433.0  GarageArea_434.0  GarageArea_435.0
GarageArea_436.0  \
0               0.0               0.0               0.0
0.0
1               0.0               0.0               0.0
0.0
2               0.0               0.0               0.0
0.0
3               0.0               0.0               0.0
0.0
4               0.0               0.0               0.0
0.0

     GarageArea_437.0  GarageArea_438.0  GarageArea_439.0
GarageArea_440.0  \
0               0.0               0.0               0.0
0.0
1               0.0               0.0               0.0
0.0
2               0.0               0.0               0.0
0.0
3               0.0               0.0               0.0
0.0
4               0.0               0.0               0.0
0.0

     GarageArea_441.0  GarageArea_442.0  GarageArea_443.0
GarageArea_444.0  \
0               0.0               0.0               0.0
0.0
1               0.0               0.0               0.0
0.0
2               0.0               0.0               0.0
0.0
3               0.0               0.0               0.0
0.0
4               0.0               0.0               0.0
```

```
0.0

     GarageArea_445.0   GarageArea_447.0   GarageArea_449.0
GarageArea_450.0  \
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

     GarageArea_451.0   GarageArea_452.0   GarageArea_453.0
GarageArea_454.0  \
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

     GarageArea_455.0   GarageArea_456.0   GarageArea_457.0
GarageArea_458.0  \
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

     GarageArea_459.0   GarageArea_460.0   GarageArea_461.0
GarageArea_462.0  \
0                 0.0                0.0                0.0
0.0
1                 0.0                1.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
```

```
0.0
4                     0.0              0.0              0.0
0.0

     GarageArea_463.0   GarageArea_464.0   GarageArea_465.0
GarageArea_466.0  \
0                     0.0              0.0              0.0
0.0
1                     0.0              0.0              0.0
0.0
2                     0.0              0.0              0.0
0.0
3                     0.0              0.0              0.0
0.0
4                     0.0              0.0              0.0
0.0

     GarageArea_467.0   GarageArea_468.0   GarageArea_469.0
GarageArea_470.0  \
0                     0.0              0.0              0.0
0.0
1                     0.0              0.0              0.0
0.0
2                     0.0              0.0              0.0
0.0
3                     0.0              0.0              0.0
0.0
4                     0.0              0.0              0.0
0.0

     GarageArea_471.0   GarageArea_472.0   GarageArea_473.0
GarageArea_474.0  \
0                     0.0              0.0              0.0
0.0
1                     0.0              0.0              0.0
0.0
2                     0.0              0.0              0.0
0.0
3                     0.0              0.0              0.0
0.0
4                     0.0              0.0              0.0
0.0

     GarageArea_475.0   GarageArea_476.0   GarageArea_477.0
GarageArea_478.0  \
0                     0.0              0.0              0.0
0.0
1                     0.0              0.0              0.0
0.0
2                     0.0              0.0              0.0
```

```
0.0
3                 0.0              0.0              0.0
0.0
4                 0.0              0.0              0.0
0.0

   GarageArea_479.0  GarageArea_480.0  GarageArea_481.0
GarageArea_482.0  \
0                 0.0              0.0              0.0
0.0
1                 0.0              0.0              0.0
0.0
2                 0.0              0.0              0.0
0.0
3                 0.0              0.0              0.0
0.0
4                 0.0              0.0              0.0
0.0

   GarageArea_483.0  GarageArea_484.0  GarageArea_485.0
GarageArea_486.0  \
0                 0.0              0.0              0.0
0.0
1                 0.0              0.0              0.0
0.0
2                 0.0              0.0              0.0
0.0
3                 0.0              0.0              0.0
0.0
4                 0.0              0.0              0.0
0.0

   GarageArea_487.0  GarageArea_488.0  GarageArea_489.0
GarageArea_490.0  \
0                 0.0              0.0              0.0
0.0
1                 0.0              0.0              0.0
0.0
2                 0.0              0.0              0.0
0.0
3                 0.0              0.0              0.0
0.0
4                 0.0              0.0              0.0
0.0

   GarageArea_492.0  GarageArea_493.0  GarageArea_494.0
GarageArea_495.0  \
0                 0.0              0.0              0.0
0.0
1                 0.0              0.0              0.0
```

```
0.0
2                  0.0                  0.0                  0.0
0.0
3                  0.0                  0.0                  0.0
0.0
4                  0.0                  0.0                  0.0
0.0

   GarageArea_496.0   GarageArea_497.0   GarageArea_498.0
GarageArea_499.0  \
0                  0.0                  0.0                  0.0
0.0
1                  0.0                  0.0                  0.0
0.0
2                  0.0                  0.0                  0.0
0.0
3                  0.0                  0.0                  0.0
0.0
4                  0.0                  0.0                  0.0
0.0

   GarageArea_500.0   GarageArea_501.0   GarageArea_502.0
GarageArea_504.0  \
0                  0.0                  0.0                  0.0
0.0
1                  0.0                  0.0                  0.0
0.0
2                  0.0                  0.0                  0.0
0.0
3                  0.0                  0.0                  0.0
0.0
4                  0.0                  0.0                  0.0
0.0

   GarageArea_505.0   GarageArea_506.0   GarageArea_508.0
GarageArea_509.0  \
0                  0.0                  0.0                  0.0
0.0
1                  0.0                  0.0                  0.0
0.0
2                  0.0                  0.0                  0.0
0.0
3                  0.0                  0.0                  0.0
0.0
4                  0.0                  0.0                  0.0
0.0

   GarageArea_510.0   GarageArea_511.0   GarageArea_512.0
GarageArea_513.0  \
0                  0.0                  0.0                  0.0
```

```
   0.0
1                   0.0              0.0              0.0
   0.0
2                   0.0              0.0              0.0
   0.0
3                   0.0              0.0              0.0
   0.0
4                   0.0              0.0              0.0
   0.0

   GarageArea_514.0  GarageArea_515.0  GarageArea_516.0  \
GarageArea_517.0
0                   0.0              0.0              0.0
   0.0
1                   0.0              0.0              0.0
   0.0
2                   0.0              0.0              0.0
   0.0
3                   0.0              0.0              0.0
   0.0
4                   0.0              0.0              0.0
   0.0

   GarageArea_518.0  GarageArea_520.0  GarageArea_521.0  \
GarageArea_522.0
0                   0.0              0.0              0.0
   0.0
1                   0.0              0.0              0.0
   0.0
2                   0.0              0.0              0.0
   0.0
3                   0.0              0.0              0.0
   0.0
4                   0.0              0.0              0.0
   0.0

   GarageArea_523.0  GarageArea_524.0  GarageArea_525.0  \
GarageArea_526.0
0                   0.0              0.0              0.0
   0.0
1                   0.0              0.0              0.0
   0.0
2                   0.0              0.0              0.0
   0.0
3                   0.0              0.0              0.0
   0.0
4                   0.0              0.0              0.0
   0.0

   GarageArea_527.0  GarageArea_528.0  GarageArea_529.0
```

```
       GarageArea_530.0  \
0                  0.0                   0.0                   0.0
0.0
1                  0.0                   0.0                   0.0
0.0
2                  0.0                   0.0                   0.0
0.0
3                  0.0                   0.0                   0.0
0.0
4                  0.0                   0.0                   0.0
0.0

    GarageArea_531.0  GarageArea_532.0  GarageArea_533.0
GarageArea_534.0  \
0                  0.0                   0.0                   0.0
0.0
1                  0.0                   0.0                   0.0
0.0
2                  0.0                   0.0                   0.0
0.0
3                  0.0                   0.0                   0.0
0.0
4                  0.0                   0.0                   0.0
0.0

    GarageArea_535.0  GarageArea_538.0  GarageArea_539.0
GarageArea_540.0  \
0                  0.0                   0.0                   0.0
0.0
1                  0.0                   0.0                   0.0
0.0
2                  0.0                   0.0                   0.0
0.0
3                  0.0                   0.0                   0.0
0.0
4                  0.0                   0.0                   0.0
0.0

    GarageArea_541.0  GarageArea_542.0  GarageArea_543.0
GarageArea_544.0  \
0                  0.0                   0.0                   0.0
0.0
1                  0.0                   0.0                   0.0
0.0
2                  0.0                   0.0                   0.0
0.0
3                  0.0                   0.0                   0.0
0.0
4                  0.0                   0.0                   0.0
0.0
```

```
     GarageArea_545.0   GarageArea_546.0   GarageArea_548.0
GarageArea_549.0   \
0                0.0                0.0                1.0
0.0
1                0.0                0.0                0.0
0.0
2                0.0                0.0                0.0
0.0
3                0.0                0.0                0.0
0.0
4                0.0                0.0                0.0
0.0

     GarageArea_550.0   GarageArea_551.0   GarageArea_552.0
GarageArea_554.0   \
0                0.0                0.0                0.0
0.0
1                0.0                0.0                0.0
0.0
2                0.0                0.0                0.0
0.0
3                0.0                0.0                0.0
0.0
4                0.0                0.0                0.0
0.0

     GarageArea_555.0   GarageArea_556.0   GarageArea_557.0
GarageArea_558.0   \
0                0.0                0.0                0.0
0.0
1                0.0                0.0                0.0
0.0
2                0.0                0.0                0.0
0.0
3                0.0                0.0                0.0
0.0
4                0.0                0.0                0.0
0.0

     GarageArea_559.0   GarageArea_560.0   GarageArea_561.0
GarageArea_562.0   \
0                0.0                0.0                0.0
0.0
1                0.0                0.0                0.0
0.0
2                0.0                0.0                0.0
0.0
3                0.0                0.0                0.0
0.0
```

```
4                    0.0              0.0              0.0
0.0

    GarageArea_564.0  GarageArea_565.0  GarageArea_566.0
GarageArea_567.0  \
0                    0.0              0.0              0.0
0.0
1                    0.0              0.0              0.0
0.0
2                    0.0              0.0              0.0
0.0
3                    0.0              0.0              0.0
0.0
4                    0.0              0.0              0.0
0.0

    GarageArea_568.0  GarageArea_569.0  GarageArea_570.0
GarageArea_571.0  \
0                    0.0              0.0              0.0
0.0
1                    0.0              0.0              0.0
0.0
2                    0.0              0.0              0.0
0.0
3                    0.0              0.0              0.0
0.0
4                    0.0              0.0              0.0
0.0

    GarageArea_572.0  GarageArea_573.0  GarageArea_574.0
GarageArea_575.0  \
0                    0.0              0.0              0.0
0.0
1                    0.0              0.0              0.0
0.0
2                    0.0              0.0              0.0
0.0
3                    0.0              0.0              0.0
0.0
4                    0.0              0.0              0.0
0.0

    GarageArea_576.0  GarageArea_577.0  GarageArea_578.0
GarageArea_579.0  \
0                    0.0              0.0              0.0
0.0
1                    0.0              0.0              0.0
0.0
2                    0.0              0.0              0.0
0.0
```

```
3                0.0            0.0            0.0
0.0
4                0.0            0.0            0.0
0.0

   GarageArea_580.0  GarageArea_581.0  GarageArea_582.0
GarageArea_583.0  \
0                0.0            0.0            0.0
0.0
1                0.0            0.0            0.0
0.0
2                0.0            0.0            0.0
0.0
3                0.0            0.0            0.0
0.0
4                0.0            0.0            0.0
0.0

   GarageArea_584.0  GarageArea_585.0  GarageArea_586.0
GarageArea_588.0  \
0                0.0            0.0            0.0
0.0
1                0.0            0.0            0.0
0.0
2                0.0            0.0            0.0
0.0
3                0.0            0.0            0.0
0.0
4                0.0            0.0            0.0
0.0

   GarageArea_590.0  GarageArea_591.0  GarageArea_592.0
GarageArea_594.0  \
0                0.0            0.0            0.0
0.0
1                0.0            0.0            0.0
0.0
2                0.0            0.0            0.0
0.0
3                0.0            0.0            0.0
0.0
4                0.0            0.0            0.0
0.0

   GarageArea_595.0  GarageArea_596.0  GarageArea_597.0
GarageArea_598.0  \
0                0.0            0.0            0.0
0.0
1                0.0            0.0            0.0
0.0
```

	GarageArea_599.0	GarageArea_600.0	GarageArea_601.0	GarageArea_602.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

GarageArea_599.0 GarageArea_600.0 GarageArea_601.0 GarageArea_602.0 \

	GarageArea_599.0	GarageArea_600.0	GarageArea_601.0	GarageArea_602.0
0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

GarageArea_603.0 GarageArea_604.0 GarageArea_605.0 GarageArea_606.0 \

	GarageArea_603.0	GarageArea_604.0	GarageArea_605.0	GarageArea_606.0
0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

GarageArea_608.0 GarageArea_609.0 GarageArea_610.0 GarageArea_611.0 \

	GarageArea_608.0	GarageArea_609.0	GarageArea_610.0	GarageArea_611.0
0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0
2	1.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0

GarageArea_612.0 GarageArea_613.0 GarageArea_614.0 GarageArea_615.0 \

	GarageArea_612.0	GarageArea_613.0	GarageArea_614.0	GarageArea_615.0
0	0.0	0.0	0.0	0.0

```
1                      0.0                    0.0                     0.0
0.0
2                      0.0                    0.0                     0.0
0.0
3                      0.0                    0.0                     0.0
0.0
4                      0.0                    0.0                     0.0
0.0

    GarageArea_616.0  GarageArea_617.0  GarageArea_618.0
GarageArea_619.0  \
0                      0.0                    0.0                     0.0
0.0
1                      0.0                    0.0                     0.0
0.0
2                      0.0                    0.0                     0.0
0.0
3                      0.0                    0.0                     0.0
0.0
4                      0.0                    0.0                     0.0
0.0

    GarageArea_620.0  GarageArea_621.0  GarageArea_622.0
GarageArea_623.0  \
0                      0.0                    0.0                     0.0
0.0
1                      0.0                    0.0                     0.0
0.0
2                      0.0                    0.0                     0.0
0.0
3                      0.0                    0.0                     0.0
0.0
4                      0.0                    0.0                     0.0
0.0

    GarageArea_624.0  GarageArea_625.0  GarageArea_626.0
GarageArea_627.0  \
0                      0.0                    0.0                     0.0
0.0
1                      0.0                    0.0                     0.0
0.0
2                      0.0                    0.0                     0.0
0.0
3                      0.0                    0.0                     0.0
0.0
4                      0.0                    0.0                     0.0
0.0

    GarageArea_628.0  GarageArea_630.0  GarageArea_631.0
GarageArea_632.0  \
```

```
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

    GarageArea_636.0  GarageArea_638.0  GarageArea_639.0
GarageArea_640.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

    GarageArea_641.0  GarageArea_642.0  GarageArea_644.0
GarageArea_645.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               1.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

    GarageArea_646.0  GarageArea_647.0  GarageArea_648.0
GarageArea_649.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0
```

```
   GarageArea_650.0  GarageArea_656.0  GarageArea_658.0
GarageArea_660.0  \
0               0.0               0.0               0.0
0.0
1               0.0               0.0               0.0
0.0
2               0.0               0.0               0.0
0.0
3               0.0               0.0               0.0
0.0
4               0.0               0.0               0.0
0.0

   GarageArea_662.0  GarageArea_663.0  GarageArea_665.0
GarageArea_666.0  \
0               0.0               0.0               0.0
0.0
1               0.0               0.0               0.0
0.0
2               0.0               0.0               0.0
0.0
3               0.0               0.0               0.0
0.0
4               0.0               0.0               0.0
0.0

   GarageArea_667.0  GarageArea_668.0  GarageArea_670.0
GarageArea_671.0  \
0               0.0               0.0               0.0
0.0
1               0.0               0.0               0.0
0.0
2               0.0               0.0               0.0
0.0
3               0.0               0.0               0.0
0.0
4               0.0               0.0               0.0
0.0

   GarageArea_672.0  GarageArea_673.0  GarageArea_674.0
GarageArea_675.0  \
0               0.0               0.0               0.0
0.0
1               0.0               0.0               0.0
0.0
2               0.0               0.0               0.0
0.0
3               0.0               0.0               0.0
0.0
4               0.0               0.0               0.0
```

```
0.0

     GarageArea_676.0   GarageArea_678.0   GarageArea_680.0
GarageArea_682.0   \
0                   0.0                0.0                0.0
0.0
1                   0.0                0.0                0.0
0.0
2                   0.0                0.0                0.0
0.0
3                   0.0                0.0                0.0
0.0
4                   0.0                0.0                0.0
0.0

     GarageArea_683.0   GarageArea_684.0   GarageArea_685.0
GarageArea_686.0   \
0                   0.0                0.0                0.0
0.0
1                   0.0                0.0                0.0
0.0
2                   0.0                0.0                0.0
0.0
3                   0.0                0.0                0.0
0.0
4                   0.0                0.0                0.0
0.0

     GarageArea_687.0   GarageArea_688.0   GarageArea_689.0
GarageArea_690.0   \
0                   0.0                0.0                0.0
0.0
1                   0.0                0.0                0.0
0.0
2                   0.0                0.0                0.0
0.0
3                   0.0                0.0                0.0
0.0
4                   0.0                0.0                0.0
0.0

     GarageArea_691.0   GarageArea_692.0   GarageArea_693.0
GarageArea_694.0   \
0                   0.0                0.0                0.0
0.0
1                   0.0                0.0                0.0
0.0
2                   0.0                0.0                0.0
0.0
3                   0.0                0.0                0.0
```

```
0.0
4                  0.0                  0.0                  0.0
0.0

     GarageArea_696.0  GarageArea_698.0  GarageArea_700.0
GarageArea_701.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

     GarageArea_702.0  GarageArea_704.0  GarageArea_706.0
GarageArea_708.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

     GarageArea_711.0  GarageArea_712.0  GarageArea_713.0
GarageArea_714.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

     GarageArea_715.0  GarageArea_716.0  GarageArea_719.0
GarageArea_720.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
```

```
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

   GarageArea_721.0  GarageArea_722.0  GarageArea_724.0
GarageArea_725.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

   GarageArea_726.0  GarageArea_728.0  GarageArea_729.0
GarageArea_730.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

   GarageArea_732.0  GarageArea_736.0  GarageArea_738.0
GarageArea_739.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
0.0
2                 0.0               0.0               0.0
0.0
3                 0.0               0.0               0.0
0.0
4                 0.0               0.0               0.0
0.0

   GarageArea_740.0  GarageArea_741.0  GarageArea_744.0
GarageArea_746.0  \
0                 0.0               0.0               0.0
0.0
1                 0.0               0.0               0.0
```

```
0.0
2                  0.0              0.0              0.0
0.0
3                  0.0              0.0              0.0
0.0
4                  0.0              0.0              0.0
0.0

   GarageArea_747.0  GarageArea_748.0  GarageArea_749.0
GarageArea_750.0  \
0                  0.0              0.0              0.0
0.0
1                  0.0              0.0              0.0
0.0
2                  0.0              0.0              0.0
0.0
3                  0.0              0.0              0.0
0.0
4                  0.0              0.0              0.0
0.0

   GarageArea_751.0  GarageArea_752.0  GarageArea_753.0
GarageArea_754.0  \
0                  0.0              0.0              0.0
0.0
1                  0.0              0.0              0.0
0.0
2                  0.0              0.0              0.0
0.0
3                  0.0              0.0              0.0
0.0
4                  0.0              0.0              0.0
0.0

   GarageArea_756.0  GarageArea_757.0  GarageArea_758.0
GarageArea_760.0  \
0                  0.0              0.0              0.0
0.0
1                  0.0              0.0              0.0
0.0
2                  0.0              0.0              0.0
0.0
3                  0.0              0.0              0.0
0.0
4                  0.0              0.0              0.0
0.0

   GarageArea_762.0  GarageArea_765.0  GarageArea_766.0
GarageArea_768.0  \
0                  0.0              0.0              0.0
```

```
0.0
1                    0.0               0.0               0.0
0.0
2                    0.0               0.0               0.0
0.0
3                    0.0               0.0               0.0
0.0
4                    0.0               0.0               0.0
0.0

   GarageArea_770.0  GarageArea_772.0  GarageArea_773.0
GarageArea_774.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

   GarageArea_776.0  GarageArea_779.0  GarageArea_780.0
GarageArea_782.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

   GarageArea_783.0  GarageArea_784.0  GarageArea_786.0
GarageArea_787.0  \
0                  0.0               0.0               0.0
0.0
1                  0.0               0.0               0.0
0.0
2                  0.0               0.0               0.0
0.0
3                  0.0               0.0               0.0
0.0
4                  0.0               0.0               0.0
0.0

   GarageArea_788.0  GarageArea_789.0  GarageArea_791.0
```

```
       GarageArea_792.0  \
0                   0.0                     0.0                     0.0
0.0
1                   0.0                     0.0                     0.0
0.0
2                   0.0                     0.0                     0.0
0.0
3                   0.0                     0.0                     0.0
0.0
4                   0.0                     0.0                     0.0
0.0

     GarageArea_795.0   GarageArea_796.0   GarageArea_800.0
GarageArea_803.0  \
0                   0.0                     0.0                     0.0
0.0
1                   0.0                     0.0                     0.0
0.0
2                   0.0                     0.0                     0.0
0.0
3                   0.0                     0.0                     0.0
0.0
4                   0.0                     0.0                     0.0
0.0

     GarageArea_804.0   GarageArea_806.0   GarageArea_807.0
GarageArea_808.0  \
0                   0.0                     0.0                     0.0
0.0
1                   0.0                     0.0                     0.0
0.0
2                   0.0                     0.0                     0.0
0.0
3                   0.0                     0.0                     0.0
0.0
4                   0.0                     0.0                     0.0
0.0

     GarageArea_810.0   GarageArea_811.0   GarageArea_812.0
GarageArea_813.0  \
0                   0.0                     0.0                     0.0
0.0
1                   0.0                     0.0                     0.0
0.0
2                   0.0                     0.0                     0.0
0.0
3                   0.0                     0.0                     0.0
0.0
4                   0.0                     0.0                     0.0
0.0
```

```
      GarageArea_814.0   GarageArea_815.0   GarageArea_816.0
GarageArea_818.0   \
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

      GarageArea_820.0   GarageArea_824.0   GarageArea_825.0
GarageArea_826.0   \
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

      GarageArea_828.0   GarageArea_830.0   GarageArea_831.0
GarageArea_832.0   \
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
4                 0.0                0.0                0.0
0.0

      GarageArea_833.0   GarageArea_834.0   GarageArea_836.0
GarageArea_839.0   \
0                 0.0                0.0                0.0
0.0
1                 0.0                0.0                0.0
0.0
2                 0.0                0.0                0.0
0.0
3                 0.0                0.0                0.0
0.0
```

```
4                   0.0                   0.0                   1.0
0.0

   GarageArea_840.0   GarageArea_841.0   GarageArea_842.0
GarageArea_843.0  \
0                   0.0                   0.0                   0.0
0.0
1                   0.0                   0.0                   0.0
0.0
2                   0.0                   0.0                   0.0
0.0
3                   0.0                   0.0                   0.0
0.0
4                   0.0                   0.0                   0.0
0.0

   GarageArea_844.0   GarageArea_845.0   GarageArea_846.0
GarageArea_848.0  \
0                   0.0                   0.0                   0.0
0.0
1                   0.0                   0.0                   0.0
0.0
2                   0.0                   0.0                   0.0
0.0
3                   0.0                   0.0                   0.0
0.0
4                   0.0                   0.0                   0.0
0.0

   GarageArea_850.0   GarageArea_851.0   GarageArea_852.0
GarageArea_853.0  \
0                   0.0                   0.0                   0.0
0.0
1                   0.0                   0.0                   0.0
0.0
2                   0.0                   0.0                   0.0
0.0
3                   0.0                   0.0                   0.0
0.0
4                   0.0                   0.0                   0.0
0.0

   GarageArea_856.0   GarageArea_857.0   GarageArea_858.0
GarageArea_859.0  \
0                   0.0                   0.0                   0.0
0.0
1                   0.0                   0.0                   0.0
0.0
2                   0.0                   0.0                   0.0
0.0
```

```
3              0.0                0.0                0.0
0.0
4              0.0                0.0                0.0
0.0

    GarageArea_860.0  GarageArea_862.0  GarageArea_864.0
GarageArea_865.0  \
0              0.0                0.0                0.0
0.0
1              0.0                0.0                0.0
0.0
2              0.0                0.0                0.0
0.0
3              0.0                0.0                0.0
0.0
4              0.0                0.0                0.0
0.0

    GarageArea_866.0  GarageArea_868.0  GarageArea_869.0
GarageArea_870.0  \
0              0.0                0.0                0.0
0.0
1              0.0                0.0                0.0
0.0
2              0.0                0.0                0.0
0.0
3              0.0                0.0                0.0
0.0
4              0.0                0.0                0.0
0.0

    GarageArea_871.0  GarageArea_872.0  GarageArea_874.0
GarageArea_876.0  \
0              0.0                0.0                0.0
0.0
1              0.0                0.0                0.0
0.0
2              0.0                0.0                0.0
0.0
3              0.0                0.0                0.0
0.0
4              0.0                0.0                0.0
0.0

    GarageArea_878.0  GarageArea_880.0  GarageArea_884.0
GarageArea_885.0  \
0              0.0                0.0                0.0
0.0
1              0.0                0.0                0.0
0.0
```

```
2                    0.0                 0.0                 0.0
0.0
3                    0.0                 0.0                 0.0
0.0
4                    0.0                 0.0                 0.0
0.0

    GarageArea_886.0  GarageArea_888.0  GarageArea_889.0
GarageArea_890.0  \
0                    0.0                 0.0                 0.0
0.0
1                    0.0                 0.0                 0.0
0.0
2                    0.0                 0.0                 0.0
0.0
3                    0.0                 0.0                 0.0
0.0
4                    0.0                 0.0                 0.0
0.0

    GarageArea_892.0  GarageArea_894.0  GarageArea_895.0
GarageArea_896.0  \
0                    0.0                 0.0                 0.0
0.0
1                    0.0                 0.0                 0.0
0.0
2                    0.0                 0.0                 0.0
0.0
3                    0.0                 0.0                 0.0
0.0
4                    0.0                 0.0                 0.0
0.0

    GarageArea_898.0  GarageArea_899.0  GarageArea_900.0
GarageArea_902.0  \
0                    0.0                 0.0                 0.0
0.0
1                    0.0                 0.0                 0.0
0.0
2                    0.0                 0.0                 0.0
0.0
3                    0.0                 0.0                 0.0
0.0
4                    0.0                 0.0                 0.0
0.0

    GarageArea_904.0  GarageArea_905.0  GarageArea_907.0
GarageArea_908.0  \
0                    0.0                 0.0                 0.0
0.0
```

```
1                  0.0              0.0              0.0
0.0
2                  0.0              0.0              0.0
0.0
3                  0.0              0.0              0.0
0.0
4                  0.0              0.0              0.0
0.0

   GarageArea_912.0  GarageArea_916.0  GarageArea_920.0
GarageArea_923.0  \
0                  0.0              0.0              0.0
0.0
1                  0.0              0.0              0.0
0.0
2                  0.0              0.0              0.0
0.0
3                  0.0              0.0              0.0
0.0
4                  0.0              0.0              0.0
0.0

   GarageArea_924.0  GarageArea_925.0  GarageArea_927.0
GarageArea_928.0  \
0                  0.0              0.0              0.0
0.0
1                  0.0              0.0              0.0
0.0
2                  0.0              0.0              0.0
0.0
3                  0.0              0.0              0.0
0.0
4                  0.0              0.0              0.0
0.0

   GarageArea_932.0  GarageArea_933.0  GarageArea_936.0
GarageArea_938.0  \
0                  0.0              0.0              0.0
0.0
1                  0.0              0.0              0.0
0.0
2                  0.0              0.0              0.0
0.0
3                  0.0              0.0              0.0
0.0
4                  0.0              0.0              0.0
0.0

   GarageArea_944.0  GarageArea_947.0  GarageArea_949.0
GarageArea_954.0  \
```

```
                    0.0                    0.0                    0.0
0.0
1                   0.0                    0.0                    0.0
0.0
2                   0.0                    0.0                    0.0
0.0
3                   0.0                    0.0                    0.0
0.0
4                   0.0                    0.0                    0.0
0.0

    GarageArea_958.0  GarageArea_959.0  GarageArea_962.0
GarageArea_963.0  \
0                   0.0                    0.0                    0.0
0.0
1                   0.0                    0.0                    0.0
0.0
2                   0.0                    0.0                    0.0
0.0
3                   0.0                    0.0                    0.0
0.0
4                   0.0                    0.0                    0.0
0.0

    GarageArea_968.0  GarageArea_972.0  GarageArea_983.0
GarageArea_984.0  \
0                   0.0                    0.0                    0.0
0.0
1                   0.0                    0.0                    0.0
0.0
2                   0.0                    0.0                    0.0
0.0
3                   0.0                    0.0                    0.0
0.0
4                   0.0                    0.0                    0.0
0.0

    GarageArea_995.0  GarageArea_NA  GarageQual_0  GarageQual_Ex  \
0                0.0             0.0           0.0            0.0
1                0.0             0.0           0.0            0.0
2                0.0             0.0           0.0            0.0
3                0.0             0.0           0.0            0.0
4                0.0             0.0           0.0            0.0

    GarageQual_Fa  GarageQual_Gd  GarageQual_Po  GarageQual_TA
GarageCond_0  \
0             0.0            0.0            0.0            1.0
0.0
1             0.0            0.0            0.0            1.0
0.0
```

```
2           0.0              0.0              0.0              1.0
0.0
3           0.0              0.0              0.0              1.0
0.0
4           0.0              0.0              0.0              1.0
0.0

    GarageCond_Ex  GarageCond_Fa  GarageCond_Gd  GarageCond_Po  \
GarageCond_TA
0           0.0              0.0              0.0              0.0
1.0
1           0.0              0.0              0.0              0.0
1.0
2           0.0              0.0              0.0              0.0
1.0
3           0.0              0.0              0.0              0.0
1.0
4           0.0              0.0              0.0              0.0
1.0

    PavedDrive_N  PavedDrive_P  PavedDrive_Y  SaleType_COD  \
SaleType_CWD
0           0.0              0.0              1.0              0.0
0.0
1           0.0              0.0              1.0              0.0
0.0
2           0.0              0.0              1.0              0.0
0.0
3           0.0              0.0              1.0              0.0
0.0
4           0.0              0.0              1.0              0.0
0.0

    SaleType_Con  SaleType_ConLD  SaleType_ConLI  SaleType_ConLw  \
SaleType_New
0           0.0              0.0              0.0              0.0
0.0
1           0.0              0.0              0.0              0.0
0.0
2           0.0              0.0              0.0              0.0
0.0
3           0.0              0.0              0.0              0.0
0.0
4           0.0              0.0              0.0              0.0
0.0

    SaleType_Oth  SaleType_WD  SaleCondition_Abnorml  \
SaleCondition_AdjLand
0           0.0              1.0                      0.0
0.0
```

```
1             0.0              1.0                     0.0
0.0
2             0.0              1.0                     0.0
0.0
3             0.0              1.0                     1.0
0.0
4             0.0              1.0                     0.0
0.0

    SaleCondition_Alloca  SaleCondition_Family  SaleCondition_Normal  \
0                    0.0                   0.0                   1.0
1                    0.0                   0.0                   1.0
2                    0.0                   0.0                   1.0
3                    0.0                   0.0                   0.0
4                    0.0                   0.0                   1.0

    SaleCondition_Partial
0                    0.0
1                    0.0
2                    0.0
3                    0.0
4                    0.0
```

```python
plt.figure(figsize=(16,9))
sns.heatmap(finalencoded_df.isnull())
plt.show()
```
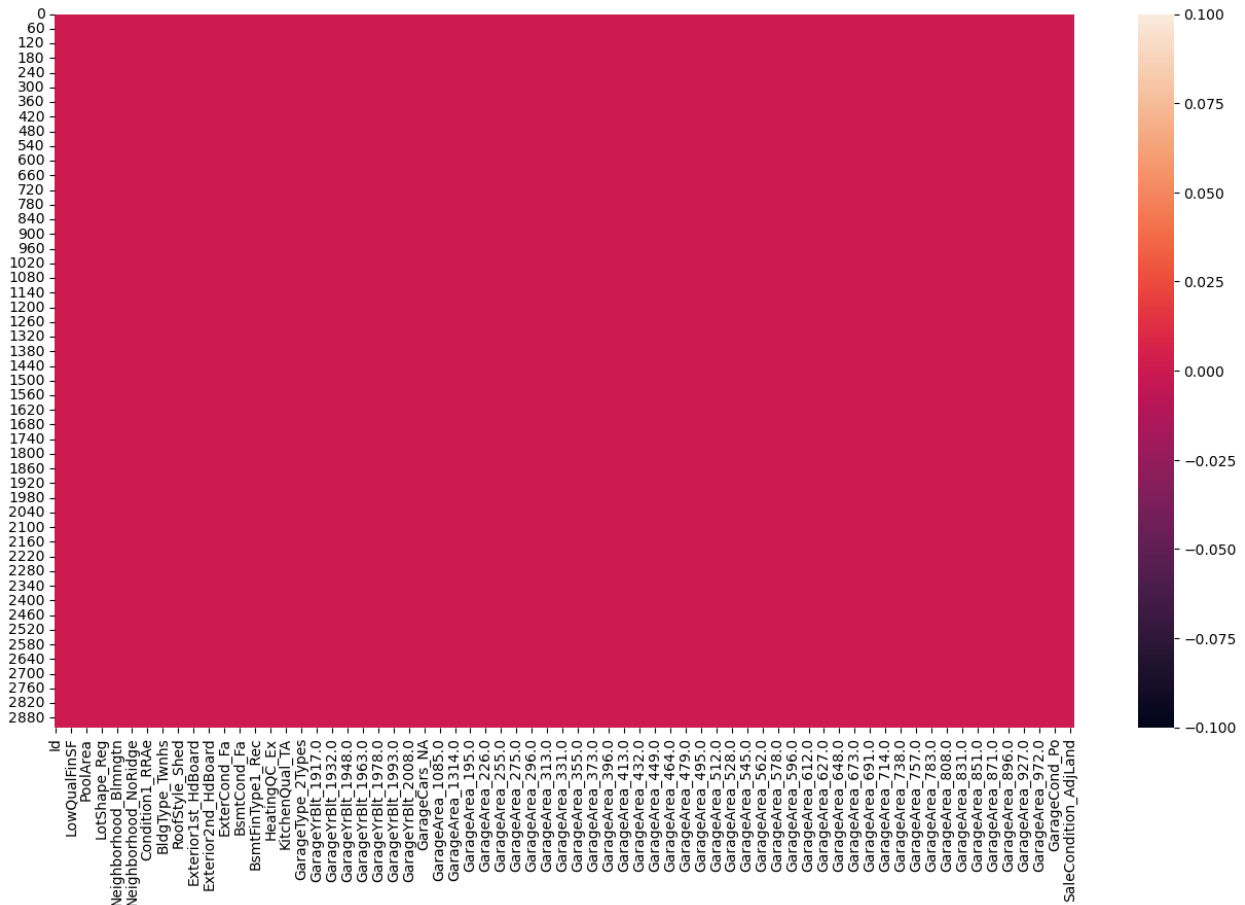
splitting the dataset for training and testing

```python
from sklearn.model_selection import train_test_split

y=finalencoded_df['SalePrice']

x=finalencoded_df.drop('SalePrice',axis=1)

x.shape

(2919, 994)

y.shape

(2919,)

x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.25,random_state=41)

x_train.shape

(2189, 994)
```

```
x_test.shape

(730, 994)
```

#standarlization

```
from sklearn.preprocessing import StandardScaler

scaler=StandardScaler()

# Fit the scaler on the training data
x_train_scaled = scaler.fit_transform(x_train)

# Transform the test data
x_test_scaled = scaler.transform(x_test)

from sklearn.linear_model import LinearRegression
from sklearn.svm import SVR
from sklearn.linear_model import SGDRegressor
from sklearn.neighbors import KNeighborsRegressor
from sklearn.gaussian_process import GaussianProcessRegressor
from sklearn.tree import DecisionTreeRegressor
from sklearn.ensemble import GradientBoostingRegressor,
RandomForestRegressor
from sklearn.neural_network import MLPRegressor
from sklearn.isotonic import IsotonicRegression
from sklearn.metrics import mean_squared_error

models = {
    'Linear Regression': LinearRegression(),
    'Support Vector Regressor': SVR(),
    'Stochastic Gradient Descent Regressor': SGDRegressor(),
    'K-Neighbors Regressor': KNeighborsRegressor(),
    'Gaussian Process Regressor': GaussianProcessRegressor(),
    'Decision Tree Regressor': DecisionTreeRegressor(),
    'Gradient Boosting Regressor': GradientBoostingRegressor(),
    'Random Forest Regressor': RandomForestRegressor(),
    'MLP Regressor': MLPRegressor(),

}

from sklearn.metrics import mean_squared_error, r2_score,
mean_absolute_error
import numpy as np

# Dictionary to store the results
results = {}

for name, model in models.items():
    # Fit the model
```

```python
    model.fit(x_train_scaled, y_train)

    # Make predictions
    y_pred = model.predict(x_test_scaled)

    # Evaluate the model
    mse = mean_squared_error(y_test, y_pred)
    r2 = r2_score(y_test, y_pred)
    mae = mean_absolute_error(y_test, y_pred)

    # Calculate percentage of predictions within a certain error
margin
    error_margin = 0.1  # Example: 10% error margin
    within_margin = np.mean(np.abs((y_pred - y_test) / y_test) <
error_margin) * 100

    results[name] = {
        'Mean Squared Error': mse,
        'R^2 Score': r2,
        'Mean Absolute Error': mae,
        'Percentage within Margin': within_margin
    }

# Print the results
for name, metrics in results.items():
    print(f"{name}:\n"
          f"  Mean Squared Error = {metrics['Mean Squared Error']}\n"
          f"  R^2 Score = {metrics['R^2 Score']}\n"
          f"  Mean Absolute Error = {metrics['Mean Absolute Error']}\
n"
          f"  Percentage within Margin = {metrics['Percentage within
Margin']}%\n")

Linear Regression:
  Mean Squared Error = 6.356124328459283e+34
  R^2 Score = -2.508157755063288e+25
  Mean Absolute Error = 6.735754396389763e+16
  Percentage within Margin = 30.136986301369863%

Support Vector Regressor:
  Mean Squared Error = 2536223986.2156878
  R^2 Score = -0.0008063925247923098
  Mean Absolute Error = 27707.36273908661
  Percentage within Margin = 59.31506849315068%

Stochastic Gradient Descent Regressor:
  Mean Squared Error = 918783610771333.6
  R^2 Score = -362555.5076288819
  Mean Absolute Error = 21393273.25271547
  Percentage within Margin = 0.136986301369863%
```

```
K-Neighbors Regressor:
  Mean Squared Error = 2199251233.227001
  R^2 Score = 0.13216470432259597
  Mean Absolute Error = 31527.37426534059
  Percentage within Margin = 42.6027397260274%

Gaussian Process Regressor:
  Mean Squared Error = 34682429375.063484
  R^2 Score = -12.68585630271746
  Mean Absolute Error = 179162.78522091787
  Percentage within Margin = 0.136986301369863%

Decision Tree Regressor:
  Mean Squared Error = 738046089.7712328
  R^2 Score = 0.7087634023511044
  Mean Absolute Error = 13292.42328767151
  Percentage within Margin = 72.6027397260274%

Gradient Boosting Regressor:
  Mean Squared Error = 459445431.63771856
  R^2 Score = 0.8187005850041522
  Mean Absolute Error = 10369.01500793016
  Percentage within Margin = 80.41095890410959%

Random Forest Regressor:
  Mean Squared Error = 454751388.3841601
  R^2 Score = 0.8205528774359255
  Mean Absolute Error = 8728.295749033785
  Percentage within Margin = 83.28767123287672%

MLP Regressor:
  Mean Squared Error = 27171485999.986156
  R^2 Score = -9.722001302321662
  Mean Absolute Error = 159031.62012404026
  Percentage within Margin = 0.0%


C:\Users\adity\anaconda3\Lib\site-packages\sklearn\neural_network\
_multilayer_perceptron.py:686: ConvergenceWarning: Stochastic
Optimizer: Maximum iterations (200) reached and the optimization
hasn't converged yet.
  warnings.warn(
```

''' the Random Forest Regressor is the best model. It has the lowest MSE, the highest R^2 score, the lowest MAE, and the highest percentage of predictions within the margin. This indicates that it performs best overall in terms of accuracy and error rates. '''