

House Prices - Advanced Regression Techniques

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1 Case : House Prices - Advanced Regression Techniques

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CRISP-DM methodology

1.1 Business Understanding

Goal: ### Predict sales prices and practice feature engineering, RFs, and gradient boosting

1.2 For more information, see the project metadata: [Project Metadata](#)

```
[2]: #Required libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import statsmodels.api as sm
import seaborn as sns
from scipy.stats import skew
from scipy.stats import zscore
from sklearn.preprocessing import LabelEncoder, OneHotEncoder, RobustScaler,OrdinalEncoder
from sklearn.linear_model import Ridge, Lasso
from sklearn.metrics import mean_squared_error, f1_score, mean_absolute_error,r2_score, make_scorer
import scipy.stats as stats
from catboost import CatBoostRegressor
from sklearn.ensemble import RandomForestRegressor, RandomForestClassifier
from sklearn.exceptions import ConvergenceWarning
from sklearn.linear_model import LinearRegression
from sklearn.neighbors import KNeighborsRegressor
from sklearn.svm import SVR
from sklearn.tree import DecisionTreeRegressor
from xgboost import XGBRegressor
from sklearn.model_selection import train_test_split, cross_val_score,GridSearchCV
from sklearn.preprocessing import StandardScaler
```

2 Data Understanding

2.1 Load and preview the dataset

```
[4]: #Read data from file
data_train = pd.read_csv('train.csv')
data_train.head()
```

```
[4]:   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 ... PoolArea PoolQC Fence MiscFeature MiscVal MoSold \
0        Lvl    AllPub ...      0    NaN    NaN        NaN    0      2
1        Lvl    AllPub ...      0    NaN    NaN        NaN    0      5
2        Lvl    AllPub ...      0    NaN    NaN        NaN    0      9
3        Lvl    AllPub ...      0    NaN    NaN        NaN    0      2
4        Lvl    AllPub ...      0    NaN    NaN        NaN    0     12

  YrSold SaleType SaleCondition SalePrice
0  2008      WD      Normal    208500
1  2007      WD      Normal    181500
2  2008      WD      Normal    223500
3  2006      WD    Abnorml    140000
4  2008      WD      Normal    250000

[5 rows x 81 columns]
```

```
[5]: data_train.shape
```

```
[5]: (1460, 81)
```

```
[ ]:
```

```
[6]: data_train['SalePrice']
```

```
[6]: 0      208500
1      181500
2      223500
3      140000
4      250000
...
1455    175000
1456    210000
1457    266500
```

```
1458      142125
1459      147500
Name: SalePrice, Length: 1460, dtype: int64
```

```
[7]: # Summary statistics
data_train.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
```

```
[8]: data_test = pd.read_csv('test.csv')
data_test.head()
```

```
[8]:    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 ... ScreenPorch PoolArea PoolQC Fence MiscFeature \
0        Lvl    AllPub   ...        120        0    NaN  MnPrv      NaN
1        Lvl    AllPub   ...         0        0    NaN  NaN  Gar2
2        Lvl    AllPub   ...         0        0    NaN  MnPrv      NaN
3        Lvl    AllPub   ...         0        0    NaN  NaN  NaN
4       HLS    AllPub   ...        144        0    NaN  NaN  NaN

  MiscVal MoSold  YrSold SaleType SaleCondition
0      0       6    2010      WD      Normal
1  12500       6    2010      WD      Normal
2      0       3    2010      WD      Normal
3      0       6    2010      WD      Normal
4      0       1    2010      WD      Normal
```

[5 rows x 80 columns]

```
[9]: data_test.shape
```

```
[9]: (1459, 80)
```

3 Data Preparation

3.1 Missing Values Analysis

```
[11]: np.sum(data_train.isnull())
np.sum(data_test.isnull())
```

```
C:\ProgramData\anaconda3\Lib\site-packages\numpy\core\fromnumeric.py:86:
FutureWarning: The behavior of DataFrame.sum with axis=None is deprecated, in a
future version this will reduce over both axes and return a scalar. To retain
the old behavior, pass axis=0 (or do not pass axis)
    return reduction(axis=axis, out=out, **passkwargs)
```

```
[11]: Id          0
MSSubClass      0
MSZoning        4
LotFrontage     227
LotArea          0
```

```
..  
MiscVal          0  
MoSold           0  
YrSold           0  
SaleType          1  
SaleCondition     0  
Length: 80, dtype: int64
```

```
[12]: msv_summary_train = data_train.isnull().sum().sort_values(ascending = False)  
print('msv_summary_train :\n', msv_summary_train[msv_summary_train > 0])  
  
msv_summary_test = data_test.isnull().sum().sort_values(ascending = False)  
print('msv_summary_test :\n', msv_summary_test[msv_summary_test > 0])
```

```
msv_summary_train :  
PoolQC          1453  
MiscFeature      1406  
Alley            1369  
Fence            1179  
MasVnrType       872  
FireplaceQu      690  
LotFrontage      259  
GarageYrBlt      81  
GarageCond        81  
GarageType        81  
GarageFinish      81  
GarageQual        81  
BsmtFinType2      38  
BsmtExposure      38  
BsmtQual          37  
BsmtCond          37  
BsmtFinType1      37  
MasVnrArea         8  
Electrical         1  
dtype: int64  
msv_summary_test :  
PoolQC          1456  
MiscFeature      1408  
Alley            1352  
Fence            1169  
MasVnrType       894  
FireplaceQu      730  
LotFrontage      227  
GarageYrBlt      78  
GarageQual        78  
GarageFinish      78  
GarageCond        78  
GarageType         76
```

```

BsmtCond      45
BsmtQual      44
BsmtExposure   44
BsmtFinType1    42
BsmtFinType2    42
MasVnrArea     15
MSZoning        4
BsmtHalfBath    2
Utilities        2
Functional       2
BsmtFullBath    2
BsmtFinSF1      1
BsmtFinSF2      1
BsmtUnfSF       1
KitchenQual      1
TotalBsmtSF      1
Exterior2nd      1
GarageCars        1
Exterior1st      1
GarageArea        1
SaleType          1
dtype: int64

```

```
[13]: msv_summary_train = pd.DataFrame({'freq': np.sum(data_train.isnull())})
msv_summary_train ['pct'] = round(msv_summary_train['freq']/data_train.shape[0] * 100, 1)
msv_summary_train.sort_values(by = 'pct', ascending = False)

print(msv_summary_train.sort_values(by = 'pct', ascending = False)[msv_summary_train.sort_values(by = 'pct', ascending = False) > 50])
```

	freq	pct
PoolQC	1453.0	99.5
MiscFeature	1406.0	96.3
Alley	1369.0	93.8
Fence	1179.0	80.8
MasVnrType	872.0	59.7
...
ExterQual	NaN	NaN
Exterior2nd	NaN	NaN
Exterior1st	NaN	NaN
RoofMatl	NaN	NaN
SalePrice	NaN	NaN

[81 rows x 2 columns]

C:\ProgramData\anaconda3\Lib\site-packages\numpy\core\fromnumeric.py:86:
FutureWarning: The behavior of DataFrame.sum with axis=None is deprecated, in a

```
future version this will reduce over both axes and return a scalar. To retain  
the old behavior, pass axis=0 (or do not pass axis)  
    return reduction(axis=axis, out=out, **passkwargs)
```

```
[14]: msv_summary_test = pd.DataFrame({'freq': np.sum(data_test.isnull())})  
msv_summary_test ['pct'] = round(msv_summary_test['freq']/data_test.shape[0] *  
    ↪100, 1)  
msv_summary_test.sort_values(by = 'pct', ascending = False)  
  
print(msv_summary_test.sort_values(by = 'pct', ascending =  
    ↪False)[msv_summary_test.sort_values(by = 'pct', ascending = False) > 50])
```

	freq	pct
PoolQC	1456.0	99.8
MiscFeature	1408.0	96.5
Alley	1352.0	92.7
Fence	1169.0	80.1
MasVnrType	894.0	61.3
...
Electrical	NaN	NaN
1stFlrSF	NaN	NaN
2ndFlrSF	NaN	NaN
LowQualFinSF	NaN	NaN
SaleCondition	NaN	NaN

[80 rows x 2 columns]

```
C:\ProgramData\anaconda3\Lib\site-packages\numpy\core\fromnumeric.py:86:  
FutureWarning: The behavior of DataFrame.sum with axis=None is deprecated, in a  
future version this will reduce over both axes and return a scalar. To retain  
the old behavior, pass axis=0 (or do not pass axis)  
    return reduction(axis=axis, out=out, **passkwargs)
```

```
[15]: print(data_train.duplicated().sum())  
print(data_train.loc[:, data_train.nunique() == 1].columns)  
  
print(data_test.duplicated().sum())  
print(data_test.loc[:, data_train.nunique() == 1].columns)
```

```
0  
Index([], dtype='object')  
0  
Index([], dtype='object')
```

```
[16]: # List of columns to drop  
columns_to_drop = ['PoolQC', 'MiscFeature', 'Alley', 'Fence', 'MasVnrType',  
    ↪'FireplaceQu']  
  
# Drop the columns
```

```

data_train.drop(columns = columns_to_drop, inplace = True, errors = 'ignore')
data_test.drop(columns = columns_to_drop, inplace = True, errors = 'ignore')

# Check the shape after dropping columns
print("Shape after dropping columns:", data_train.shape)
print("Shape after dropping columns:", data_test.shape)
# Check missing value summary
msv_summary_train = data_train.isnull().sum() / len(data_train) * 100 #or ↵
msv_summary_train = pd.DataFrame(msv_summary_train, columns=['pct'])
msv_summary_test = data_test.isnull().sum() / len(data_test) * 100 #or ↵
msv_summary_test = pd.DataFrame(msv_summary_test, columns=['pct'])
print('msv_summary_train_new : \n', msv_summary_train.sort_values(by='pct', ↵
    ascending=False))
print('msv_summary_test_new : \n', msv_summary_test.sort_values(by='pct', ↵
    ascending=False))

```

Shape after dropping columns: (1460, 75)

Shape after dropping columns: (1459, 74)

msv_summary_train_new :

	pct
LotFrontage	17.739726
GarageYrBlt	5.547945
GarageCond	5.547945
GarageType	5.547945
GarageFinish	5.547945
...	...
BsmtUnfSF	0.000000
TotalBsmtSF	0.000000
MSSubClass	0.000000
HeatingQC	0.000000
SalePrice	0.000000

[75 rows x 1 columns]

msv_summary_test_new :

	pct
LotFrontage	15.558602
GarageYrBlt	5.346127
GarageFinish	5.346127
GarageQual	5.346127
GarageCond	5.346127
...	...
CentralAir	0.000000
Electrical	0.000000
1stFlrSF	0.000000
2ndFlrSF	0.000000

```
SaleCondition    0.000000
```

```
[74 rows x 1 columns]
```

4 Variables Analysis

```
[18]: data_train.set_index('Id', inplace=True)
data_test.set_index('Id', inplace=True)
```

```
[19]: print(data_train.describe())

plt.figure(figsize=(8, 5))
sns.histplot(data_train['SalePrice'], kde=True, bins=50)
plt.title("Distribution of SalePrice")
plt.show()
```

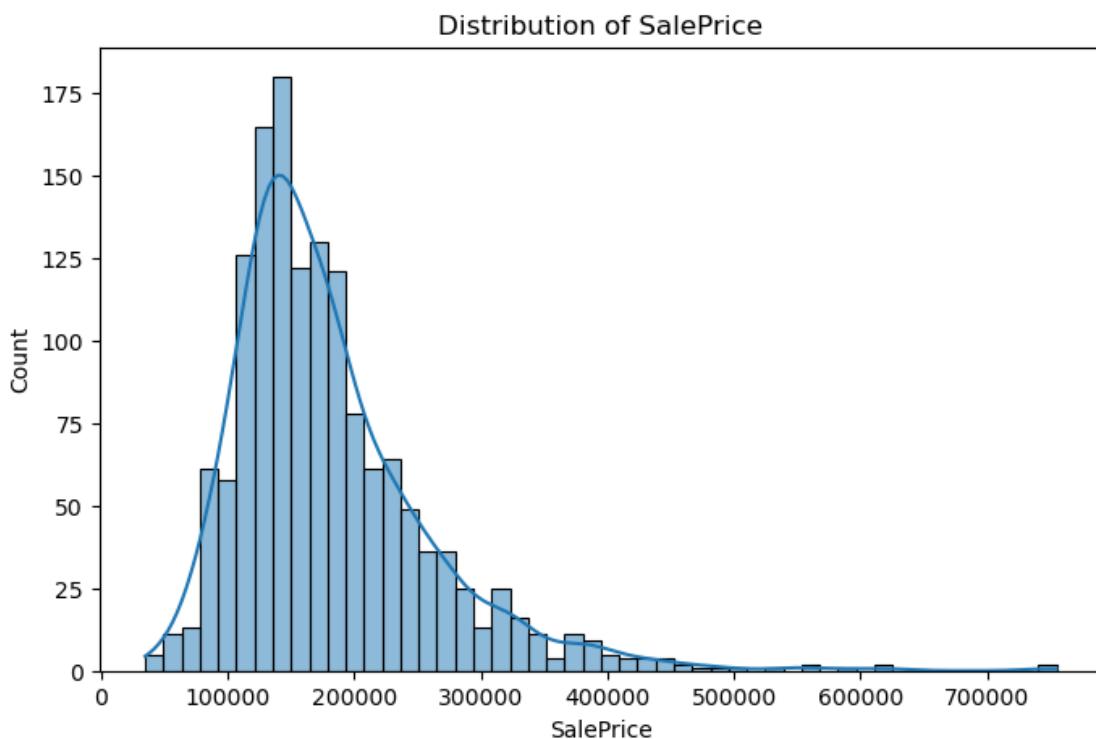
	MSSubClass	LotFrontage	LotArea	OverallQual	OverallCond	\
count	1460.000000	1201.000000	1460.000000	1460.000000	1460.000000	
mean	56.897260	70.049958	10516.828082	6.099315	5.575342	
std	42.300571	24.284752	9981.264932	1.382997	1.112799	
min	20.000000	21.000000	1300.000000	1.000000	1.000000	
25%	20.000000	59.000000	7553.500000	5.000000	5.000000	
50%	50.000000	69.000000	9478.500000	6.000000	5.000000	
75%	70.000000	80.000000	11601.500000	7.000000	6.000000	
max	190.000000	313.000000	215245.000000	10.000000	9.000000	
	YearBuilt	YearRemodAdd	MasVnrArea	BsmtFinSF1	BsmtFinSF2	... \
count	1460.000000	1460.000000	1452.000000	1460.000000	1460.000000	...
mean	1971.267808	1984.865753	103.685262	443.639726	46.549315	...
std	30.202904	20.645407	181.066207	456.098091	161.319273	...
min	1872.000000	1950.000000	0.000000	0.000000	0.000000	...
25%	1954.000000	1967.000000	0.000000	0.000000	0.000000	...
50%	1973.000000	1994.000000	0.000000	383.500000	0.000000	...
75%	2000.000000	2004.000000	166.000000	712.250000	0.000000	...
max	2010.000000	2010.000000	1600.000000	5644.000000	1474.000000	...
	WoodDeckSF	OpenPorchSF	EnclosedPorch	3SsnPorch	ScreenPorch	\
count	1460.000000	1460.000000	1460.000000	1460.000000	1460.000000	
mean	94.244521	46.660274	21.954110	3.409589	15.060959	
std	125.338794	66.256028	61.119149	29.317331	55.757415	
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	25.000000	0.000000	0.000000	0.000000	
75%	168.000000	68.000000	0.000000	0.000000	0.000000	
max	857.000000	547.000000	552.000000	508.000000	480.000000	
	PoolArea	MiscVal	MoSold	YrSold	SalePrice	

```

count    1460.000000    1460.000000    1460.000000    1460.000000    1460.000000
mean      2.758904     43.489041     6.321918   2007.815753 180921.195890
std       40.177307    496.123024    2.703626     1.328095  79442.502883
min       0.000000     0.000000    1.000000   2006.000000 34900.000000
25%      0.000000     0.000000    5.000000   2007.000000 129975.000000
50%      0.000000     0.000000    6.000000   2008.000000 163000.000000
75%      0.000000     0.000000    8.000000   2009.000000 214000.000000
max      738.000000   15500.000000   12.000000  2010.000000 755000.000000

```

[8 rows x 37 columns]



```

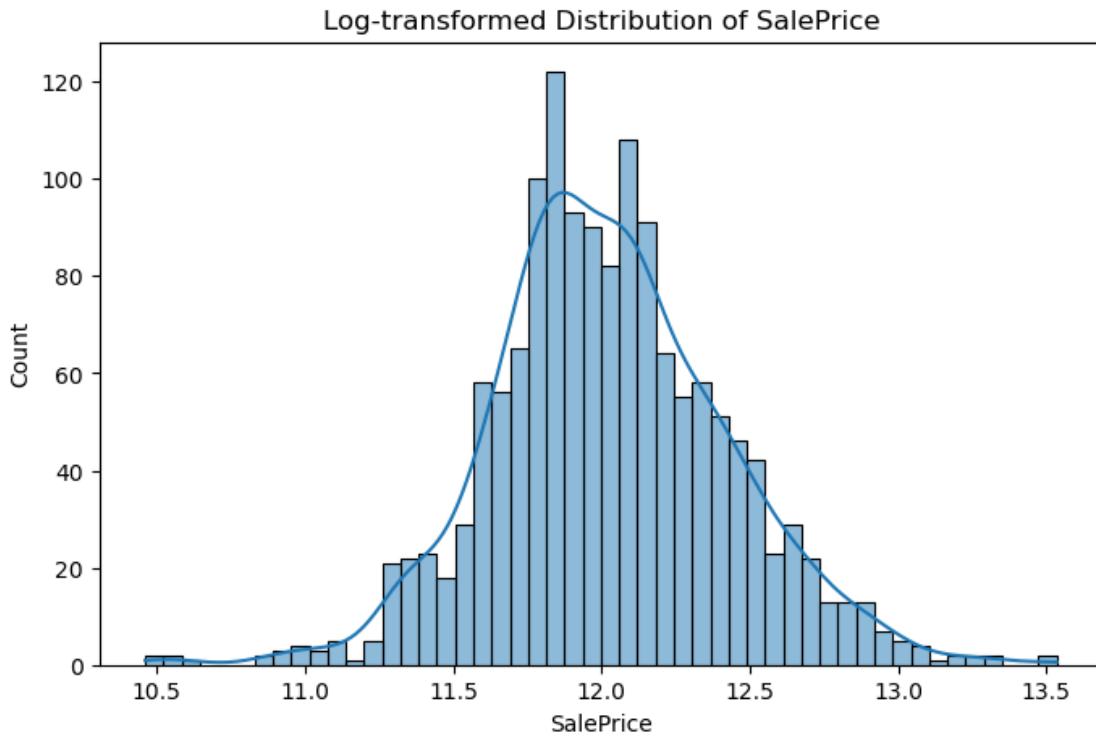
[20]: print(data_train['SalePrice'].skew())

if data_train['SalePrice'].skew() > 1:
    data_train['SalePrice'] = np.log1p(data_train['SalePrice'])

plt.figure(figsize=(8, 5))
sns.histplot(data_train['SalePrice'], kde=True, bins=50)
plt.title("Log-transformed Distribution of SalePrice")
plt.show()

```

1.8828757597682129



```
[21]: numeric_features_train = data_train.select_dtypes(include=['int64', 'float64'])

msv_numeric_features_train = [col for col in numeric_features_train.columns if
    ~data_train[col].isnull().sum() > 0]

print(msv_numeric_features_train)

print("-----")
numeric_features_test = data_test.select_dtypes(include=['int64', 'float64'])

msv_numeric_features_test = [col for col in numeric_features_test.columns if
    ~data_test[col].isnull().sum() > 0]

print(msv_numeric_features_test)

['LotFrontage', 'MasVnrArea', 'GarageYrBlt']
-----
['LotFrontage', 'MasVnrArea', 'BsmtFinSF1', 'BsmtFinSF2', 'BsmtUnfSF',
'TotalBsmtSF', 'BsmtFullBath', 'BsmtHalfBath', 'GarageYrBlt', 'GarageCars',
'GarageArea']

[22]: # Ensure that numeric_features_train is a list of numeric column names
```

```

numeric_features_train = numeric_features_train.columns.tolist() if ↴
    ↪hasattr(numeric_features_train, 'columns') else numeric_features_train

# Remove columns that should not be analyzed (e.g., 'Id')
ignore_columns = ['Id'] # Add any other columns to ignore here
numeric_features_train = [col for col in numeric_features_train if col not in ↴
    ↪ignore_columns]

# Loop through all pairwise relationships among numeric features
for i in range(len(numeric_features_train)):
    for j in range(i + 1, len(numeric_features_train)):
        col1 = numeric_features_train[i]
        col2 = numeric_features_train[j]

        # Check if both columns are present in the dataset
        if col1 in data_train.columns and col2 in data_train.columns:
            print(f"Checking pairwise relationship for {col1} and {col2}:")

            # Create flags for missing values in both columns
            data_train[f'{col1}_missing_flag'] = np.where(data_train[col1].
                ↪isnull(), 1, 0)
            data_train[f'{col2}_missing_flag'] = np.where(data_train[col2].
                ↪isnull(), 1, 0)

            # Calculate the mean of col1 when it is present and missing
            mean_col1_not_null = round(data_train.
                ↪loc[data_train[f'{col1}_missing_flag'] == 0, col1].mean(), 1)
            mean_col1_null = round(data_train.
                ↪loc[data_train[f'{col1}_missing_flag'] == 1, col1].mean(), 1)

            # Calculate the mean of col2 when it is present and missing
            mean_col2_not_null = round(data_train.
                ↪loc[data_train[f'{col2}_missing_flag'] == 0, col2].mean(), 1)
            mean_col2_null = round(data_train.
                ↪loc[data_train[f'{col2}_missing_flag'] == 1, col2].mean(), 1)

            # Print the results of the analysis
            print(f"Mean of {col1} when present: {mean_col1_not_null}")
            print(f"Mean of {col1} when missing: {mean_col1_null}")
            print(f"Mean of {col2} when present: {mean_col2_not_null}")
            print(f"Mean of {col2} when missing: {mean_col2_null}")
            print("-----")
        else:
            # Handle the case where one or both columns are missing in the ↴
            ↪dataset

```

```

        print(f"One of the columns ({col1} or {col2}) is missing in the dataset.")

print("-----TEST-----")
# Ensure that numeric_features_test is a list of numeric column names
numeric_features_test = numeric_features_test.columns.tolist() if hasattr(numeric_features_test, 'columns') else numeric_features_test

# Remove columns that should not be analyzed (e.g., 'Id')
ignore_columns = ['Id'] # Add any other columns to ignore here
numeric_features_test = [col for col in numeric_features_test if col not in ignore_columns]

# Loop through all pairwise relationships among numeric features
for i in range(len(numeric_features_test)):
    for j in range(i + 1, len(numeric_features_test)):
        col1 = numeric_features_test[i]
        col2 = numeric_features_test[j]

        # Check if both columns are present in the dataset
        if col1 in data_test.columns and col2 in data_test.columns:
            print(f"Checking pairwise relationship for {col1} and {col2}:")

            # Create flags for missing values in both columns
            data_test[f'{col1}_missing_flag'] = np.where(data_test[col1].isnull(), 1, 0)
            data_test[f'{col2}_missing_flag'] = np.where(data_test[col2].isnull(), 1, 0)

            # Calculate the mean of col1 when it is present and missing
            mean_col1_not_null = round(data_test.loc[data_test[f'{col1}_missing_flag'] == 0, col1].mean(), 1)
            mean_col1_null = round(data_test.loc[data_test[f'{col1}_missing_flag'] == 1, col1].mean(), 1)

            # Calculate the mean of col2 when it is present and missing
            mean_col2_not_null = round(data_test.loc[data_test[f'{col2}_missing_flag'] == 0, col2].mean(), 1)
            mean_col2_null = round(data_test.loc[data_test[f'{col2}_missing_flag'] == 1, col2].mean(), 1)

            # Print the results of the analysis
            print(f"Mean of {col1} when present: {mean_col1_not_null}")
            print(f"Mean of {col1} when missing: {mean_col1_null}")

```

```

        print(f"Mean of {col2} when present: {mean_col2_not_null}")
        print(f"Mean of {col2} when missing: {mean_col2_null}")
        print("-----")
    else:
        # Handle the case where one or both columns are missing in the
        ↵dataset
        print(f"One of the columns ({col1} or {col2}) is missing in the
        ↵dataset.")

```

Checking pairwise relationship for MSSubClass and LotFrontage:

Mean of MSSubClass when present: 56.9
 Mean of MSSubClass when missing: nan
 Mean of LotFrontage when present: 70.0
 Mean of LotFrontage when missing: nan

 Checking pairwise relationship for MSSubClass and LotArea:

Mean of MSSubClass when present: 56.9
 Mean of MSSubClass when missing: nan
 Mean of LotArea when present: 10516.8
 Mean of LotArea when missing: nan

 Checking pairwise relationship for MSSubClass and OverallQual:

Mean of MSSubClass when present: 56.9
 Mean of MSSubClass when missing: nan
 Mean of OverallQual when present: 6.1
 Mean of OverallQual when missing: nan

 Checking pairwise relationship for MSSubClass and OverallCond:

Mean of MSSubClass when present: 56.9
 Mean of MSSubClass when missing: nan
 Mean of OverallCond when present: 5.6
 Mean of OverallCond when missing: nan

 Checking pairwise relationship for MSSubClass and YearBuilt:

Mean of MSSubClass when present: 56.9
 Mean of MSSubClass when missing: nan
 Mean of YearBuilt when present: 1971.3
 Mean of YearBuilt when missing: nan

 Checking pairwise relationship for MSSubClass and YearRemodAdd:

Mean of MSSubClass when present: 56.9
 Mean of MSSubClass when missing: nan
 Mean of YearRemodAdd when present: 1984.9
 Mean of YearRemodAdd when missing: nan

 Checking pairwise relationship for MSSubClass and MasVnrArea:

Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan

Checking pairwise relationship for MSSubClass and BsmtFinSF1:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for MSSubClass and BsmtFinSF2:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for MSSubClass and BsmtUnfSF:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for MSSubClass and TotalBsmtSF:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for MSSubClass and 1stFlrSF:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for MSSubClass and 2ndFlrSF:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for MSSubClass and LowQualFinSF:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for MSSubClass and GrLivArea:

Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for MSSubClass and BsmtFullBath:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for MSSubClass and BsmtHalfBath:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for MSSubClass and FullBath:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for MSSubClass and HalfBath:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for MSSubClass and BedroomAbvGr:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for MSSubClass and KitchenAbvGr:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for MSSubClass and TotRmsAbvGrd:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for MSSubClass and Fireplaces:

Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for MSSubClass and GarageYrBlt:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for MSSubClass and GarageCars:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for MSSubClass and GarageArea:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for MSSubClass and WoodDeckSF:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for MSSubClass and OpenPorchSF:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for MSSubClass and EnclosedPorch:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for MSSubClass and 3SsnPorch:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for MSSubClass and ScreenPorch:

Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for MSSubClass and PoolArea:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for MSSubClass and MiscVal:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for MSSubClass and MoSold:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for MSSubClass and YrSold:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for MSSubClass and SalePrice:
Mean of MSSubClass when present: 56.9
Mean of MSSubClass when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for LotFrontage and LotArea:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan

Checking pairwise relationship for LotFrontage and OverallQual:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan

Checking pairwise relationship for LotFrontage and OverallCond:

Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan

Checking pairwise relationship for LotFrontage and YearBuilt:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan

Checking pairwise relationship for LotFrontage and YearRemodAdd:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for LotFrontage and MasVnrArea:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan

Checking pairwise relationship for LotFrontage and BsmtFinSF1:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for LotFrontage and BsmtFinSF2:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for LotFrontage and BsmtUnfSF:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for LotFrontage and TotalBsmtSF:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for LotFrontage and 1stFlrSF:

Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for LotFrontage and 2ndFlrSF:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for LotFrontage and LowQualFinSF:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for LotFrontage and GrLivArea:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for LotFrontage and BsmtFullBath:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for LotFrontage and BsmtHalfBath:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for LotFrontage and FullBath:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for LotFrontage and HalfBath:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for LotFrontage and BedroomAbvGr:

Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for LotFrontage and KitchenAbvGr:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for LotFrontage and TotRmsAbvGrd:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for LotFrontage and Fireplaces:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for LotFrontage and GarageYrBlt:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for LotFrontage and GarageCars:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for LotFrontage and GarageArea:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for LotFrontage and WoodDeckSF:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for LotFrontage and OpenPorchSF:

Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for LotFrontage and EnclosedPorch:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for LotFrontage and 3SsnPorch:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for LotFrontage and ScreenPorch:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for LotFrontage and PoolArea:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for LotFrontage and MiscVal:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for LotFrontage and MoSold:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for LotFrontage and YrSold:
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for LotFrontage and SalePrice:

```
Mean of LotFrontage when present: 70.0
Mean of LotFrontage when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan
-----
Checking pairwise relationship for LotArea and OverallQual:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
-----
Checking pairwise relationship for LotArea and OverallCond:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
-----
Checking pairwise relationship for LotArea and YearBuilt:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
-----
Checking pairwise relationship for LotArea and YearRemodAdd:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
-----
Checking pairwise relationship for LotArea and MasVnrArea:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
-----
Checking pairwise relationship for LotArea and BsmtFinSF1:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
-----
Checking pairwise relationship for LotArea and BsmtFinSF2:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
-----
Checking pairwise relationship for LotArea and BsmtUnfSF:
```

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of BsmtUnfSF when present: 567.2

Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for LotArea and TotalBsmtSF:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of TotalBsmtSF when present: 1057.4

Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for LotArea and 1stFlrSF:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of 1stFlrSF when present: 1162.6

Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for LotArea and 2ndFlrSF:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of 2ndFlrSF when present: 347.0

Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for LotArea and LowQualFinSF:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of LowQualFinSF when present: 5.8

Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for LotArea and GrLivArea:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of GrLivArea when present: 1515.5

Mean of GrLivArea when missing: nan

Checking pairwise relationship for LotArea and BsmtFullBath:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for LotArea and BsmtHalfBath:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for LotArea and FullBath:

Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for LotArea and HalfBath:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for LotArea and BedroomAbvGr:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for LotArea and KitchenAbvGr:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for LotArea and TotRmsAbvGrd:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for LotArea and Fireplaces:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for LotArea and GarageYrBlt:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for LotArea and GarageCars:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for LotArea and GarageArea:

Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for LotArea and WoodDeckSF:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for LotArea and OpenPorchSF:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for LotArea and EnclosedPorch:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for LotArea and 3SsnPorch:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for LotArea and ScreenPorch:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for LotArea and PoolArea:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for LotArea and MiscVal:
Mean of LotArea when present: 10516.8
Mean of LotArea when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for LotArea and MoSold:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of MoSold when present: 6.3

Mean of MoSold when missing: nan

Checking pairwise relationship for LotArea and YrSold:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for LotArea and SalePrice:

Mean of LotArea when present: 10516.8

Mean of LotArea when missing: nan

Mean of SalePrice when present: 12.0

Mean of SalePrice when missing: nan

Checking pairwise relationship for OverallQual and OverallCond:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Checking pairwise relationship for OverallQual and YearBuilt:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of YearBuilt when present: 1971.3

Mean of YearBuilt when missing: nan

Checking pairwise relationship for OverallQual and YearRemodAdd:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of YearRemodAdd when present: 1984.9

Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for OverallQual and MasVnrArea:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of MasVnrArea when present: 103.7

Mean of MasVnrArea when missing: nan

Checking pairwise relationship for OverallQual and BsmtFinSF1:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for OverallQual and BsmtFinSF2:

Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for OverallQual and BsmtUnfSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for OverallQual and TotalBsmtSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for OverallQual and 1stFlrSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for OverallQual and 2ndFlrSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for OverallQual and LowQualFinSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for OverallQual and GrLivArea:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for OverallQual and BsmtFullBath:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for OverallQual and BsmtHalfBath:

Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for OverallQual and FullBath:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for OverallQual and HalfBath:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for OverallQual and BedroomAbvGr:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for OverallQual and KitchenAbvGr:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for OverallQual and TotRmsAbvGrd:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for OverallQual and Fireplaces:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for OverallQual and GarageYrBlt:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for OverallQual and GarageCars:

Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for OverallQual and GarageArea:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for OverallQual and WoodDeckSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for OverallQual and OpenPorchSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for OverallQual and EnclosedPorch:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for OverallQual and 3SsnPorch:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for OverallQual and ScreenPorch:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for OverallQual and PoolArea:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for OverallQual and MiscVal:

Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for OverallQual and MoSold:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for OverallQual and YrSold:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for OverallQual and SalePrice:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for OverallCond and YearBuilt:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan

Checking pairwise relationship for OverallCond and YearRemodAdd:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for OverallCond and MasVnrArea:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan

Checking pairwise relationship for OverallCond and BsmtFinSF1:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for OverallCond and BsmtFinSF2:

Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for OverallCond and BsmtUnfSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for OverallCond and TotalBsmtSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for OverallCond and 1stFlrSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for OverallCond and 2ndFlrSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for OverallCond and LowQualFinSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for OverallCond and GrLivArea:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for OverallCond and BsmtFullBath:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for OverallCond and BsmtHalfBath:

Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for OverallCond and FullBath:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for OverallCond and HalfBath:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for OverallCond and BedroomAbvGr:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for OverallCond and KitchenAbvGr:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for OverallCond and TotRmsAbvGrd:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for OverallCond and Fireplaces:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for OverallCond and GarageYrBlt:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for OverallCond and GarageCars:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for OverallCond and GarageArea:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Checking pairwise relationship for OverallCond and WoodDeckSF:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of WoodDeckSF when present: 94.2

Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for OverallCond and OpenPorchSF:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of OpenPorchSF when present: 46.7

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for OverallCond and EnclosedPorch:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of EnclosedPorch when present: 22.0

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for OverallCond and 3SsnPorch:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of 3SsnPorch when present: 3.4

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for OverallCond and ScreenPorch:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of ScreenPorch when present: 15.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for OverallCond and PoolArea:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of PoolArea when present: 2.8

Mean of PoolArea when missing: nan

Checking pairwise relationship for OverallCond and MiscVal:

Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for OverallCond and MoSold:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for OverallCond and YrSold:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for OverallCond and SalePrice:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for YearBuilt and YearRemodAdd:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for YearBuilt and MasVnrArea:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan

Checking pairwise relationship for YearBuilt and BsmtFinSF1:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for YearBuilt and BsmtFinSF2:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for YearBuilt and BsmtUnfSF:

Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for YearBuilt and TotalBsmtSF:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for YearBuilt and 1stFlrSF:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for YearBuilt and 2ndFlrSF:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for YearBuilt and LowQualFinSF:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for YearBuilt and GrLivArea:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for YearBuilt and BsmtFullBath:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for YearBuilt and BsmtHalfBath:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for YearBuilt and FullBath:

Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for YearBuilt and HalfBath:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for YearBuilt and BedroomAbvGr:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for YearBuilt and KitchenAbvGr:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for YearBuilt and TotRmsAbvGrd:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for YearBuilt and Fireplaces:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for YearBuilt and GarageYrBlt:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for YearBuilt and GarageCars:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for YearBuilt and GarageArea:

Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for YearBuilt and WoodDeckSF:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for YearBuilt and OpenPorchSF:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for YearBuilt and EnclosedPorch:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for YearBuilt and 3SsnPorch:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for YearBuilt and ScreenPorch:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for YearBuilt and PoolArea:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for YearBuilt and MiscVal:
Mean of YearBuilt when present: 1971.3
Mean of YearBuilt when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for YearBuilt and MoSold:

Mean of YearBuilt when present: 1971.3

Mean of YearBuilt when missing: nan

Mean of MoSold when present: 6.3

Mean of MoSold when missing: nan

Checking pairwise relationship for YearBuilt and YrSold:

Mean of YearBuilt when present: 1971.3

Mean of YearBuilt when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for YearBuilt and SalePrice:

Mean of YearBuilt when present: 1971.3

Mean of YearBuilt when missing: nan

Mean of SalePrice when present: 12.0

Mean of SalePrice when missing: nan

Checking pairwise relationship for YearRemodAdd and MasVnrArea:

Mean of YearRemodAdd when present: 1984.9

Mean of YearRemodAdd when missing: nan

Mean of MasVnrArea when present: 103.7

Mean of MasVnrArea when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtFinSF1:

Mean of YearRemodAdd when present: 1984.9

Mean of YearRemodAdd when missing: nan

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtFinSF2:

Mean of YearRemodAdd when present: 1984.9

Mean of YearRemodAdd when missing: nan

Mean of BsmtFinSF2 when present: 46.5

Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtUnfSF:

Mean of YearRemodAdd when present: 1984.9

Mean of YearRemodAdd when missing: nan

Mean of BsmtUnfSF when present: 567.2

Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for YearRemodAdd and TotalBsmtSF:

Mean of YearRemodAdd when present: 1984.9

Mean of YearRemodAdd when missing: nan

Mean of TotalBsmtSF when present: 1057.4

Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for YearRemodAdd and 1stFlrSF:

Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for YearRemodAdd and 2ndFlrSF:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for YearRemodAdd and LowQualFinSF:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for YearRemodAdd and GrLivArea:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtFullBath:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtHalfBath:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for YearRemodAdd and FullBath:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for YearRemodAdd and HalfBath:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for YearRemodAdd and BedroomAbvGr:

Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for YearRemodAdd and KitchenAbvGr:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for YearRemodAdd and TotRmsAbvGrd:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for YearRemodAdd and Fireplaces:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for YearRemodAdd and GarageYrBlt:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for YearRemodAdd and GarageCars:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for YearRemodAdd and GarageArea:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for YearRemodAdd and WoodDeckSF:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for YearRemodAdd and OpenPorchSF:

Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for YearRemodAdd and EnclosedPorch:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for YearRemodAdd and 3SsnPorch:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for YearRemodAdd and ScreenPorch:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for YearRemodAdd and PoolArea:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for YearRemodAdd and MiscVal:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for YearRemodAdd and MoSold:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for YearRemodAdd and YrSold:
Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for YearRemodAdd and SalePrice:

Mean of YearRemodAdd when present: 1984.9
Mean of YearRemodAdd when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtFinSF1:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtFinSF2:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtUnfSF:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for MasVnrArea and TotalBsmtSF:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for MasVnrArea and 1stFlrSF:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for MasVnrArea and 2ndFlrSF:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for MasVnrArea and LowQualFinSF:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for MasVnrArea and GrLivArea:

Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtFullBath:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtHalfBath:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for MasVnrArea and FullBath:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for MasVnrArea and HalfBath:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for MasVnrArea and BedroomAbvGr:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for MasVnrArea and KitchenAbvGr:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for MasVnrArea and TotRmsAbvGrd:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for MasVnrArea and Fireplaces:

Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for MasVnrArea and GarageYrBlt:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for MasVnrArea and GarageCars:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for MasVnrArea and GarageArea:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for MasVnrArea and WoodDeckSF:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for MasVnrArea and OpenPorchSF:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for MasVnrArea and EnclosedPorch:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for MasVnrArea and 3SsnPorch:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for MasVnrArea and ScreenPorch:

Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for MasVnrArea and PoolArea:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for MasVnrArea and MiscVal:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for MasVnrArea and MoSold:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for MasVnrArea and YrSold:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for MasVnrArea and SalePrice:
Mean of MasVnrArea when present: 103.7
Mean of MasVnrArea when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BsmtFinSF2:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BsmtUnfSF:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and TotalBsmtSF:

Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and 1stFlrSF:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and 2ndFlrSF:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and LowQualFinSF:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and GrLivArea:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BsmtFullBath:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BsmtHalfBath:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for BsmtFinSF1 and FullBath:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtFinSF1 and HalfBath:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BedroomAbvGr:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtFinSF1 and KitchenAbvGr:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtFinSF1 and TotRmsAbvGrd:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of TotRmsAbvGrd when present: 6.5

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtFinSF1 and Fireplaces:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtFinSF1 and GarageYrBlt:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtFinSF1 and GarageCars:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtFinSF1 and GarageArea:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtFinSF1 and WoodDeckSF:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of WoodDeckSF when present: 94.2

Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and OpenPorchSF:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of OpenPorchSF when present: 46.7

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and EnclosedPorch:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of EnclosedPorch when present: 22.0

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtFinSF1 and 3SsnPorch:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of 3SsnPorch when present: 3.4

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtFinSF1 and ScreenPorch:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of ScreenPorch when present: 15.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtFinSF1 and PoolArea:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of PoolArea when present: 2.8

Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtFinSF1 and MiscVal:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of MiscVal when present: 43.5

Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtFinSF1 and MoSold:

Mean of BsmtFinSF1 when present: 443.6

Mean of BsmtFinSF1 when missing: nan

Mean of MoSold when present: 6.3

Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtFinSF1 and YrSold:

Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtFinSF1 and SalePrice:
Mean of BsmtFinSF1 when present: 443.6
Mean of BsmtFinSF1 when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for BsmtFinSF2 and BsmtUnfSF:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and TotalBsmtSF:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and 1stFlrSF:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and 2ndFlrSF:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and LowQualFinSF:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and GrLivArea:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for BsmtFinSF2 and BsmtFullBath:

Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for BsmtFinSF2 and BsmtHalfBath:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for BsmtFinSF2 and FullBath:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtFinSF2 and HalfBath:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtFinSF2 and BedroomAbvGr:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtFinSF2 and KitchenAbvGr:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtFinSF2 and TotRmsAbvGrd:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtFinSF2 and Fireplaces:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtFinSF2 and GarageYrBlt:

Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtFinSF2 and GarageCars:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtFinSF2 and GarageArea:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtFinSF2 and WoodDeckSF:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and OpenPorchSF:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and EnclosedPorch:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtFinSF2 and 3SsnPorch:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtFinSF2 and ScreenPorch:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtFinSF2 and PoolArea:

Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtFinSF2 and MiscVal:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtFinSF2 and MoSold:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtFinSF2 and YrSold:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtFinSF2 and SalePrice:
Mean of BsmtFinSF2 when present: 46.5
Mean of BsmtFinSF2 when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for BsmtUnfSF and TotalBsmtSF:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and 1stFlrSF:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and 2ndFlrSF:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and LowQualFinSF:

Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and GrLivArea:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for BsmtUnfSF and BsmtFullBath:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for BsmtUnfSF and BsmtHalfBath:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for BsmtUnfSF and FullBath:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtUnfSF and HalfBath:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtUnfSF and BedroomAbvGr:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtUnfSF and KitchenAbvGr:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtUnfSF and TotRmsAbvGrd:

Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtUnfSF and Fireplaces:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtUnfSF and GarageYrBlt:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtUnfSF and GarageCars:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtUnfSF and GarageArea:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtUnfSF and WoodDeckSF:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and OpenPorchSF:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and EnclosedPorch:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtUnfSF and 3SsnPorch:

Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtUnfSF and ScreenPorch:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtUnfSF and PoolArea:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtUnfSF and MiscVal:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtUnfSF and MoSold:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtUnfSF and YrSold:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtUnfSF and SalePrice:
Mean of BsmtUnfSF when present: 567.2
Mean of BsmtUnfSF when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for TotalBsmtSF and 1stFlrSF:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and 2ndFlrSF:

Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and LowQualFinSF:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and GrLivArea:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for TotalBsmtSF and BsmtFullBath:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for TotalBsmtSF and BsmtHalfBath:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for TotalBsmtSF and FullBath:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for TotalBsmtSF and HalfBath:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for TotalBsmtSF and BedroomAbvGr:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for TotalBsmtSF and KitchenAbvGr:

Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for TotalBsmtSF and TotRmsAbvGrd:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for TotalBsmtSF and Fireplaces:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for TotalBsmtSF and GarageYrBlt:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for TotalBsmtSF and GarageCars:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for TotalBsmtSF and GarageArea:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for TotalBsmtSF and WoodDeckSF:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and OpenPorchSF:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and EnclosedPorch:

Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for TotalBsmtSF and 3SsnPorch:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for TotalBsmtSF and ScreenPorch:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for TotalBsmtSF and PoolArea:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for TotalBsmtSF and MiscVal:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for TotalBsmtSF and MoSold:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for TotalBsmtSF and YrSold:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for TotalBsmtSF and SalePrice:
Mean of TotalBsmtSF when present: 1057.4
Mean of TotalBsmtSF when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for 1stFlrSF and 2ndFlrSF:

Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for 1stFlrSF and LowQualFinSF:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for 1stFlrSF and GrLivArea:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for 1stFlrSF and BsmtFullBath:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for 1stFlrSF and BsmtHalfBath:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for 1stFlrSF and FullBath:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for 1stFlrSF and HalfBath:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for 1stFlrSF and BedroomAbvGr:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for 1stFlrSF and KitchenAbvGr:

Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for 1stFlrSF and TotRmsAbvGrd:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for 1stFlrSF and Fireplaces:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for 1stFlrSF and GarageYrBlt:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for 1stFlrSF and GarageCars:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for 1stFlrSF and GarageArea:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for 1stFlrSF and WoodDeckSF:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for 1stFlrSF and OpenPorchSF:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for 1stFlrSF and EnclosedPorch:

Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for 1stFlrSF and 3SsnPorch:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for 1stFlrSF and ScreenPorch:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for 1stFlrSF and PoolArea:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for 1stFlrSF and MiscVal:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for 1stFlrSF and MoSold:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for 1stFlrSF and YrSold:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for 1stFlrSF and SalePrice:
Mean of 1stFlrSF when present: 1162.6
Mean of 1stFlrSF when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for 2ndFlrSF and LowQualFinSF:

Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for 2ndFlrSF and GrLivArea:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for 2ndFlrSF and BsmtFullBath:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for 2ndFlrSF and BsmtHalfBath:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for 2ndFlrSF and FullBath:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for 2ndFlrSF and HalfBath:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for 2ndFlrSF and BedroomAbvGr:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for 2ndFlrSF and KitchenAbvGr:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for 2ndFlrSF and TotRmsAbvGrd:

Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for 2ndFlrSF and Fireplaces:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for 2ndFlrSF and GarageYrBlt:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for 2ndFlrSF and GarageCars:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for 2ndFlrSF and GarageArea:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for 2ndFlrSF and WoodDeckSF:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for 2ndFlrSF and OpenPorchSF:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for 2ndFlrSF and EnclosedPorch:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for 2ndFlrSF and 3SsnPorch:

Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for 2ndFlrSF and ScreenPorch:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for 2ndFlrSF and PoolArea:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for 2ndFlrSF and MiscVal:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for 2ndFlrSF and MoSold:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for 2ndFlrSF and YrSold:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for 2ndFlrSF and SalePrice:
Mean of 2ndFlrSF when present: 347.0
Mean of 2ndFlrSF when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for LowQualFinSF and GrLivArea:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan

Checking pairwise relationship for LowQualFinSF and BsmtFullBath:

Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for LowQualFinSF and BsmtHalfBath:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for LowQualFinSF and FullBath:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for LowQualFinSF and HalfBath:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for LowQualFinSF and BedroomAbvGr:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for LowQualFinSF and KitchenAbvGr:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for LowQualFinSF and TotRmsAbvGrd:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for LowQualFinSF and Fireplaces:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for LowQualFinSF and GarageYrBlt:

Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for LowQualFinSF and GarageCars:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for LowQualFinSF and GarageArea:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for LowQualFinSF and WoodDeckSF:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for LowQualFinSF and OpenPorchSF:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for LowQualFinSF and EnclosedPorch:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for LowQualFinSF and 3SsnPorch:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for LowQualFinSF and ScreenPorch:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for LowQualFinSF and PoolArea:

Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for LowQualFinSF and MiscVal:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for LowQualFinSF and MoSold:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for LowQualFinSF and YrSold:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for LowQualFinSF and SalePrice:
Mean of LowQualFinSF when present: 5.8
Mean of LowQualFinSF when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for GrLivArea and BsmtFullBath:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for GrLivArea and BsmtHalfBath:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for GrLivArea and FullBath:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for GrLivArea and HalfBath:

Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for GrLivArea and BedroomAbvGr:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for GrLivArea and KitchenAbvGr:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for GrLivArea and TotRmsAbvGrd:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for GrLivArea and Fireplaces:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for GrLivArea and GarageYrBlt:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for GrLivArea and GarageCars:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for GrLivArea and GarageArea:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for GrLivArea and WoodDeckSF:

Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for GrLivArea and OpenPorchSF:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for GrLivArea and EnclosedPorch:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for GrLivArea and 3SsnPorch:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for GrLivArea and ScreenPorch:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for GrLivArea and PoolArea:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for GrLivArea and MiscVal:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for GrLivArea and MoSold:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for GrLivArea and YrSold:

Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for GrLivArea and SalePrice:
Mean of GrLivArea when present: 1515.5
Mean of GrLivArea when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for BsmtFullBath and BsmtHalfBath:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for BsmtFullBath and FullBath:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtFullBath and HalfBath:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtFullBath and BedroomAbvGr:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtFullBath and KitchenAbvGr:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtFullBath and TotRmsAbvGrd:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtFullBath and Fireplaces:

Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtFullBath and GarageYrBlt:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtFullBath and GarageCars:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtFullBath and GarageArea:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtFullBath and WoodDeckSF:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtFullBath and OpenPorchSF:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtFullBath and EnclosedPorch:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtFullBath and 3SsnPorch:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtFullBath and ScreenPorch:

Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtFullBath and PoolArea:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtFullBath and MiscVal:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtFullBath and MoSold:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtFullBath and YrSold:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtFullBath and SalePrice:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for BsmtHalfBath and FullBath:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtHalfBath and HalfBath:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtHalfBath and BedroomAbvGr:

Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtHalfBath and KitchenAbvGr:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtHalfBath and TotRmsAbvGrd:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtHalfBath and Fireplaces:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtHalfBath and GarageYrBlt:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtHalfBath and GarageCars:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtHalfBath and GarageArea:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtHalfBath and WoodDeckSF:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtHalfBath and OpenPorchSF:

Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtHalfBath and EnclosedPorch:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtHalfBath and 3SsnPorch:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtHalfBath and ScreenPorch:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtHalfBath and PoolArea:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtHalfBath and MiscVal:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtHalfBath and MoSold:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtHalfBath and YrSold:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtHalfBath and SalePrice:

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Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan
-----
Checking pairwise relationship for FullBath and HalfBath:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
-----
Checking pairwise relationship for FullBath and BedroomAbvGr:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
-----
Checking pairwise relationship for FullBath and KitchenAbvGr:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
-----
Checking pairwise relationship for FullBath and TotRmsAbvGrd:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
-----
Checking pairwise relationship for FullBath and Fireplaces:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
-----
Checking pairwise relationship for FullBath and GarageYrBlt:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan
-----
Checking pairwise relationship for FullBath and GarageCars:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
-----
Checking pairwise relationship for FullBath and GarageArea:
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```
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan
-----
Checking pairwise relationship for FullBath and WoodDeckSF:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
-----
Checking pairwise relationship for FullBath and OpenPorchSF:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
-----
Checking pairwise relationship for FullBath and EnclosedPorch:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan
-----
Checking pairwise relationship for FullBath and 3SsnPorch:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan
-----
Checking pairwise relationship for FullBath and ScreenPorch:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan
-----
Checking pairwise relationship for FullBath and PoolArea:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan
-----
Checking pairwise relationship for FullBath and MiscVal:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan
-----
Checking pairwise relationship for FullBath and MoSold:
```

Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for FullBath and YrSold:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for FullBath and SalePrice:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for HalfBath and BedroomAbvGr:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for HalfBath and KitchenAbvGr:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for HalfBath and TotRmsAbvGrd:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for HalfBath and Fireplaces:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for HalfBath and GarageYrBlt:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for HalfBath and GarageCars:

Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for HalfBath and GarageArea:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for HalfBath and WoodDeckSF:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for HalfBath and OpenPorchSF:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for HalfBath and EnclosedPorch:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for HalfBath and 3SsnPorch:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for HalfBath and ScreenPorch:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for HalfBath and PoolArea:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for HalfBath and MiscVal:

Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for HalfBath and MoSold:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for HalfBath and YrSold:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for HalfBath and SalePrice:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for BedroomAbvGr and KitchenAbvGr:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BedroomAbvGr and TotRmsAbvGrd:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BedroomAbvGr and Fireplaces:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for BedroomAbvGr and GarageYrBlt:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BedroomAbvGr and GarageCars:

Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for BedroomAbvGr and GarageArea:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for BedroomAbvGr and WoodDeckSF:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BedroomAbvGr and OpenPorchSF:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BedroomAbvGr and EnclosedPorch:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BedroomAbvGr and 3SsnPorch:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BedroomAbvGr and ScreenPorch:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BedroomAbvGr and PoolArea:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for BedroomAbvGr and MiscVal:

Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for BedroomAbvGr and MoSold:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for BedroomAbvGr and YrSold:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BedroomAbvGr and SalePrice:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for KitchenAbvGr and TotRmsAbvGrd:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for KitchenAbvGr and Fireplaces:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for KitchenAbvGr and GarageYrBlt:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for KitchenAbvGr and GarageCars:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for KitchenAbvGr and GarageArea:

Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for KitchenAbvGr and WoodDeckSF:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for KitchenAbvGr and OpenPorchSF:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for KitchenAbvGr and EnclosedPorch:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for KitchenAbvGr and 3SsnPorch:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for KitchenAbvGr and ScreenPorch:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for KitchenAbvGr and PoolArea:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for KitchenAbvGr and MiscVal:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for KitchenAbvGr and MoSold:

Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for KitchenAbvGr and YrSold:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for KitchenAbvGr and SalePrice:
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and Fireplaces:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and GarageYrBlt:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and GarageCars:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and GarageArea:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and WoodDeckSF:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and OpenPorchSF:

Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and EnclosedPorch:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and 3SsnPorch:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and ScreenPorch:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and PoolArea:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and MiscVal:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and MoSold:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and YrSold:
Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and SalePrice:

Mean of TotRmsAbvGrd when present: 6.5
Mean of TotRmsAbvGrd when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for Fireplaces and GarageYrBlt:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for Fireplaces and GarageCars:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for Fireplaces and GarageArea:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for Fireplaces and WoodDeckSF:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for Fireplaces and OpenPorchSF:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for Fireplaces and EnclosedPorch:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for Fireplaces and 3SsnPorch:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for Fireplaces and ScreenPorch:

Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for Fireplaces and PoolArea:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for Fireplaces and MiscVal:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for Fireplaces and MoSold:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for Fireplaces and YrSold:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for Fireplaces and SalePrice:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for GarageYrBlt and GarageCars:
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for GarageYrBlt and GarageArea:
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for GarageYrBlt and WoodDeckSF:

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Mean of WoodDeckSF when present: 94.2

Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for GarageYrBlt and OpenPorchSF:

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Mean of OpenPorchSF when present: 46.7

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for GarageYrBlt and EnclosedPorch:

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Mean of EnclosedPorch when present: 22.0

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for GarageYrBlt and 3SsnPorch:

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Mean of 3SsnPorch when present: 3.4

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for GarageYrBlt and ScreenPorch:

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Mean of ScreenPorch when present: 15.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for GarageYrBlt and PoolArea:

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Mean of PoolArea when present: 2.8

Mean of PoolArea when missing: nan

Checking pairwise relationship for GarageYrBlt and MiscVal:

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Mean of MiscVal when present: 43.5

Mean of MiscVal when missing: nan

Checking pairwise relationship for GarageYrBlt and MoSold:

Mean of GarageYrBlt when present: 1978.5

Mean of GarageYrBlt when missing: nan

Mean of MoSold when present: 6.3

Mean of MoSold when missing: nan

Checking pairwise relationship for GarageYrBlt and YrSold:

Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for GarageYrBlt and SalePrice:
Mean of GarageYrBlt when present: 1978.5
Mean of GarageYrBlt when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for GarageCars and GarageArea:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan

Checking pairwise relationship for GarageCars and WoodDeckSF:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for GarageCars and OpenPorchSF:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for GarageCars and EnclosedPorch:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for GarageCars and 3SsnPorch:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for GarageCars and ScreenPorch:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for GarageCars and PoolArea:

Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for GarageCars and MiscVal:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for GarageCars and MoSold:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for GarageCars and YrSold:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for GarageCars and SalePrice:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for GarageArea and WoodDeckSF:
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for GarageArea and OpenPorchSF:
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for GarageArea and EnclosedPorch:
Mean of GarageArea when present: 473.0
Mean of GarageArea when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for GarageArea and 3SsnPorch:

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Mean of 3SsnPorch when present: 3.4

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for GarageArea and ScreenPorch:

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Mean of ScreenPorch when present: 15.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for GarageArea and PoolArea:

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Mean of PoolArea when present: 2.8

Mean of PoolArea when missing: nan

Checking pairwise relationship for GarageArea and MiscVal:

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Mean of MiscVal when present: 43.5

Mean of MiscVal when missing: nan

Checking pairwise relationship for GarageArea and MoSold:

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Mean of MoSold when present: 6.3

Mean of MoSold when missing: nan

Checking pairwise relationship for GarageArea and YrSold:

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for GarageArea and SalePrice:

Mean of GarageArea when present: 473.0

Mean of GarageArea when missing: nan

Mean of SalePrice when present: 12.0

Mean of SalePrice when missing: nan

Checking pairwise relationship for WoodDeckSF and OpenPorchSF:

Mean of WoodDeckSF when present: 94.2

Mean of WoodDeckSF when missing: nan

Mean of OpenPorchSF when present: 46.7

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for WoodDeckSF and EnclosedPorch:

Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for WoodDeckSF and 3SsnPorch:
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for WoodDeckSF and ScreenPorch:
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for WoodDeckSF and PoolArea:
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for WoodDeckSF and MiscVal:
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for WoodDeckSF and MoSold:
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for WoodDeckSF and YrSold:
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for WoodDeckSF and SalePrice:
Mean of WoodDeckSF when present: 94.2
Mean of WoodDeckSF when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for OpenPorchSF and EnclosedPorch:

Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for OpenPorchSF and 3SsnPorch:
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for OpenPorchSF and ScreenPorch:
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for OpenPorchSF and PoolArea:
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for OpenPorchSF and MiscVal:
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for OpenPorchSF and MoSold:
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for OpenPorchSF and YrSold:
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for OpenPorchSF and SalePrice:
Mean of OpenPorchSF when present: 46.7
Mean of OpenPorchSF when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for EnclosedPorch and 3SsnPorch:

Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for EnclosedPorch and ScreenPorch:
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for EnclosedPorch and PoolArea:
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for EnclosedPorch and MiscVal:
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for EnclosedPorch and MoSold:
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for EnclosedPorch and YrSold:
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for EnclosedPorch and SalePrice:
Mean of EnclosedPorch when present: 22.0
Mean of EnclosedPorch when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for 3SsnPorch and ScreenPorch:
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for 3SsnPorch and PoolArea:

Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for 3SsnPorch and MiscVal:
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for 3SsnPorch and MoSold:
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for 3SsnPorch and YrSold:
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for 3SsnPorch and SalePrice:
Mean of 3SsnPorch when present: 3.4
Mean of 3SsnPorch when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for ScreenPorch and PoolArea:
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan

Checking pairwise relationship for ScreenPorch and MiscVal:
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for ScreenPorch and MoSold:
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for ScreenPorch and YrSold:

Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for ScreenPorch and SalePrice:
Mean of ScreenPorch when present: 15.1
Mean of ScreenPorch when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for PoolArea and MiscVal:
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan

Checking pairwise relationship for PoolArea and MoSold:
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for PoolArea and YrSold:
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for PoolArea and SalePrice:
Mean of PoolArea when present: 2.8
Mean of PoolArea when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for MiscVal and MoSold:
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan

Checking pairwise relationship for MiscVal and YrSold:
Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for MiscVal and SalePrice:

Mean of MiscVal when present: 43.5
Mean of MiscVal when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for MoSold and YrSold:
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for MoSold and SalePrice:
Mean of MoSold when present: 6.3
Mean of MoSold when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

Checking pairwise relationship for YrSold and SalePrice:
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan
Mean of SalePrice when present: 12.0
Mean of SalePrice when missing: nan

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Checking pairwise relationship for MSSubClass and LotFrontage:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan

Checking pairwise relationship for MSSubClass and LotArea:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan

Checking pairwise relationship for MSSubClass and OverallQual:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan

Checking pairwise relationship for MSSubClass and OverallCond:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan

Checking pairwise relationship for MSSubClass and YearBuilt:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Checking pairwise relationship for MSSubClass and YearRemodAdd:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of YearRemodAdd when present: 1983.7

Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for MSSubClass and MasVnrArea:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Checking pairwise relationship for MSSubClass and BsmtFinSF1:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for MSSubClass and BsmtFinSF2:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for MSSubClass and BsmtUnfSF:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of BsmtUnfSF when present: 554.3

Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for MSSubClass and TotalBsmtSF:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of TotalBsmtSF when present: 1046.1

Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for MSSubClass and 1stFlrSF:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of 1stFlrSF when present: 1156.5

Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for MSSubClass and 2ndFlrSF:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for MSSubClass and LowQualFinSF:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for MSSubClass and GrLivArea:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for MSSubClass and BsmtFullBath:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for MSSubClass and BsmtHalfBath:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for MSSubClass and FullBath:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for MSSubClass and HalfBath:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for MSSubClass and BedroomAbvGr:
Mean of MSSubClass when present: 57.4
Mean of MSSubClass when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for MSSubClass and KitchenAbvGr:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for MSSubClass and TotRmsAbvGrd:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for MSSubClass and Fireplaces:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for MSSubClass and GarageYrBlt:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for MSSubClass and GarageCars:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for MSSubClass and GarageArea:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Checking pairwise relationship for MSSubClass and WoodDeckSF:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of WoodDeckSF when present: 93.2

Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for MSSubClass and OpenPorchSF:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of OpenPorchSF when present: 48.3

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for MSSubClass and EnclosedPorch:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of EnclosedPorch when present: 24.2

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for MSSubClass and 3SsnPorch:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of 3SsnPorch when present: 1.8

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for MSSubClass and ScreenPorch:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of ScreenPorch when present: 17.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for MSSubClass and PoolArea:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of PoolArea when present: 1.7

Mean of PoolArea when missing: nan

Checking pairwise relationship for MSSubClass and MiscVal:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of MiscVal when present: 58.2

Mean of MiscVal when missing: nan

Checking pairwise relationship for MSSubClass and MoSold:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of MoSold when present: 6.1

Mean of MoSold when missing: nan

Checking pairwise relationship for MSSubClass and YrSold:

Mean of MSSubClass when present: 57.4

Mean of MSSubClass when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for LotFrontage and LotArea:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Checking pairwise relationship for LotFrontage and OverallQual:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan

Checking pairwise relationship for LotFrontage and OverallCond:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan

Checking pairwise relationship for LotFrontage and YearBuilt:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan

Checking pairwise relationship for LotFrontage and YearRemodAdd:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for LotFrontage and MasVnrArea:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan

Checking pairwise relationship for LotFrontage and BsmtFinSF1:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for LotFrontage and BsmtFinSF2:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for LotFrontage and BsmtUnfSF:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for LotFrontage and TotalBsmtSF:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for LotFrontage and 1stFlrSF:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for LotFrontage and 2ndFlrSF:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for LotFrontage and LowQualFinSF:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for LotFrontage and GrLivArea:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for LotFrontage and BsmtFullBath:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for LotFrontage and BsmtHalfBath:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for LotFrontage and FullBath:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for LotFrontage and HalfBath:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for LotFrontage and BedroomAbvGr:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for LotFrontage and KitchenAbvGr:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for LotFrontage and TotRmsAbvGrd:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for LotFrontage and Fireplaces:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for LotFrontage and GarageYrBlt:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for LotFrontage and GarageCars:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for LotFrontage and GarageArea:

Mean of LotFrontage when present: 68.6

Mean of LotFrontage when missing: nan

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Checking pairwise relationship for LotFrontage and WoodDeckSF:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for LotFrontage and OpenPorchSF:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for LotFrontage and EnclosedPorch:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for LotFrontage and 3SsnPorch:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for LotFrontage and ScreenPorch:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for LotFrontage and PoolArea:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for LotFrontage and MiscVal:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for LotFrontage and MoSold:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for LotFrontage and YrSold:
Mean of LotFrontage when present: 68.6
Mean of LotFrontage when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for LotArea and OverallQual:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan

Checking pairwise relationship for LotArea and OverallCond:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan

Checking pairwise relationship for LotArea and YearBuilt:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan

Checking pairwise relationship for LotArea and YearRemodAdd:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for LotArea and MasVnrArea:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan

Checking pairwise relationship for LotArea and BsmtFinSF1:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for LotArea and BsmtFinSF2:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for LotArea and BsmtUnfSF:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for LotArea and TotalBsmtSF:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for LotArea and 1stFlrSF:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for LotArea and 2ndFlrSF:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for LotArea and LowQualFinSF:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for LotArea and GrLivArea:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for LotArea and BsmtFullBath:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for LotArea and BsmtHalfBath:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for LotArea and FullBath:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of FullBath when present: 1.6

Mean of FullBath when missing: nan

Checking pairwise relationship for LotArea and HalfBath:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for LotArea and BedroomAbvGr:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for LotArea and KitchenAbvGr:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for LotArea and TotRmsAbvGrd:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for LotArea and Fireplaces:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for LotArea and GarageYrBlt:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for LotArea and GarageCars:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for LotArea and GarageArea:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for LotArea and WoodDeckSF:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for LotArea and OpenPorchSF:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for LotArea and EnclosedPorch:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for LotArea and 3SsnPorch:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for LotArea and ScreenPorch:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for LotArea and PoolArea:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for LotArea and MiscVal:
Mean of LotArea when present: 9819.2
Mean of LotArea when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for LotArea and MoSold:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of MoSold when present: 6.1

Mean of MoSold when missing: nan

Checking pairwise relationship for LotArea and YrSold:

Mean of LotArea when present: 9819.2

Mean of LotArea when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for OverallQual and OverallCond:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Checking pairwise relationship for OverallQual and YearBuilt:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Checking pairwise relationship for OverallQual and YearRemodAdd:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of YearRemodAdd when present: 1983.7

Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for OverallQual and MasVnrArea:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Checking pairwise relationship for OverallQual and BsmtFinSF1:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for OverallQual and BsmtFinSF2:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for OverallQual and BsmtUnfSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for OverallQual and TotalBsmtSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for OverallQual and 1stFlrSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for OverallQual and 2ndFlrSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for OverallQual and LowQualFinSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for OverallQual and GrLivArea:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for OverallQual and BsmtFullBath:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for OverallQual and BsmtHalfBath:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for OverallQual and FullBath:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of FullBath when present: 1.6

Mean of FullBath when missing: nan

Checking pairwise relationship for OverallQual and HalfBath:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for OverallQual and BedroomAbvGr:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for OverallQual and KitchenAbvGr:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for OverallQual and TotRmsAbvGrd:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for OverallQual and Fireplaces:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for OverallQual and GarageYrBlt:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for OverallQual and GarageCars:

Mean of OverallQual when present: 6.1

Mean of OverallQual when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for OverallQual and GarageArea:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for OverallQual and WoodDeckSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for OverallQual and OpenPorchSF:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for OverallQual and EnclosedPorch:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for OverallQual and 3SsnPorch:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for OverallQual and ScreenPorch:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for OverallQual and PoolArea:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for OverallQual and MiscVal:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for OverallQual and MoSold:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for OverallQual and YrSold:
Mean of OverallQual when present: 6.1
Mean of OverallQual when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for OverallCond and YearBuilt:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan

Checking pairwise relationship for OverallCond and YearRemodAdd:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for OverallCond and MasVnrArea:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan

Checking pairwise relationship for OverallCond and BsmtFinSF1:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for OverallCond and BsmtFinSF2:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for OverallCond and BsmtUnfSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for OverallCond and TotalBsmtSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for OverallCond and 1stFlrSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for OverallCond and 2ndFlrSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for OverallCond and LowQualFinSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for OverallCond and GrLivArea:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for OverallCond and BsmtFullBath:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for OverallCond and BsmtHalfBath:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for OverallCond and FullBath:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for OverallCond and HalfBath:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for OverallCond and BedroomAbvGr:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for OverallCond and KitchenAbvGr:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for OverallCond and TotRmsAbvGrd:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for OverallCond and Fireplaces:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for OverallCond and GarageYrBlt:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for OverallCond and GarageCars:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for OverallCond and GarageArea:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Checking pairwise relationship for OverallCond and WoodDeckSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for OverallCond and OpenPorchSF:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for OverallCond and EnclosedPorch:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for OverallCond and 3SsnPorch:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for OverallCond and ScreenPorch:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for OverallCond and PoolArea:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for OverallCond and MiscVal:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for OverallCond and MoSold:
Mean of OverallCond when present: 5.6
Mean of OverallCond when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for OverallCond and YrSold:

Mean of OverallCond when present: 5.6

Mean of OverallCond when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for YearBuilt and YearRemodAdd:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of YearRemodAdd when present: 1983.7

Mean of YearRemodAdd when missing: nan

Checking pairwise relationship for YearBuilt and MasVnrArea:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Checking pairwise relationship for YearBuilt and BsmtFinSF1:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for YearBuilt and BsmtFinSF2:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for YearBuilt and BsmtUnfSF:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of BsmtUnfSF when present: 554.3

Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for YearBuilt and TotalBsmtSF:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of TotalBsmtSF when present: 1046.1

Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for YearBuilt and 1stFlrSF:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of 1stFlrSF when present: 1156.5

Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for YearBuilt and 2ndFlrSF:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for YearBuilt and LowQualFinSF:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of LowQualFinSF when present: 3.5

Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for YearBuilt and GrLivArea:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of GrLivArea when present: 1486.0

Mean of GrLivArea when missing: nan

Checking pairwise relationship for YearBuilt and BsmtFullBath:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for YearBuilt and BsmtHalfBath:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for YearBuilt and FullBath:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of FullBath when present: 1.6

Mean of FullBath when missing: nan

Checking pairwise relationship for YearBuilt and HalfBath:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for YearBuilt and BedroomAbvGr:

Mean of YearBuilt when present: 1971.4

Mean of YearBuilt when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for YearBuilt and KitchenAbvGr:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for YearBuilt and TotRmsAbvGrd:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for YearBuilt and Fireplaces:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for YearBuilt and GarageYrBlt:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for YearBuilt and GarageCars:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for YearBuilt and GarageArea:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for YearBuilt and WoodDeckSF:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for YearBuilt and OpenPorchSF:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for YearBuilt and EnclosedPorch:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for YearBuilt and 3SsnPorch:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for YearBuilt and ScreenPorch:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for YearBuilt and PoolArea:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for YearBuilt and MiscVal:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for YearBuilt and MoSold:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for YearBuilt and YrSold:
Mean of YearBuilt when present: 1971.4
Mean of YearBuilt when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for YearRemodAdd and MasVnrArea:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtFinSF1:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtFinSF2:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtUnfSF:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for YearRemodAdd and TotalBsmtSF:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for YearRemodAdd and 1stFlrSF:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for YearRemodAdd and 2ndFlrSF:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for YearRemodAdd and LowQualFinSF:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for YearRemodAdd and GrLivArea:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtFullBath:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for YearRemodAdd and BsmtHalfBath:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for YearRemodAdd and FullBath:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for YearRemodAdd and HalfBath:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for YearRemodAdd and BedroomAbvGr:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for YearRemodAdd and KitchenAbvGr:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for YearRemodAdd and TotRmsAbvGrd:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for YearRemodAdd and Fireplaces:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for YearRemodAdd and GarageYrBlt:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for YearRemodAdd and GarageCars:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for YearRemodAdd and GarageArea:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for YearRemodAdd and WoodDeckSF:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for YearRemodAdd and OpenPorchSF:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for YearRemodAdd and EnclosedPorch:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for YearRemodAdd and 3SsnPorch:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for YearRemodAdd and ScreenPorch:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for YearRemodAdd and PoolArea:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for YearRemodAdd and MiscVal:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for YearRemodAdd and MoSold:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for YearRemodAdd and YrSold:
Mean of YearRemodAdd when present: 1983.7
Mean of YearRemodAdd when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtFinSF1:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtFinSF2:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtUnfSF:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for MasVnrArea and TotalBsmtSF:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for MasVnrArea and 1stFlrSF:

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Mean of 1stFlrSF when present: 1156.5

Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for MasVnrArea and 2ndFlrSF:

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for MasVnrArea and LowQualFinSF:

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Mean of LowQualFinSF when present: 3.5

Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for MasVnrArea and GrLivArea:

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Mean of GrLivArea when present: 1486.0

Mean of GrLivArea when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtFullBath:

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for MasVnrArea and BsmtHalfBath:

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for MasVnrArea and FullBath:

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Mean of FullBath when present: 1.6

Mean of FullBath when missing: nan

Checking pairwise relationship for MasVnrArea and HalfBath:

Mean of MasVnrArea when present: 100.7

Mean of MasVnrArea when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for MasVnrArea and BedroomAbvGr:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for MasVnrArea and KitchenAbvGr:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for MasVnrArea and TotRmsAbvGrd:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for MasVnrArea and Fireplaces:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for MasVnrArea and GarageYrBlt:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for MasVnrArea and GarageCars:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for MasVnrArea and GarageArea:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for MasVnrArea and WoodDeckSF:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for MasVnrArea and OpenPorchSF:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for MasVnrArea and EnclosedPorch:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for MasVnrArea and 3SsnPorch:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for MasVnrArea and ScreenPorch:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for MasVnrArea and PoolArea:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for MasVnrArea and MiscVal:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for MasVnrArea and MoSold:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for MasVnrArea and YrSold:
Mean of MasVnrArea when present: 100.7
Mean of MasVnrArea when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BsmtFinSF2:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BsmtUnfSF:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and TotalBsmtSF:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and 1stFlrSF:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and 2ndFlrSF:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and LowQualFinSF:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and GrLivArea:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BsmtFullBath:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BsmtHalfBath:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for BsmtFinSF1 and FullBath:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of FullBath when present: 1.6

Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtFinSF1 and HalfBath:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtFinSF1 and BedroomAbvGr:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtFinSF1 and KitchenAbvGr:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtFinSF1 and TotRmsAbvGrd:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtFinSF1 and Fireplaces:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtFinSF1 and GarageYrBlt:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtFinSF1 and GarageCars:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtFinSF1 and GarageArea:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtFinSF1 and WoodDeckSF:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of WoodDeckSF when present: 93.2

Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and OpenPorchSF:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of OpenPorchSF when present: 48.3

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtFinSF1 and EnclosedPorch:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of EnclosedPorch when present: 24.2

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtFinSF1 and 3SsnPorch:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of 3SsnPorch when present: 1.8

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtFinSF1 and ScreenPorch:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of ScreenPorch when present: 17.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtFinSF1 and PoolArea:

Mean of BsmtFinSF1 when present: 439.2

Mean of BsmtFinSF1 when missing: nan

Mean of PoolArea when present: 1.7

Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtFinSF1 and MiscVal:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtFinSF1 and MoSold:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtFinSF1 and YrSold:
Mean of BsmtFinSF1 when present: 439.2
Mean of BsmtFinSF1 when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtFinSF2 and BsmtUnfSF:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and TotalBsmtSF:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and 1stFlrSF:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and 2ndFlrSF:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and LowQualFinSF:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and GrLivArea:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for BsmtFinSF2 and BsmtFullBath:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for BsmtFinSF2 and BsmtHalfBath:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for BsmtFinSF2 and FullBath:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtFinSF2 and HalfBath:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtFinSF2 and BedroomAbvGr:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtFinSF2 and KitchenAbvGr:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtFinSF2 and TotRmsAbvGrd:
Mean of BsmtFinSF2 when present: 52.6
Mean of BsmtFinSF2 when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtFinSF2 and Fireplaces:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtFinSF2 and GarageYrBlt:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtFinSF2 and GarageCars:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtFinSF2 and GarageArea:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtFinSF2 and WoodDeckSF:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of WoodDeckSF when present: 93.2

Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and OpenPorchSF:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of OpenPorchSF when present: 48.3

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtFinSF2 and EnclosedPorch:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of EnclosedPorch when present: 24.2

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtFinSF2 and 3SsnPorch:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of 3SsnPorch when present: 1.8

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtFinSF2 and ScreenPorch:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of ScreenPorch when present: 17.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtFinSF2 and PoolArea:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of PoolArea when present: 1.7

Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtFinSF2 and MiscVal:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of MiscVal when present: 58.2

Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtFinSF2 and MoSold:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of MoSold when present: 6.1

Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtFinSF2 and YrSold:

Mean of BsmtFinSF2 when present: 52.6

Mean of BsmtFinSF2 when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtUnfSF and TotalBsmtSF:

Mean of BsmtUnfSF when present: 554.3

Mean of BsmtUnfSF when missing: nan

Mean of TotalBsmtSF when present: 1046.1

Mean of TotalBsmtSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and 1stFlrSF:

Mean of BsmtUnfSF when present: 554.3

Mean of BsmtUnfSF when missing: nan

Mean of 1stFlrSF when present: 1156.5

Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and 2ndFlrSF:

Mean of BsmtUnfSF when present: 554.3

Mean of BsmtUnfSF when missing: nan

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and LowQualFinSF:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and GrLivArea:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for BsmtUnfSF and BsmtFullBath:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for BsmtUnfSF and BsmtHalfBath:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for BsmtUnfSF and FullBath:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtUnfSF and HalfBath:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtUnfSF and BedroomAbvGr:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtUnfSF and KitchenAbvGr:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtUnfSF and TotRmsAbvGrd:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtUnfSF and Fireplaces:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtUnfSF and GarageYrBlt:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtUnfSF and GarageCars:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtUnfSF and GarageArea:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtUnfSF and WoodDeckSF:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and OpenPorchSF:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtUnfSF and EnclosedPorch:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtUnfSF and 3SsnPorch:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtUnfSF and ScreenPorch:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtUnfSF and PoolArea:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtUnfSF and MiscVal:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtUnfSF and MoSold:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtUnfSF and YrSold:
Mean of BsmtUnfSF when present: 554.3
Mean of BsmtUnfSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for TotalBsmtSF and 1stFlrSF:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and 2ndFlrSF:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and LowQualFinSF:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and GrLivArea:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for TotalBsmtSF and BsmtFullBath:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for TotalBsmtSF and BsmtHalfBath:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for TotalBsmtSF and FullBath:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for TotalBsmtSF and HalfBath:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for TotalBsmtSF and BedroomAbvGr:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for TotalBsmtSF and KitchenAbvGr:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for TotalBsmtSF and TotRmsAbvGrd:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for TotalBsmtSF and Fireplaces:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for TotalBsmtSF and GarageYrBlt:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for TotalBsmtSF and GarageCars:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for TotalBsmtSF and GarageArea:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for TotalBsmtSF and WoodDeckSF:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and OpenPorchSF:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for TotalBsmtSF and EnclosedPorch:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for TotalBsmtSF and 3SsnPorch:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for TotalBsmtSF and ScreenPorch:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for TotalBsmtSF and PoolArea:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for TotalBsmtSF and MiscVal:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for TotalBsmtSF and MoSold:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for TotalBsmtSF and YrSold:
Mean of TotalBsmtSF when present: 1046.1
Mean of TotalBsmtSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for 1stFlrSF and 2ndFlrSF:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan

Checking pairwise relationship for 1stFlrSF and LowQualFinSF:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for 1stFlrSF and GrLivArea:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for 1stFlrSF and BsmtFullBath:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for 1stFlrSF and BsmtHalfBath:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for 1stFlrSF and FullBath:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for 1stFlrSF and HalfBath:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for 1stFlrSF and BedroomAbvGr:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for 1stFlrSF and KitchenAbvGr:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for 1stFlrSF and TotRmsAbvGrd:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for 1stFlrSF and Fireplaces:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for 1stFlrSF and GarageYrBlt:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for 1stFlrSF and GarageCars:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for 1stFlrSF and GarageArea:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for 1stFlrSF and WoodDeckSF:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for 1stFlrSF and OpenPorchSF:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for 1stFlrSF and EnclosedPorch:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for 1stFlrSF and 3SsnPorch:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for 1stFlrSF and ScreenPorch:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for 1stFlrSF and PoolArea:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for 1stFlrSF and MiscVal:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for 1stFlrSF and MoSold:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for 1stFlrSF and YrSold:
Mean of 1stFlrSF when present: 1156.5
Mean of 1stFlrSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for 2ndFlrSF and LowQualFinSF:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan

Checking pairwise relationship for 2ndFlrSF and GrLivArea:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for 2ndFlrSF and BsmtFullBath:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for 2ndFlrSF and BsmtHalfBath:

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for 2ndFlrSF and FullBath:

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Mean of FullBath when present: 1.6

Mean of FullBath when missing: nan

Checking pairwise relationship for 2ndFlrSF and HalfBath:

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for 2ndFlrSF and BedroomAbvGr:

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for 2ndFlrSF and KitchenAbvGr:

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for 2ndFlrSF and TotRmsAbvGrd:

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for 2ndFlrSF and Fireplaces:

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for 2ndFlrSF and GarageYrBlt:

Mean of 2ndFlrSF when present: 326.0

Mean of 2ndFlrSF when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for 2ndFlrSF and GarageCars:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for 2ndFlrSF and GarageArea:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for 2ndFlrSF and WoodDeckSF:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for 2ndFlrSF and OpenPorchSF:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for 2ndFlrSF and EnclosedPorch:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for 2ndFlrSF and 3SsnPorch:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for 2ndFlrSF and ScreenPorch:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for 2ndFlrSF and PoolArea:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for 2ndFlrSF and MiscVal:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for 2ndFlrSF and MoSold:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for 2ndFlrSF and YrSold:
Mean of 2ndFlrSF when present: 326.0
Mean of 2ndFlrSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for LowQualFinSF and GrLivArea:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan

Checking pairwise relationship for LowQualFinSF and BsmtFullBath:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for LowQualFinSF and BsmtHalfBath:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for LowQualFinSF and FullBath:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for LowQualFinSF and HalfBath:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for LowQualFinSF and BedroomAbvGr:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for LowQualFinSF and KitchenAbvGr:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for LowQualFinSF and TotRmsAbvGrd:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for LowQualFinSF and Fireplaces:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for LowQualFinSF and GarageYrBlt:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for LowQualFinSF and GarageCars:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for LowQualFinSF and GarageArea:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for LowQualFinSF and WoodDeckSF:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for LowQualFinSF and OpenPorchSF:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for LowQualFinSF and EnclosedPorch:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for LowQualFinSF and 3SsnPorch:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for LowQualFinSF and ScreenPorch:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for LowQualFinSF and PoolArea:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for LowQualFinSF and MiscVal:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for LowQualFinSF and MoSold:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for LowQualFinSF and YrSold:
Mean of LowQualFinSF when present: 3.5
Mean of LowQualFinSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for GrLivArea and BsmtFullBath:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan

Checking pairwise relationship for GrLivArea and BsmtHalfBath:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for GrLivArea and FullBath:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for GrLivArea and HalfBath:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for GrLivArea and BedroomAbvGr:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for GrLivArea and KitchenAbvGr:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for GrLivArea and TotRmsAbvGrd:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for GrLivArea and Fireplaces:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for GrLivArea and GarageYrBlt:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for GrLivArea and GarageCars:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for GrLivArea and GarageArea:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for GrLivArea and WoodDeckSF:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for GrLivArea and OpenPorchSF:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for GrLivArea and EnclosedPorch:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for GrLivArea and 3SsnPorch:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for GrLivArea and ScreenPorch:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for GrLivArea and PoolArea:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for GrLivArea and MiscVal:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for GrLivArea and MoSold:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for GrLivArea and YrSold:
Mean of GrLivArea when present: 1486.0
Mean of GrLivArea when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtFullBath and BsmtHalfBath:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan

Checking pairwise relationship for BsmtFullBath and FullBath:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtFullBath and HalfBath:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtFullBath and BedroomAbvGr:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtFullBath and KitchenAbvGr:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtFullBath and TotRmsAbvGrd:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtFullBath and Fireplaces:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtFullBath and GarageYrBlt:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtFullBath and GarageCars:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtFullBath and GarageArea:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtFullBath and WoodDeckSF:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtFullBath and OpenPorchSF:
Mean of BsmtFullBath when present: 0.4
Mean of BsmtFullBath when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtFullBath and EnclosedPorch:

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Mean of EnclosedPorch when present: 24.2

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtFullBath and 3SsnPorch:

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Mean of 3SsnPorch when present: 1.8

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtFullBath and ScreenPorch:

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Mean of ScreenPorch when present: 17.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtFullBath and PoolArea:

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Mean of PoolArea when present: 1.7

Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtFullBath and MiscVal:

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Mean of MiscVal when present: 58.2

Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtFullBath and MoSold:

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Mean of MoSold when present: 6.1

Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtFullBath and YrSold:

Mean of BsmtFullBath when present: 0.4

Mean of BsmtFullBath when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for BsmtHalfBath and FullBath:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of FullBath when present: 1.6

Mean of FullBath when missing: nan

Checking pairwise relationship for BsmtHalfBath and HalfBath:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of HalfBath when present: 0.4

Mean of HalfBath when missing: nan

Checking pairwise relationship for BsmtHalfBath and BedroomAbvGr:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for BsmtHalfBath and KitchenAbvGr:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BsmtHalfBath and TotRmsAbvGrd:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BsmtHalfBath and Fireplaces:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for BsmtHalfBath and GarageYrBlt:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BsmtHalfBath and GarageCars:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for BsmtHalfBath and GarageArea:

Mean of BsmtHalfBath when present: 0.1

Mean of BsmtHalfBath when missing: nan

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Checking pairwise relationship for BsmtHalfBath and WoodDeckSF:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BsmtHalfBath and OpenPorchSF:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BsmtHalfBath and EnclosedPorch:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BsmtHalfBath and 3SsnPorch:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BsmtHalfBath and ScreenPorch:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BsmtHalfBath and PoolArea:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for BsmtHalfBath and MiscVal:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for BsmtHalfBath and MoSold:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for BsmtHalfBath and YrSold:
Mean of BsmtHalfBath when present: 0.1
Mean of BsmtHalfBath when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for FullBath and HalfBath:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan

Checking pairwise relationship for FullBath and BedroomAbvGr:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for FullBath and KitchenAbvGr:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for FullBath and TotRmsAbvGrd:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for FullBath and Fireplaces:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for FullBath and GarageYrBlt:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for FullBath and GarageCars:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for FullBath and GarageArea:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for FullBath and WoodDeckSF:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for FullBath and OpenPorchSF:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for FullBath and EnclosedPorch:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for FullBath and 3SsnPorch:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for FullBath and ScreenPorch:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for FullBath and PoolArea:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for FullBath and MiscVal:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for FullBath and MoSold:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for FullBath and YrSold:
Mean of FullBath when present: 1.6
Mean of FullBath when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for HalfBath and BedroomAbvGr:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan

Checking pairwise relationship for HalfBath and KitchenAbvGr:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for HalfBath and TotRmsAbvGrd:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for HalfBath and Fireplaces:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for HalfBath and GarageYrBlt:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for HalfBath and GarageCars:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for HalfBath and GarageArea:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for HalfBath and WoodDeckSF:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for HalfBath and OpenPorchSF:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for HalfBath and EnclosedPorch:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for HalfBath and 3SsnPorch:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for HalfBath and ScreenPorch:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for HalfBath and PoolArea:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for HalfBath and MiscVal:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for HalfBath and MoSold:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for HalfBath and YrSold:
Mean of HalfBath when present: 0.4
Mean of HalfBath when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for BedroomAbvGr and KitchenAbvGr:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of KitchenAbvGr when present: 1.0
Mean of KitchenAbvGr when missing: nan

Checking pairwise relationship for BedroomAbvGr and TotRmsAbvGrd:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for BedroomAbvGr and Fireplaces:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan

Checking pairwise relationship for BedroomAbvGr and GarageYrBlt:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for BedroomAbvGr and GarageCars:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for BedroomAbvGr and GarageArea:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for BedroomAbvGr and WoodDeckSF:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for BedroomAbvGr and OpenPorchSF:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for BedroomAbvGr and EnclosedPorch:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for BedroomAbvGr and 3SsnPorch:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for BedroomAbvGr and ScreenPorch:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for BedroomAbvGr and PoolArea:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for BedroomAbvGr and MiscVal:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for BedroomAbvGr and MoSold:
Mean of BedroomAbvGr when present: 2.9
Mean of BedroomAbvGr when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for BedroomAbvGr and YrSold:

Mean of BedroomAbvGr when present: 2.9

Mean of BedroomAbvGr when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for KitchenAbvGr and TotRmsAbvGrd:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Checking pairwise relationship for KitchenAbvGr and Fireplaces:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for KitchenAbvGr and GarageYrBlt:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of GarageYrBlt when present: 1977.7

Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for KitchenAbvGr and GarageCars:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of GarageCars when present: 1.8

Mean of GarageCars when missing: nan

Checking pairwise relationship for KitchenAbvGr and GarageArea:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Checking pairwise relationship for KitchenAbvGr and WoodDeckSF:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of WoodDeckSF when present: 93.2

Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for KitchenAbvGr and OpenPorchSF:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of OpenPorchSF when present: 48.3

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for KitchenAbvGr and EnclosedPorch:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of EnclosedPorch when present: 24.2

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for KitchenAbvGr and 3SsnPorch:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of 3SsnPorch when present: 1.8

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for KitchenAbvGr and ScreenPorch:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of ScreenPorch when present: 17.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for KitchenAbvGr and PoolArea:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of PoolArea when present: 1.7

Mean of PoolArea when missing: nan

Checking pairwise relationship for KitchenAbvGr and MiscVal:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of MiscVal when present: 58.2

Mean of MiscVal when missing: nan

Checking pairwise relationship for KitchenAbvGr and MoSold:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of MoSold when present: 6.1

Mean of MoSold when missing: nan

Checking pairwise relationship for KitchenAbvGr and YrSold:

Mean of KitchenAbvGr when present: 1.0

Mean of KitchenAbvGr when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and Fireplaces:

Mean of TotRmsAbvGrd when present: 6.4

Mean of TotRmsAbvGrd when missing: nan

Mean of Fireplaces when present: 0.6

Mean of Fireplaces when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and GarageYrBlt:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and GarageCars:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and GarageArea:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and WoodDeckSF:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and OpenPorchSF:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and EnclosedPorch:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and 3SsnPorch:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and ScreenPorch:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and PoolArea:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and MiscVal:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and MoSold:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for TotRmsAbvGrd and YrSold:
Mean of TotRmsAbvGrd when present: 6.4
Mean of TotRmsAbvGrd when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for Fireplaces and GarageYrBlt:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan

Checking pairwise relationship for Fireplaces and GarageCars:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for Fireplaces and GarageArea:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for Fireplaces and WoodDeckSF:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for Fireplaces and OpenPorchSF:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for Fireplaces and EnclosedPorch:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for Fireplaces and 3SsnPorch:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for Fireplaces and ScreenPorch:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for Fireplaces and PoolArea:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for Fireplaces and MiscVal:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for Fireplaces and MoSold:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for Fireplaces and YrSold:
Mean of Fireplaces when present: 0.6
Mean of Fireplaces when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for GarageYrBlt and GarageCars:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan

Checking pairwise relationship for GarageYrBlt and GarageArea:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for GarageYrBlt and WoodDeckSF:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for GarageYrBlt and OpenPorchSF:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for GarageYrBlt and EnclosedPorch:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for GarageYrBlt and 3SsnPorch:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for GarageYrBlt and ScreenPorch:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for GarageYrBlt and PoolArea:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for GarageYrBlt and MiscVal:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for GarageYrBlt and MoSold:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for GarageYrBlt and YrSold:
Mean of GarageYrBlt when present: 1977.7
Mean of GarageYrBlt when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for GarageCars and GarageArea:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan

Checking pairwise relationship for GarageCars and WoodDeckSF:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for GarageCars and OpenPorchSF:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for GarageCars and EnclosedPorch:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for GarageCars and 3SsnPorch:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for GarageCars and ScreenPorch:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for GarageCars and PoolArea:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for GarageCars and MiscVal:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for GarageCars and MoSold:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for GarageCars and YrSold:
Mean of GarageCars when present: 1.8
Mean of GarageCars when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for GarageArea and WoodDeckSF:
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan

Checking pairwise relationship for GarageArea and OpenPorchSF:
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for GarageArea and EnclosedPorch:
Mean of GarageArea when present: 472.8
Mean of GarageArea when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for GarageArea and 3SsnPorch:

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Mean of 3SsnPorch when present: 1.8

Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for GarageArea and ScreenPorch:

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Mean of ScreenPorch when present: 17.1

Mean of ScreenPorch when missing: nan

Checking pairwise relationship for GarageArea and PoolArea:

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Mean of PoolArea when present: 1.7

Mean of PoolArea when missing: nan

Checking pairwise relationship for GarageArea and MiscVal:

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Mean of MiscVal when present: 58.2

Mean of MiscVal when missing: nan

Checking pairwise relationship for GarageArea and MoSold:

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Mean of MoSold when present: 6.1

Mean of MoSold when missing: nan

Checking pairwise relationship for GarageArea and YrSold:

Mean of GarageArea when present: 472.8

Mean of GarageArea when missing: nan

Mean of YrSold when present: 2007.8

Mean of YrSold when missing: nan

Checking pairwise relationship for WoodDeckSF and OpenPorchSF:

Mean of WoodDeckSF when present: 93.2

Mean of WoodDeckSF when missing: nan

Mean of OpenPorchSF when present: 48.3

Mean of OpenPorchSF when missing: nan

Checking pairwise relationship for WoodDeckSF and EnclosedPorch:

Mean of WoodDeckSF when present: 93.2

Mean of WoodDeckSF when missing: nan

Mean of EnclosedPorch when present: 24.2

Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for WoodDeckSF and 3SsnPorch:
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for WoodDeckSF and ScreenPorch:
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for WoodDeckSF and PoolArea:
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for WoodDeckSF and MiscVal:
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for WoodDeckSF and MoSold:
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for WoodDeckSF and YrSold:
Mean of WoodDeckSF when present: 93.2
Mean of WoodDeckSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for OpenPorchSF and EnclosedPorch:
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan

Checking pairwise relationship for OpenPorchSF and 3SsnPorch:
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for OpenPorchSF and ScreenPorch:
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for OpenPorchSF and PoolArea:
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for OpenPorchSF and MiscVal:
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for OpenPorchSF and MoSold:
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for OpenPorchSF and YrSold:
Mean of OpenPorchSF when present: 48.3
Mean of OpenPorchSF when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for EnclosedPorch and 3SsnPorch:
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan

Checking pairwise relationship for EnclosedPorch and ScreenPorch:
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for EnclosedPorch and PoolArea:
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for EnclosedPorch and MiscVal:
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for EnclosedPorch and MoSold:
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for EnclosedPorch and YrSold:
Mean of EnclosedPorch when present: 24.2
Mean of EnclosedPorch when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for 3SsnPorch and ScreenPorch:
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan

Checking pairwise relationship for 3SsnPorch and PoolArea:
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for 3SsnPorch and MiscVal:
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for 3SsnPorch and MoSold:
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for 3SsnPorch and YrSold:
Mean of 3SsnPorch when present: 1.8
Mean of 3SsnPorch when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for ScreenPorch and PoolArea:
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan

Checking pairwise relationship for ScreenPorch and MiscVal:
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for ScreenPorch and MoSold:
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for ScreenPorch and YrSold:
Mean of ScreenPorch when present: 17.1
Mean of ScreenPorch when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for PoolArea and MiscVal:
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan

Checking pairwise relationship for PoolArea and MoSold:
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

Checking pairwise relationship for PoolArea and YrSold:
Mean of PoolArea when present: 1.7
Mean of PoolArea when missing: nan
Mean of YrSold when present: 2007.8
Mean of YrSold when missing: nan

Checking pairwise relationship for MiscVal and MoSold:
Mean of MiscVal when present: 58.2
Mean of MiscVal when missing: nan
Mean of MoSold when present: 6.1
Mean of MoSold when missing: nan

```
-----  
Checking pairwise relationship for MiscVal and YrSold:  
Mean of MiscVal when present: 58.2  
Mean of MiscVal when missing: nan  
Mean of YrSold when present: 2007.8  
Mean of YrSold when missing: nan  
-----
```

```
Checking pairwise relationship for MoSold and YrSold:  
Mean of MoSold when present: 6.1  
Mean of MoSold when missing: nan  
Mean of YrSold when present: 2007.8  
Mean of YrSold when missing: nan  
-----
```

```
[23]: # Identify all columns that end with '_missing_flag'  
missing_flag_columns = [col for col in data_train.columns if col.  
    ↪endswith('_missing_flag')]  
  
# Drop those columns from the dataframe  
data_train.drop(missing_flag_columns, axis=1, inplace=True)  
  
data_train
```

```
[23]:      MSSubClass MSZoning  LotFrontage  LotArea Street LotShape LandContour  \  
Id  
1          60       RL        65.0     8450   Pave    Reg      Lvl  
2          20       RL        80.0     9600   Pave    Reg      Lvl  
3          60       RL        68.0    11250   Pave    IR1      Lvl  
4          70       RL        60.0     9550   Pave    IR1      Lvl  
5          60       RL        84.0    14260   Pave    IR1      Lvl  
...        ...      ...       ...     ...    ...    ...  
1456        60       RL        62.0     7917   Pave    Reg      Lvl  
1457        20       RL        85.0    13175   Pave    Reg      Lvl  
1458        70       RL        66.0     9042   Pave    Reg      Lvl  
1459        20       RL        68.0    9717   Pave    Reg      Lvl  
1460        20       RL        75.0    9937   Pave    Reg      Lvl  
  
      Utilities LotConfig LandSlope  ... EnclosedPorch 3SsnPorch ScreenPorch  \  
Id  
1          AllPub    Inside     Gtl ...           0       0       0  
2          AllPub     FR2      Gtl ...           0       0       0  
3          AllPub    Inside     Gtl ...           0       0       0  
4          AllPub    Corner    Gtl ...           272      0       0  
5          AllPub     FR2      Gtl ...           0       0       0  
...        ...      ...    ... ...  
1456        AllPub    Inside    Gtl ...           0       0       0  
1457        AllPub    Inside    Gtl ...           0       0       0
```

1458	AllPub	Inside	Gtl ...	0	0	0	
1459	AllPub	Inside	Gtl ...	112	0	0	
1460	AllPub	Inside	Gtl ...	0	0	0	
	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	SalePrice
Id							
1	0	0	2	2008	WD	Normal	12.247699
2	0	0	5	2007	WD	Normal	12.109016
3	0	0	9	2008	WD	Normal	12.317171
4	0	0	2	2006	WD	Abnorml	11.849405
5	0	0	12	2008	WD	Normal	12.429220
...
1456	0	0	8	2007	WD	Normal	12.072547
1457	0	0	2	2010	WD	Normal	12.254868
1458	0	2500	5	2010	WD	Normal	12.493133
1459	0	0	4	2010	WD	Normal	11.864469
1460	0	0	6	2008	WD	Normal	11.901590

[1460 rows x 74 columns]

```
[24]: # Identify all columns that end with '_missing_flag'
missing_flag_columns = [col for col in data_test.columns if col.
    ↪endswith('_missing_flag')]

# Drop those columns from the dataframe
data_test.drop(missing_flag_columns, axis=1, inplace=True)

data_test
```

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
1461	20	RH	80.0	11622	Pave	Reg	Lvl	
1462	20	RL	81.0	14267	Pave	IR1	Lvl	
1463	60	RL	74.0	13830	Pave	IR1	Lvl	
1464	60	RL	78.0	9978	Pave	IR1	Lvl	
1465	120	RL	43.0	5005	Pave	IR1	HLS	
...	
2915	160	RM	21.0	1936	Pave	Reg	Lvl	
2916	160	RM	21.0	1894	Pave	Reg	Lvl	
2917	20	RL	160.0	20000	Pave	Reg	Lvl	
2918	85	RL	62.0	10441	Pave	Reg	Lvl	
2919	60	RL	74.0	9627	Pave	Reg	Lvl	
	Utilities	LotConfig	LandSlope	...	OpenPorchSF	EnclosedPorch	3SsnPorch	\
Id				...				
1461	AllPub	Inside	Gtl ...		0	0	0	
1462	AllPub	Corner	Gtl ...		36	0	0	

1463	AllPub	Inside	Gtl	...	34	0	0
1464	AllPub	Inside	Gtl	...	36	0	0
1465	AllPub	Inside	Gtl	...	82	0	0
...
2915	AllPub	Inside	Gtl	...	0	0	0
2916	AllPub	Inside	Gtl	...	24	0	0
2917	AllPub	Inside	Gtl	...	0	0	0
2918	AllPub	Inside	Gtl	...	32	0	0
2919	AllPub	Inside	Mod	...	48	0	0
ScreenPorch PoolArea MiscVal MoSold YrSold SaleType SaleCondition							
Id							
1461	120	0	0	6	2010	WD	Normal
1462	0	0	12500	6	2010	WD	Normal
1463	0	0	0	3	2010	WD	Normal
1464	0	0	0	6	2010	WD	Normal
1465	144	0	0	1	2010	WD	Normal
...
2915	0	0	0	6	2006	WD	Normal
2916	0	0	0	4	2006	WD	Abnorml
2917	0	0	0	9	2006	WD	Abnorml
2918	0	0	700	7	2006	WD	Normal
2919	0	0	0	11	2006	WD	Normal

[1459 rows x 73 columns]

```
[25]: # Function to handle missing data in the training dataset
def handle_missing_data_train(data_train, numeric_features, missing_threshold=0.1):
    for col in numeric_features:
        if data_train[col].isnull().sum() > 0: # Check for missing values
            # Calculate skewness
            col_skewness = skew(data_train[col].dropna()) # Skewness of the column (drop NaN values)

            # If skewness is low, fill missing values with the mean
            if abs(col_skewness) < 0.5:
                print(f"{col} has a symmetric distribution (skewness:{col_skewness:.2f}). Filling with mean.")
                data_train[col].fillna(data_train[col].mean(), inplace=True)
            else:
                print(f"{col} has a skewed distribution (skewness:{col_skewness:.2f}). Using regression model.")
                # Get feature columns (exclude the current column)
                feature_cols = [f for f in numeric_features if f != col]
                train_data = data_train[data_train[col].notnull()]
                X_train = train_data[feature_cols]
```

```

y_train = train_data[col]

# Train the model and predict missing values
model = RandomForestRegressor(n_estimators=100, random_state=42)
model.fit(X_train, y_train)
missing_data = data_train[data_train[col].isnull()]
X_missing = missing_data[feature_cols]
predicted_values = model.predict(X_missing)
data_train.loc[data_train[col].isnull(), col] = predicted_values
print(f"Missing values in {col} filled using"
      ↪RandomForestRegressor.")
return data_train

# Function to handle missing data in the test dataset
def handle_missing_data_test(data_test, numeric_features, model,
                             ↪missing_threshold=0.1):
    for col in numeric_features:
        if data_test[col].isnull().sum() > 0: # Check for missing values
            # Calculate skewness
            col_skewness = skew(data_test[col].dropna()) # Skewness of the
            ↪column (drop NaN values)

            # If skewness is low, fill missing values with the mean
            if abs(col_skewness) < 0.5:
                print(f"{col} has a symmetric distribution (skewness: "
                      ↪{col_skewness:.2f}). Filling with mean.")
                data_test[col].fillna(data_test[col].mean(), inplace=True)
            else:
                print(f"{col} has a skewed distribution (skewness: "
                      ↪{col_skewness:.2f}). Using regression model.")
                # Get feature columns (exclude the current column)
                feature_cols = [f for f in numeric_features if f != col]
                missing_data = data_test[data_test[col].isnull()]
                X_missing = missing_data[feature_cols]
                predicted_values = model.predict(X_missing)
                data_test.loc[data_test[col].isnull(), col] = predicted_values
                print(f"Missing values in {col} filled using"
                      ↪RandomForestRegressor.")
    return data_test

```

[26]: data_test.select_dtypes(include=['int64', 'float64']).isnull().sum().sort_values(ascending = False)

LotFrontage	227
GarageYrBlt	78
MasVnrArea	15
BsmtHalfBath	2

```

BsmtFullBath      2
TotalBsmtSF       1
GarageCars         1
BsmtFinSF1        1
BsmtFinSF2        1
BsmtUnfSF         1
GarageArea         1
OpenPorchSF        0
WoodDeckSF         0
MSSubClass         0
EnclosedPorch      0
TotRmsAbvGrd      0
3SsnPorch          0
ScreenPorch         0
PoolArea           0
MiscVal            0
MoSold             0
Fireplaces          0
FullBath            0
KitchenAbvGr       0
BedroomAbvGr       0
HalfBath            0
GrLivArea          0
LowQualFinSF       0
2ndFlrSF            0
1stFlrSF            0
YearRemodAdd        0
YearBuilt           0
OverallCond         0
OverallQual         0
LotArea             0
YrSold              0
dtype: int64

```

```

[27]: columns_to_fill_test = [ 'LotFrontage',   'GarageYrBlt',   'MasVnrArea', □
    ↵'BsmtHalfBath',   'BsmtFullBath',
    ↵      'BsmtFinSF2',   'GarageCars',   'GarageArea', □
    ↵'TotalBsmtSF',   'BsmtUnfSF',   'BsmtFinSF1'  ]

for column in columns_to_fill_test:
    median_value = data_test[column].median()
    data_test[column].fillna(median_value, inplace=True)

```

```

C:\Users\izadi\AppData\Local\Temp\ipykernel_24696\1365818443.py:6:
FutureWarning: A value is trying to be set on a copy of a DataFrame or Series
through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work
because the intermediate object on which we are setting values always behaves as

```

a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform the operation inplace on the original object.

```
data_test[column].fillna(median_value, inplace=True)
```

```
[28]: data_test.select_dtypes(include=['int64', 'float64']).isnull().sum().  
      ↪sort_values(ascending = False)
```

```
[28]: MSSubClass      0  
LotFrontage      0  
BedroomAbvGr     0  
KitchenAbvGr     0  
TotRmsAbvGrd     0  
Fireplaces       0  
GarageYrBlt      0  
GarageCars        0  
GarageArea        0  
WoodDeckSF        0  
OpenPorchSF       0  
EnclosedPorch     0  
3SsnPorch         0  
ScreenPorch       0  
PoolArea          0  
MiscVal           0  
MoSold            0  
HalfBath          0  
FullBath          0  
BsmtHalfBath     0  
BsmtFinSF1       0  
LotArea           0  
OverallQual       0  
OverallCond       0  
YearBuilt          0  
YearRemodAdd      0  
MasVnrArea        0  
BsmtFinSF2       0  
BsmtFullBath      0  
BsmtUnfSF        0  
TotalBsmtSF       0  
1stFlrSF          0  
2ndFlrSF          0  
LowQualFinSF      0  
GrLivArea          0
```

```
YrSold          0  
dtype: int64
```

```
[29]: data_train.select_dtypes(include=['int64', 'float64']).isnull().sum().  
      ↪sort_values(ascending = False)
```

```
[29]: LotFrontage      259  
GarageYrBlt        81  
MasVnrArea         8  
OpenPorchSF        0  
KitchenAbvGr       0  
TotRmsAbvGrd       0  
Fireplaces          0  
GarageCars          0  
GarageArea          0  
WoodDeckSF          0  
MSSubClass          0  
BedroomAbvGr        0  
3SsnPorch           0  
ScreenPorch          0  
PoolArea            0  
MiscVal             0  
MoSold              0  
YrSold              0  
EnclosedPorch        0  
FullBath             0  
HalfBath             0  
BsmtFinSF2          0  
LotArea              0  
OverallQual          0  
OverallCond          0  
YearBuilt             0  
YearRemodAdd          0  
BsmtFinSF1          0  
BsmtUnfSF            0  
BsmtHalfBath         0  
TotalBsmtSF          0  
1stFlrSF              0  
2ndFlrSF              0  
LowQualFinSF          0  
GrLivArea             0  
BsmtFullBath          0  
SalePrice              0  
dtype: int64
```

```
[30]: columns_to_fill_train = [ 'LotFrontage', 'GarageYrBlt', 'MasVnrArea' ]
```

```
for column in columns_to_fill_train:  
    median_value = data_train[column].median()  
    data_train[column].fillna(median_value, inplace=True)
```

C:\Users\izadi\AppData\Local\Temp\ipykernel_24696\3752660924.py:5:
FutureWarning: A value is trying to be set on a copy of a DataFrame or Series
through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work
because the intermediate object on which we are setting values always behaves as
a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using
'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value)
instead, to perform the operation inplace on the original object.

```
data_train[column].fillna(median_value, inplace=True)
```

[31]: np.sum(data_train.select_dtypes(include=['int64', 'float64']).isnull()).
 ↪sort_values(ascending = False)

C:\ProgramData\anaconda3\Lib\site-packages\numpy\core\fromnumeric.py:86:
FutureWarning: The behavior of DataFrame.sum with axis=None is deprecated, in a
future version this will reduce over both axes and return a scalar. To retain
the old behavior, pass axis=0 (or do not pass axis)
 return reduction(axis=axis, out=out, **passkwargs)

[31]:

MSSubClass	0
HalfBath	0
KitchenAbvGr	0
TotRmsAbvGrd	0
Fireplaces	0
GarageYrBlt	0
GarageCars	0
GarageArea	0
WoodDeckSF	0
OpenPorchSF	0
EnclosedPorch	0
3SsnPorch	0
ScreenPorch	0
PoolArea	0
MiscVal	0
MoSold	0
YrSold	0
BedroomAbvGr	0
FullBath	0
LotFrontage	0
BsmtHalfBath	0

```
LotArea          0
OverallQual      0
OverallCond      0
YearBuilt         0
YearRemodAdd     0
MasVnrArea       0
BsmtFinSF1       0
BsmtFinSF2       0
BsmtUnfSF        0
TotalBsmtSF      0
1stFlrSF          0
2ndFlrSF          0
LowQualFinSF     0
GrLivArea         0
BsmtFullBath     0
SalePrice          0
dtype: int64
```

4.1 Feature scaling

```
[33]: # Define the target column in the training data
target_column = 'SalePrice'

# Select numerical features, excluding the target column in the training data
numeric_features_train = data_train.drop(columns=[target_column]).
    ↪select_dtypes(include=['int64', 'float64']).columns
numeric_features_test = data_test.select_dtypes(include=['int64', 'float64']).
    ↪columns

# Initialize the StandardScaler
scaler = StandardScaler()

# Scale the numerical columns in the training data (fit and transform)
data_train[numeric_features_train] = scaler.
    ↪fit_transform(data_train[numeric_features_train])

# Scale the numerical columns in the test data (transform only, using the same
    ↪scaler)
data_test[numeric_features_test] = scaler.
    ↪transform(data_test[numeric_features_test])
```

4.2 Visualization

```
[35]: # Ensure numeric_features_train is a DataFrame and extract column names properly
if isinstance(numeric_features_train, pd.DataFrame):
    numeric_features_train_list = numeric_features_train.columns.tolist()
else:
```

```

numeric_features_train_list = numeric_features_train # assuming it's already a list of column names

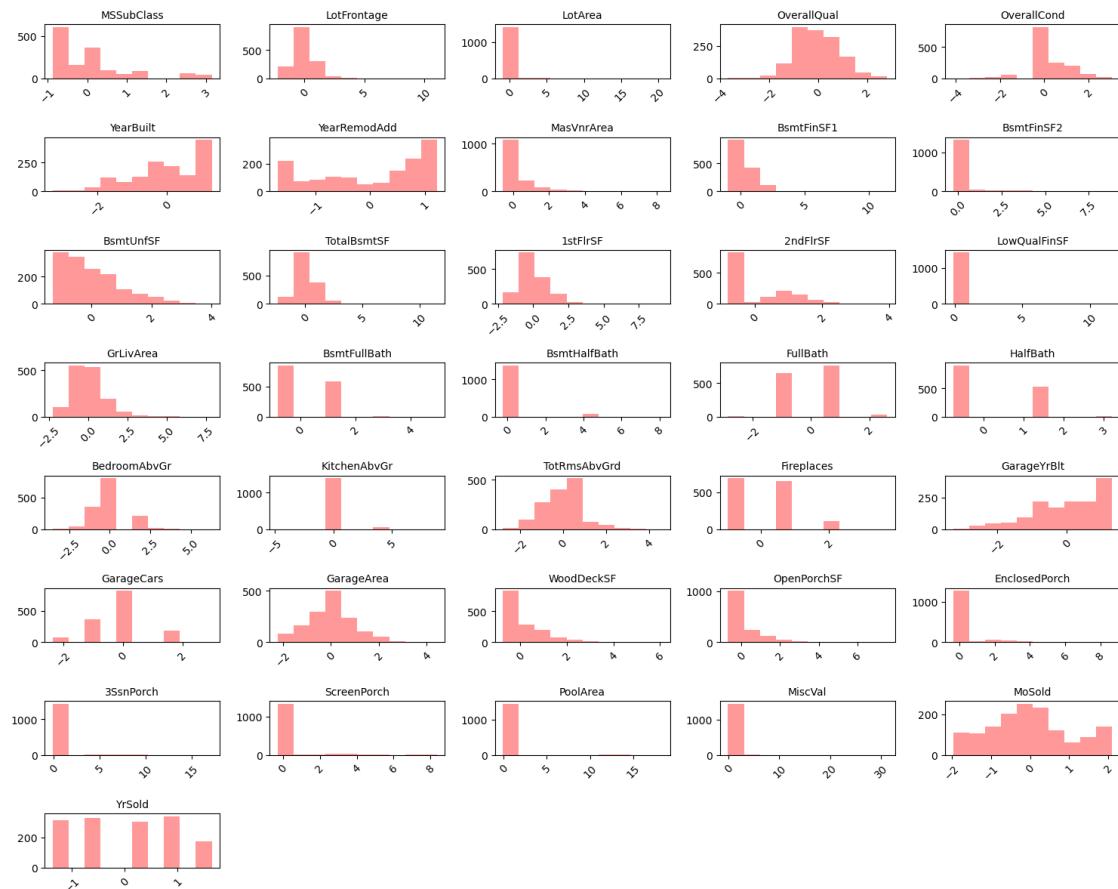
# Get the indices of numeric columns in data_train using column names
numeric_indices_train = [data_train.columns.get_loc(col) for col in numeric_features_train_list if col in data_train.columns]

# Plot histograms for numeric variables
plt.figure(figsize=(15, 12)) # Adjust the figure size for better visibility
plt.subplots_adjust(hspace=0.5, wspace=0.5)

# Loop through each index in numeric_indices
for i in range(len(numeric_indices_train)):
    plt.subplot(8, 5, i + 1) # Correct subplot indexing (1-based)
    plt.hist(x=data_train.iloc[:, numeric_indices_train[i]], alpha=0.4, color='red')
    plt.title(data_train.columns[numeric_indices_train[i]], fontsize=10)
    plt.xticks(rotation=45)

plt.tight_layout()
plt.show()

```



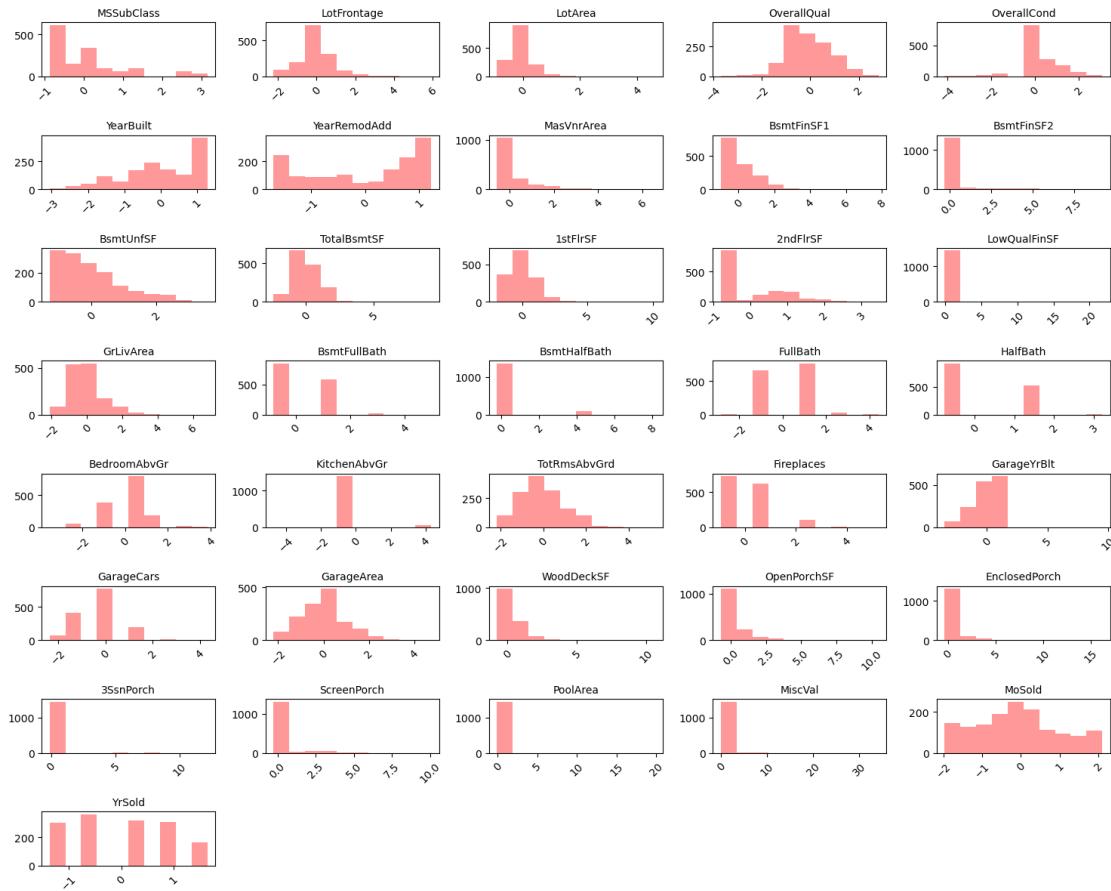
```
[36]: # Ensure numeric_features_test is a DataFrame and extract column names properly
if isinstance(numeric_features_test, pd.DataFrame):
    numeric_features_test_list = numeric_features_test.columns.tolist()
else:
    numeric_features_test_list = numeric_features_test # assuming it's already
    ↪a list of column names

# Get the indices of numeric columns in data_test using column names
numeric_indices_test = [data_test.columns.get_loc(col) for col in
    ↪numeric_features_test_list if col in data_test.columns]

# Plot histograms for numeric variables
plt.figure(figsize=(15, 12)) # Adjust the figure size for better visibility
plt.subplots_adjust(hspace=0.5, wspace=0.5) # Adjust space between plots

# Loop through each index in numeric_indices_test
for i in range(len(numeric_indices_test)):
    plt.subplot(8, 5, i + 1) # Correct subplot indexing (1-based)
    plt.hist(x=data_test.iloc[:, numeric_indices_test[i]], alpha=0.4, ↪
    ↪color='red')
    plt.title(data_test.columns[numeric_indices_test[i]], fontsize=10)
    plt.xticks(rotation=45)

plt.tight_layout() # Adjust subplots to fit in the figure area
plt.show()
```



Handle categorical data

```
[38]: data_train.select_dtypes(include=['object', 'category']).isnull().sum().
    ↪sort_values(ascending = False)
```

[38]: GarageCond	81
GarageQual	81
GarageFinish	81
GarageType	81
BsmtExposure	38
BsmtFinType2	38
BsmtCond	37
BsmtFinType1	37
BsmtQual	37
Electrical	1
HeatingQC	0
Heating	0
MSZoning	0
CentralAir	0
Functional	0

```
PavedDrive      0
SaleType        0
KitchenQual    0
Foundation      0
Street          0
ExterCond       0
LotShape         0
LandContour     0
Utilities        0
LotConfig        0
LandSlope        0
Neighborhood    0
Condition1      0
Condition2      0
BldgType         0
HouseStyle       0
RoofStyle        0
RoofMatl         0
Exterior1st     0
Exterior2nd     0
ExterQual        0
SaleCondition    0
dtype: int64
```

```
[39]: #Handle categorical data (Categorical columns in Data train)
categoric_features = data_train.select_dtypes(include=['object', 'category']).columns
for col in categoric_features:
    if data_train[col].isnull().sum() > 0: # If there are missing values
        mode_value = data_train[col].mode()[0] # Find the mode (most frequent value)
        data_train[col].fillna(mode_value, inplace=True) # Fill missing values with the mode
```

```
C:\Users\izadi\AppData\Local\Temp\ipykernel_24696\4249127474.py:6:
FutureWarning: A value is trying to be set on a copy of a DataFrame or Series
through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work
because the intermediate object on which we are setting values always behaves as
a copy.
```

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform the operation inplace on the original object.

```
data_train[col].fillna(mode_value, inplace=True) # Fill missing values with
the mode
```

```
[40]: data_train.select_dtypes(include=['object', 'category']).isnull().sum()  
      ↪sort_values(ascending = False)
```

```
[40]: MSZoning      0  
BsmtQual      0  
BsmtExposure   0  
BsmtFinType1    0  
BsmtFinType2    0  
Heating        0  
HeatingQC      0  
CentralAir     0  
Electrical      0  
KitchenQual    0  
Functional      0  
GarageType      0  
GarageFinish    0  
GarageQual      0  
GarageCond      0  
PavedDrive     0  
SaleType        0  
BsmtCond        0  
Foundation      0  
Street          0  
ExterCond       0  
LotShape         0  
LandContour     0  
Utilities        0  
LotConfig        0  
LandSlope        0  
Neighborhood    0  
Condition1      0  
Condition2      0  
BldgType         0  
HouseStyle       0  
RoofStyle        0  
RoofMatl        0  
Exterior1st     0  
Exterior2nd     0  
ExterQual       0  
SaleCondition    0  
dtype: int64
```

```
[41]: #Handle categorical data (Categorical columns in Data test)  
categoric_features = data_test.select_dtypes(include=['object', 'category']).  
      ↪columns  
for col in categoric_features:  
    if data_test[col].isnull().sum() > 0: # If there are missing values
```

```

    mode_value = data_test[col].mode()[0] # Find the mode (most frequent
    ↪value)
    data_test[col].fillna(mode_value, inplace=True) # Fill missing values
    ↪with the mode

```

C:\Users\izadi\AppData\Local\Temp\ipykernel_24696\2336348955.py:6:
 FutureWarning: A value is trying to be set on a copy of a DataFrame or Series
 through chained assignment using an inplace method.
 The behavior will change in pandas 3.0. This inplace method will never work
 because the intermediate object on which we are setting values always behaves as
 a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using
 'df.method({col: value}, inplace=True)' or df[col] = df[col].method(value)
 instead, to perform the operation inplace on the original object.

```
data_test[col].fillna(mode_value, inplace=True) # Fill missing values with
the mode
```

[42]: data_test.select_dtypes(include=['object', 'category']).isnull().sum().
 ↪sort_values(ascending = False)

MSZoning	0
BsmtQual	0
BsmtExposure	0
BsmtFinType1	0
BsmtFinType2	0
Heating	0
HeatingQC	0
CentralAir	0
Electrical	0
KitchenQual	0
Functional	0
GarageType	0
GarageFinish	0
GarageQual	0
GarageCond	0
PavedDrive	0
SaleType	0
BsmtCond	0
Foundation	0
Street	0
ExterCond	0
LotShape	0
LandContour	0
Utilities	0

```

LotConfig      0
LandSlope      0
Neighborhood   0
Condition1    0
Condition2    0
BldgType       0
HouseStyle     0
RoofStyle      0
RoofMatl       0
Exterior1st   0
Exterior2nd   0
ExterQual      0
SaleCondition  0
dtype: int64

```

5 Correlation Analysis

```
[44]: def high_correlated_cols(data_train, plot=False, corr_th=0.90):
    # Compute correlation matrix
    corr = data_train.corr(numeric_only=True)

    # Create an absolute correlation matrix
    cor_matrix = corr.abs()

    # Extract upper triangle matrix to identify high correlations
    upper_triangle_matrix = cor_matrix.where(np.triu(np.ones(cor_matrix.shape), k=1).astype(bool))
    drop_list = [col for col in upper_triangle_matrix.columns if any(upper_triangle_matrix[col] > corr_th)]

    if plot:
        # Enhance figure size and quality
        plt.figure(figsize=(20, 18), dpi=300) # Increased size and resolution

        # Improved heatmap with adjusted annotations and line widths
        sns.heatmap(
            corr,
            annot=True,                      # Show values
            fmt=".2f",                       # Format for annotation
            cmap="RdBu",                      # Diverging color map
            annot_kws={"size": 8},             # Font size for annotations
            linewidths=0.5,                  # Line width between cells
            linecolor="white",                # Line color between cells
            cbar_kws={"shrink": 0.75}         # Shrink color bar for better fit
        )

```

```

# Add title and adjust layout
plt.title("Correlation Matrix", fontsize=18, weight="bold", pad=20)
plt.xticks(fontsize=10, rotation=45, weight="bold")
plt.yticks(fontsize=10, weight="bold")
plt.tight_layout() # Adjust layout to prevent clipping
plt.show()

return drop_list

```

```

[45]: # Ensure plots are displayed directly in the Jupyter Notebook
%matplotlib inline

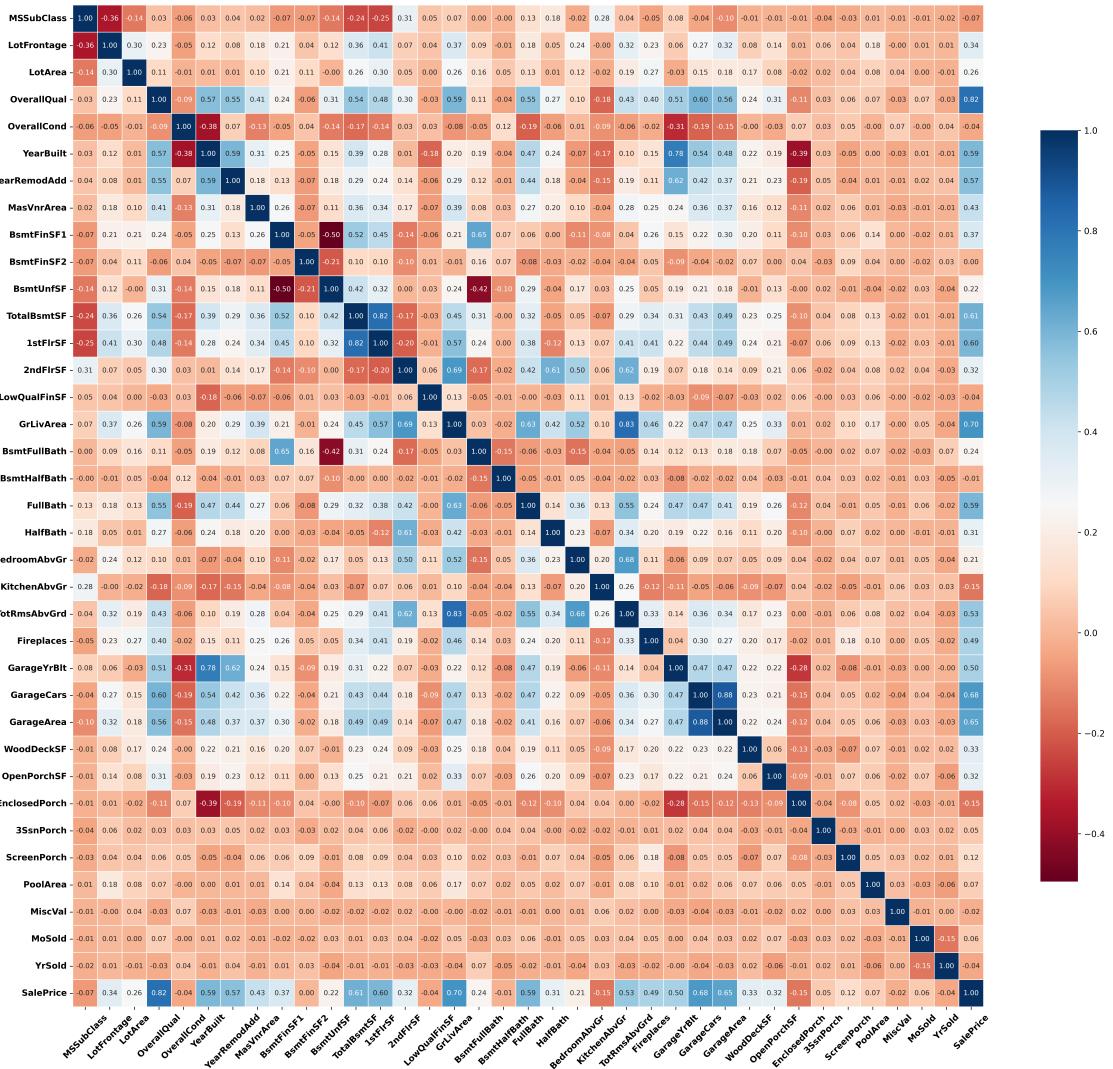
# Configure high-resolution output for Retina displays
%config InlineBackend.figure_format = 'retina'

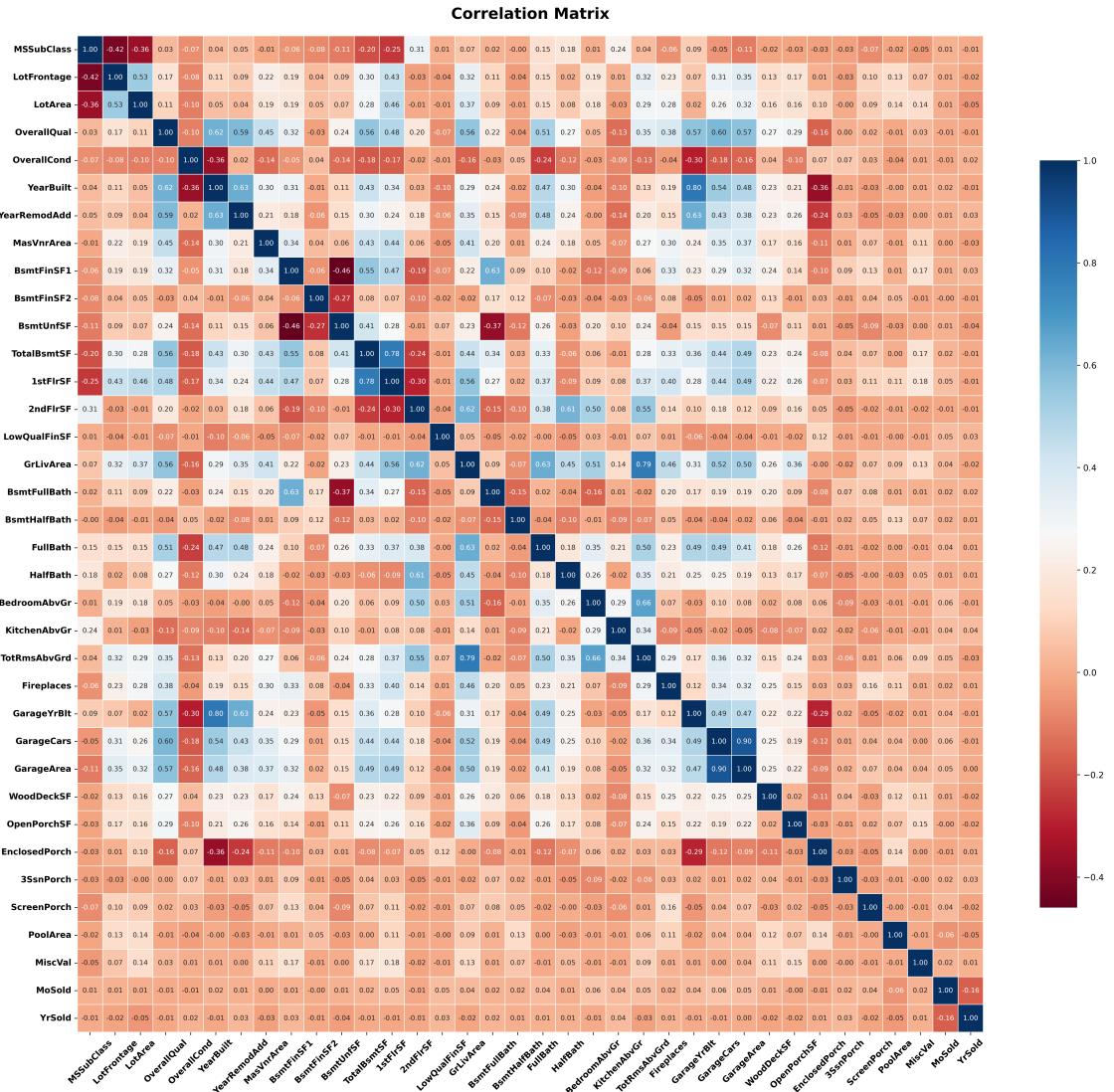
# Set default configurations for matplotlib plots
plt.rcParams['figure.figsize'] = [15, 10] # Set default figure size (width ↴height in inches)
plt.rcParams['figure.dpi'] = 120           # Set default resolution (dots per ↴inch)
plt.rcParams['axes.titlesize'] = 14        # Set default font size for titles
plt.rcParams['axes.labelsize'] = 12         # Set default font size for axis ↴labels
plt.rcParams['xtick.labelsize'] = 10        # Set default font size for x-axis ↴ticks
plt.rcParams['ytick.labelsize'] = 10        # Set default font size for y-axis ↴ticks

```

```
[46]: high_correlated_cols(data_train, plot=True)
```

Correlation Matrix





```

# Step 1: Calculate outlier thresholds based on IQR
def outlier_thresholds(dataframe, col_name, q1=0.05, q3=0.95):
    """
    Calculate lower and upper bounds for outliers using IQR.
    """

    quartile1 = dataframe[col_name].quantile(q1)
    quartile3 = dataframe[col_name].quantile(q3)
    iqr = quartile3 - quartile1
    low_limit = quartile1 - 1.5 * iqr
    up_limit = quartile3 + 1.5 * iqr
    return low_limit, up_limit

# Step 2: Identify outliers in a specific column
def check_outliers(dataframe, col_name):
    """
    Identify rows with outliers in a specific column.
    """

    low_limit, up_limit = outlier_thresholds(dataframe, col_name)
    outliers = dataframe[(dataframe[col_name] < low_limit) | (dataframe[col_name] > up_limit)]
    return outliers

# Step 3: Remove outliers from training data
def remove_outliers(dataframe, numeric_features, target_col):
    """
    Remove outliers from numeric features and target using IQR and linear regression residuals.
    """

    # Remove feature outliers using IQR
    for col in numeric_features:
        low_limit, up_limit = outlier_thresholds(dataframe, col)
        dataframe = dataframe[(dataframe[col] >= low_limit) & (dataframe[col] <= up_limit)]

    # Remove outliers based on target residuals
    X = dataframe.drop(columns=[target_col]).select_dtypes(include=[np.number])
    y = dataframe[target_col]

    model = LinearRegression()
    model.fit(X, y)

    residuals = y - model.predict(X)
    outliers = residuals[np.abs(zscore(residuals)) > 3].index

    dataframe = dataframe.drop(index=outliers)
    return dataframe

```

```

# Step 4: Clip outliers in test data
def clip_outliers(test_dataframe, train_dataframe, numeric_features):
    """
    Adjust test data outliers using thresholds derived from training data.
    """
    for col in numeric_features:
        low_limit, up_limit = outlier_thresholds(train_dataframe, col)
        test_dataframe[col] = test_dataframe[col].clip(lower=low_limit, upper=up_limit)
    return test_dataframe

# Step 5: Align test data with training data columns
def align_test_data(test_dataframe, train_dataframe, target_col):
    """
    Align test data with training data columns, excluding the target column.
    """
    X_train = train_dataframe.drop(columns=[target_col])
    X_test = test_dataframe.reindex(columns=X_train.columns, fill_value=0)
    return X_train, X_test

# Step 6: Apply the functions to training and test data
numeric_features = data_train.select_dtypes(include=[np.number]).columns.tolist()
numeric_features.remove('SalePrice') # Exclude target column from numeric features

data_train_cleaned = remove_outliers(data_train, numeric_features, target_col='SalePrice')
data_test_cleaned = clip_outliers(data_test, data_train_cleaned, numeric_features)

# Align test data with cleaned training data
X_train, X_test = align_test_data(data_test_cleaned, data_train_cleaned, target_col='SalePrice')
y_train = data_train_cleaned['SalePrice']

# Display results
print(f"Training data shape before cleaning: {data_train.shape}")
print(f"Training data shape after cleaning: {data_train_cleaned.shape}")
print(f"Testing data shape before cleaning: {data_test.shape}")
print(f"Testing data shape after cleaning: {data_test_cleaned.shape}")
print(f"X_train shape: {X_train.shape}")
print(f"X_test shape: {X_test.shape}")

```

Training data shape before cleaning: (1460, 74)

Training data shape after cleaning: (1246, 74)

Testing data shape before cleaning: (1459, 73)

```
Testing data shape after cleaning: (1459, 73)
X_train shape: (1246, 73)
X_test shape: (1459, 73)
```

```
[52]: # Step 1: Define the function for calculating outlier thresholds using IQR
def outlier_thresholds(dataframe, col_name, q1=0.05, q3=0.95):
    """
    Calculate the lower and upper limits for outliers using IQR.
    This is done by calculating the first (Q1) and third quartiles (Q3) and
    using the formula:
    lower_limit = Q1 - 1.5 * IQR
    upper_limit = Q3 + 1.5 * IQR
    """
    quartile1 = dataframe[col_name].quantile(q1)
    quartile3 = dataframe[col_name].quantile(q3)
    interquartile_range = quartile3 - quartile1
    up_limit = quartile3 + 1.5 * interquartile_range
    low_limit = quartile1 - 1.5 * interquartile_range
    return low_limit, up_limit

# Step 2: Define the function for checking if a column has outliers
def check_outlier(dataframe, col_name):
    """
    Check if a column contains outliers by comparing each value with the
    calculated thresholds.
    """
    # Call the outlier_thresholds function to get the limits
    low_limit, up_limit = outlier_thresholds(dataframe, col_name)

    # Filter the rows where the column values are outside the limits
    outliers = dataframe[(dataframe[col_name] > up_limit) | (dataframe[col_name] < low_limit)]

    # If there are any outliers, print them
    if outliers.shape[0] > 0:
        print(f"Outliers detected in column: {col_name}")
        print(outliers)
        return True
    else:
        print(f"No outliers detected in column: {col_name}")
        return False

# Example usage with a DataFrame
# Assuming 'data_train' is your DataFrame and contains numeric columns you want
# to check for outliers
numeric_features = data_train.select_dtypes(include=['number']).columns.tolist()
```

```
# Checking for outliers in all numeric features
for feature in numeric_features:
    check_outlier(data_train, feature)
```

No outliers detected in column: MSSubClass
Outliers detected in column: LotFrontage

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
935	-0.872563	RL	11.041546	1.717121	Pave	IR2	HLS	
1299	0.073375	RL	11.041546	5.348867	Pave	IR3	Bnk	

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
935	AllPub	Inside	Mod	...	-0.359325	-0.116339	-0.270208	
1299	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208	

	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
Id							
935	-0.068692	-0.087688	1.730892	0.138777	WD	Normal	
1299	11.882444	-0.087688	-1.969111	0.138777	New	Partial	

	SalePrice
Id	
935	12.396697
1299	11.982935

[2 rows x 74 columns]

Outliers detected in column: LotArea

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
54	-0.872563	RL	-0.084636	3.984244	Pave	IR1	Low	
250	-0.163109	RL	-0.039223	14.881285	Pave	IR2	Low	
272	-0.872563	RL	0.142429	2.865064	Pave	IR1	Low	
314	-0.872563	RL	3.639229	20.518273	Pave	IR3	Low	
336	3.147673	RL	-0.039223	15.448542	Grvl	IR1	HLS	
385	0.073375	RL	-0.039223	4.268474	Pave	IR2	Low	
452	-0.872563	RL	-0.357114	6.037793	Pave	IR1	Low	
458	-0.872563	RL	-0.039223	4.280500	Pave	IR1	Low	
524	0.073375	RL	2.730969	2.964284	Pave	IR1	Bnk	
662	0.073375	RL	-0.811244	3.615226	Pave	IR2	Lvl	
707	-0.872563	RL	-0.039223	10.486449	Pave	IR2	Low	
770	0.073375	RL	-1.038309	4.308262	Pave	IR2	HLS	
849	-0.163109	RL	0.233255	3.516107	Pave	IR2	Bnk	
1299	0.073375	RL	11.041546	5.348867	Pave	IR3	Bnk	
1397	-0.872563	RL	-0.039223	4.678682	Pave	IR1	Bnk	

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				

54	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
250	AllPub	CulDSac	Sev	...	-0.359325	-0.116339	-0.270208
272	AllPub	CulDSac	Sev	...	-0.359325	-0.116339	-0.270208
314	AllPub	Inside	Sev	...	-0.359325	-0.116339	-0.270208
336	AllPub	Corner	Sev	...	-0.359325	-0.116339	-0.270208
385	AllPub	Corner	Mod	...	-0.359325	-0.116339	-0.270208
452	AllPub	Inside	Mod	...	-0.359325	-0.116339	-0.270208
458	AllPub	CulDSac	Mod	...	-0.359325	-0.116339	-0.270208
524	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
662	AllPub	CulDSac	Gtl	...	-0.359325	-0.116339	-0.270208
707	AllPub	CulDSac	Sev	...	-0.359325	-0.116339	-0.270208
770	AllPub	CulDSac	Mod	...	-0.359325	-0.116339	3.497397
849	AllPub	Inside	Gtl	...	-0.359325	-0.116339	2.869463
1299	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
1397	AllPub	Inside	Sev	...	0.459030	-0.116339	-0.270208

Id	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
54	-0.068692	-0.087688	1.730892	-1.367655	WD	Normal	
250	-0.068692	0.920472	-0.119110	-0.614439	WD	Normal	
272	-0.068692	-0.087688	-0.859110	0.138777	WD	Normal	
314	-0.068692	-0.087688	-0.119110	0.891994	WD	Normal	
336	-0.068692	1.323736	0.620891	0.138777	WD	Normal	
385	-0.068692	-0.087688	-0.119110	-0.614439	WD	Normal	
452	-0.068692	-0.087688	2.100892	-1.367655	WD	Normal	
458	-0.068692	-0.087688	-1.229111	0.138777	WD	Normal	
524	-0.068692	-0.087688	1.360892	-0.614439	New	Partial	
662	-0.068692	-0.087688	0.250891	0.891994	WD	Normal	
707	-0.068692	-0.087688	-0.119110	-0.614439	WD	Normal	
770	-0.068692	-0.087688	-0.119110	1.645210	WD	Normal	
849	-0.068692	-0.087688	0.990891	0.138777	WD	Normal	
1299	11.882444	-0.087688	-1.969111	0.138777	New	Partial	
1397	-0.068692	-0.087688	-0.119110	1.645210	WD	Normal	

Id	SalePrice
54	12.861001
250	12.531776
272	12.394629
314	12.834684
336	12.341263
385	12.388398
452	12.542548
458	12.452937
524	12.126764
662	12.904210
707	12.618186
770	13.195616

```

849  12.388398
1299 11.982935
1397 11.982935

```

[15 rows x 74 columns]

No outliers detected in column: OverallQual
 No outliers detected in column: OverallCond
 No outliers detected in column: YearBuilt
 No outliers detected in column: YearRemodAdd
 Outliers detected in column: MasVnrArea

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
298	0.073375	FV	-0.175462	-0.312475	Pave	IR1	Lvl	
692	0.073375	RL	1.550231	1.104264	Pave	IR1	Lvl	
1170	0.073375	RL	2.186013	2.529922	Pave	IR1	Lvl	

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
298	AllPub	Inside	Gtl	...	-0.359325	-0.116339	3.282106	
692	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208	
1170	AllPub	CulDSac	Gtl	...	-0.359325	-0.116339	-0.270208	

	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
Id							
298	-0.068692	-0.087688	-0.119110	-0.614439	WD	Normal	
692	-0.068692	-0.087688	-1.969111	-0.614439	WD	Normal	
1170	-0.068692	-0.087688	0.250891	-1.367655	WD	Normal	

	SalePrice
Id	
298	12.384223
692	13.534474
1170	13.345509

[3 rows x 74 columns]

Outliers detected in column: BsmtFinSF1

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
1299	0.073375	RL	11.041546	5.348867	Pave	IR3	Bnk	

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
1299	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208	

	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
Id							
1299	11.882444	-0.087688	-1.969111	0.138777	New	Partial	

SalePrice

Id

1299 11.982935

[1 rows x 74 columns]

Outliers detected in column: BsmtFinSF2

MSSubClass MSZoning LotFrontage LotArea Street LotShape LandContour \

Id

154	-0.872563	RL	-0.039223	0.298980	Pave	Reg	Lvl
272	-0.872563	RL	0.142429	2.865064	Pave	IR1	Low
323	0.073375	RL	0.732798	-0.013713	Pave	IR1	Lvl
471	1.492282	RL	-0.039223	-0.370504	Pave	IR1	Lvl
543	-0.872563	RL	0.369494	-0.037766	Pave	Reg	Lvl
765	1.492282	RL	-1.810330	-0.096998	Pave	IR1	Lvl
855	-0.872563	RL	1.459405	0.741961	Pave	Reg	Lvl
925	-0.872563	RL	0.414907	-0.027744	Pave	Reg	Lvl
1254	0.073375	RL	-0.039223	0.704077	Pave	IR1	Lvl
1459	-0.872563	RL	-0.084636	-0.080160	Pave	Reg	Lvl

Utilities LotConfig LandSlope ... EnclosedPorch 3SsnPorch ScreenPorch \

Id

154	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
272	AllPub	CulDSac	Sev	...	-0.359325	-0.116339	-0.270208
323	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
471	AllPub	Corner	Gtl	...	-0.359325	-0.116339	2.241529
543	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
765	AllPub	CulDSac	Gtl	...	-0.359325	-0.116339	3.605043
855	AllPub	Inside	Gtl	...	-0.359325	-0.116339	5.327377
925	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
1254	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
1459	AllPub	Inside	Gtl	...	1.473789	-0.116339	-0.270208

PoolArea MiscVal MoSold YrSold SaleType SaleCondition \

Id

154	-0.068692	-0.087688	-1.229111	0.138777	WD	Normal
272	-0.068692	-0.087688	-0.859110	0.138777	WD	Normal
323	-0.068692	-0.087688	0.620891	-0.614439	WD	Normal
471	-0.068692	-0.087688	-0.119110	1.645210	WD	Normal
543	-0.068692	-0.087688	-0.119110	0.891994	WD	Normal
765	-0.068692	-0.087688	-0.859110	-1.367655	WD	Normal
855	-0.068692	-0.087688	0.250891	-1.367655	WD	Abnorml
925	-0.068692	-0.087688	-0.489110	-1.367655	WD	Normal
1254	-0.068692	-0.087688	0.250891	-0.614439	WD	Normal
1459	-0.068692	-0.087688	-0.859110	1.645210	WD	Normal

SalePrice

Id

154 12.367345

```
272  12.394629
323  12.614869
471  12.264346
543  12.270225
765  12.506181
855  12.043560
925  12.242891
1254 12.591338
1459 11.864469
```

[10 rows x 74 columns]

No outliers detected in column: BsmtUnfSF

Outliers detected in column: TotalBsmtSF

```
MSSubClass MSZoning LotFrontage LotArea Street LotShape LandContour \
Id
1299  0.073375      RL    11.041546  5.348867  Pave     IR3      Bnk
Utilities LotConfig LandSlope ... EnclosedPorch 3SsnPorch ScreenPorch \
Id
1299  AllPub       Corner   Gtl   ...      -0.359325 -0.116339  -0.270208
PoolArea  MiscVal   MoSold   YrSold  SaleType  SaleCondition \
Id
1299  11.882444 -0.087688 -1.969111  0.138777      New      Partial
SalePrice
Id
1299  11.982935
```

[1 rows x 74 columns]

Outliers detected in column: 1stFlrSF

```
MSSubClass MSZoning LotFrontage LotArea Street LotShape LandContour \
Id
1299  0.073375      RL    11.041546  5.348867  Pave     IR3      Bnk
Utilities LotConfig LandSlope ... EnclosedPorch 3SsnPorch ScreenPorch \
Id
1299  AllPub       Corner   Gtl   ...      -0.359325 -0.116339  -0.270208
PoolArea  MiscVal   MoSold   YrSold  SaleType  SaleCondition \
Id
1299  11.882444 -0.087688 -1.969111  0.138777      New      Partial
SalePrice
Id
1299  11.982935
```

[1 rows x 74 columns]

No outliers detected in column: 2ndFlrSF

Outliers detected in column: LowQualFinSF

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
52	-0.163109	RM	-0.811244	-0.428632	Pave	Reg		Lvl
89	-0.163109	C (all)	1.595644	-0.205137	Pave	IR1		Lvl
126	3.147673	RM	-0.447940	-0.374512	Pave	Reg		Lvl
171	-0.163109	RM	-0.039223	0.184526	Pave	IR1		Lvl
186	0.428102	RM	0.914450	1.246078	Pave	IR2		Lvl
188	-0.163109	RL	-0.447940	-0.010707	Pave	Reg		Lvl
198	0.428102	RL	4.729141	1.493526	Pave	Reg		Lvl
199	0.428102	RM	1.005276	-0.500792	Pave	Reg		Lvl
264	-0.163109	RM	-0.902070	-0.502797	Pave	Reg		Lvl
268	0.428102	RL	-0.447940	-0.212153	Pave	Reg		Bnk
407	-0.163109	RL	-0.856657	-0.003691	Pave	Reg		Lvl
590	-0.399594	RM	-0.902070	-0.141997	Pave	Reg		Lvl
636	3.147673	RH	-0.447940	0.038001	Pave	Reg		Bnk
730	-0.636078	RM	-0.811244	-0.428632	Pave	Reg		Lvl
830	2.438219	FV	-2.082808	-0.799053	Pave	Reg		Lvl
832	2.438219	FV	-1.810330	-0.735312	Pave	Reg		Lvl
869	0.073375	RL	-0.039223	0.425460	Pave	IR2		Lvl
874	-0.399594	RL	-0.447940	0.163078	Pave	Reg		Lvl
884	0.428102	RL	-0.447940	-0.432240	Pave	Reg		Bnk
946	-0.163109	RM	1.277754	-0.170060	Pave	Reg		Lvl
1010	-0.163109	RL	-0.447940	-0.452686	Pave	Reg		Lvl
1032	0.428102	RL	1.459405	0.535804	Pave	Reg		Lvl
1174	-0.163109	RL	3.094273	0.752985	Pave	IR1		Bnk
1350	0.309859	RM	-0.902070	-0.527852	Pave	Reg		Lvl
1365	2.438219	FV	-1.810330	-0.735312	Pave	Reg		Lvl
1441	0.309859	RL	0.414907	0.101141	Pave	IR1		Bnk

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
52	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
89	AllPub	Corner	Gtl	...	2.193941	-0.116339	-0.270208	
126	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
171	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
186	AllPub	Inside	Gtl	...	-0.359325	-0.116339	7.085593	
188	AllPub	Inside	Gtl	...	-0.359325	4.660629	-0.270208	
198	AllPub	Corner	Gtl	...	8.675309	-0.116339	-0.270208	
199	AllPub	Corner	Gtl	...	0.131688	-0.116339	-0.270208	
264	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208	
268	AllPub	Inside	Mod	...	-0.359325	-0.116339	-0.270208	
407	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
590	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
636	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
730	AllPub	Inside	Gtl	...	1.473789	-0.116339	-0.270208	
830	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	

832	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
869	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
874	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
884	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
946	AllPub	Corner	Gtl	...	3.634245	-0.116339	-0.270208
1010	AllPub	Inside	Gtl	...	1.899334	-0.116339	-0.270208
1032	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
1174	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
1350	AllPub	Inside	Gtl	...	-0.031983	-0.116339	-0.270208
1365	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
1441	AllPub	Inside	Mod	...	-0.359325	-0.116339	-0.270208

Id	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
52	-0.068692	0.718840	0.990891	-1.367655	WD	Normal	
89	-0.068692	-0.087688	1.360892	0.891994	ConLD	Abnorml	
126	-0.068692	-0.087688	-0.119110	-1.367655	WD	Normal	
171	-0.068692	-0.087688	-0.489110	-0.614439	WD	Normal	
186	-0.068692	-0.087688	-0.119110	-1.367655	WD	Normal	
188	-0.068692	-0.087688	0.620891	0.891994	WD	Normal	
198	12.679187	-0.087688	-1.229111	-1.367655	WD	Abnorml	
199	-0.068692	-0.087688	0.250891	0.891994	WD	Abnorml	
264	-0.068692	-0.087688	-0.859110	1.645210	WD	Normal	
268	-0.068692	-0.087688	0.250891	0.138777	WD	Normal	
407	-0.068692	-0.087688	-1.229111	0.138777	WD	Normal	
590	-0.068692	1.122104	0.620891	0.138777	WD	Normal	
636	-0.068692	-0.087688	-1.229111	-0.614439	WD	Abnorml	
730	-0.068692	-0.087688	-1.969111	0.891994	WD	Normal	
830	-0.068692	-0.087688	0.250891	-1.367655	WD	Normal	
832	-0.068692	-0.087688	-0.119110	-1.367655	WD	Normal	
869	-0.068692	-0.087688	-0.489110	-1.367655	WD	Normal	
874	-0.068692	-0.087688	0.990891	0.891994	WD	Normal	
884	-0.068692	-0.087688	-1.229111	-1.367655	WD	Normal	
946	-0.068692	-0.087688	0.990891	0.891994	WD	Normal	
1010	-0.068692	-0.087688	-0.119110	-1.367655	WD	Normal	
1032	-0.068692	-0.087688	0.620891	0.891994	WD	Normal	
1174	-0.068692	-0.087688	-1.229111	-0.614439	WD	Normal	
1350	-0.068692	-0.087688	2.100892	0.138777	WD	Normal	
1365	-0.068692	-0.087688	-0.859110	-1.367655	WD	Abnorml	
1441	-0.068692	-0.087688	0.990891	0.138777	WD	Normal	

Id	SalePrice
52	11.648339
89	11.350418
126	11.344519
171	11.763692
186	13.071072

```

188  11.813037
198  12.367345
199  11.552156
264  11.775297
268  12.097936
407  11.652696
590  11.283525
636  12.206078
730  11.542494
830  11.900912
832  11.925042
869  12.037660
874  11.798112
884  11.682677
946  11.735277
1010 11.532738
1032 12.190964
1174 12.208575
1350 11.711785
1365 11.878631
1441 12.160034

```

[26 rows x 74 columns]

Outliers detected in column: GrLivArea

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
1299	0.073375	RL	11.041546	5.348867	Pave	IR3	Bnk	

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id								
1299	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208	

	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
Id							
1299	11.882444	-0.087688	-1.969111	0.138777	New	Partial	

	SalePrice
Id	
1299	11.982935

[1 rows x 74 columns]

Outliers detected in column: BsmtFullBath

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
739	0.782828	RL	-0.44794	0.02838	Pave	Reg	Lvl	

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id								
				...				

739 AllPub Inside Gtl ... -0.359325 -0.116339 -0.270208
 PoolArea MiscVal MoSold YrSold SaleType SaleCondition \

Id
 739 -0.068692 -0.087688 -1.229111 0.891994 WD Alloca
 SalePrice
 Id
 739 12.095147

[1 rows x 74 columns]

No outliers detected in column: BsmtHalfBath
 No outliers detected in column: FullBath
 No outliers detected in column: HalfBath
 Outliers detected in column: BedroomAbvGr

MSSubClass MSZoning LotFrontage LotArea Street LotShape LandContour \

Id
 636 3.147673 RH -0.44794 0.038001 Pave Reg Bnk
 Utilities LotConfig LandSlope ... EnclosedPorch 3SsnPorch ScreenPorch \

Id
 636 AllPub Inside Gtl ... -0.359325 -0.116339 -0.270208

PoolArea MiscVal MoSold YrSold SaleType SaleCondition \

Id
 636 -0.068692 -0.087688 -1.229111 -0.614439 WD Abnorml
 SalePrice
 Id
 636 12.206078

[1 rows x 74 columns]

Outliers detected in column: KitchenAbvGr

MSSubClass MSZoning LotFrontage LotArea Street LotShape LandContour \

Id
 9 -0.163109 RM -0.856657 -0.440659 Pave Reg Lvl
 10 3.147673 RL -0.902070 -0.310370 Pave Reg Lvl
 18 0.782828 RL 0.097016 0.027478 Pave Reg Lvl
 40 0.782828 RL -0.220875 -0.448677 Pave Reg Lvl
 49 3.147673 RM -1.674091 -0.607428 Pave Reg Lvl

 1392 0.782828 RL -0.220875 -0.157632 Pave Reg Lvl
 1394 3.147673 RM -0.447940 0.028380 Pave Reg Lvl
 1413 0.782828 RL -0.447940 -0.332419 Pave Reg Lvl
 1417 3.147673 RM -0.447940 0.082500 Pave Reg Lvl
 1451 0.782828 RL -0.447940 -0.152020 Pave Reg Lvl

Utilities LotConfig LandSlope ... EnclosedPorch 3SsnPorch ScreenPorch \

Id					...			
9	AllPub	Inside	Gtl	...	2.995929	-0.116339	-0.270208	
10	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208	
18	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
40	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
49	AllPub	Inside	Gtl	...	1.310118	-0.116339	-0.270208	
...	
1392	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
1394	AllPub	Inside	Gtl	...	3.110498	-0.116339	-0.270208	
1413	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
1417	AllPub	Inside	Gtl	...	1.506523	-0.116339	-0.270208	
1451	AllPub	FR2	Gtl	...	-0.359325	-0.116339	-0.270208	
								\
Id	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition		
9	-0.068692	-0.087688	-0.859110	0.138777	WD	Abnorml		
10	-0.068692	-0.087688	-1.969111	0.138777	WD	Normal		
18	-0.068692	0.920472	1.360892	-1.367655	WD	Normal		
40	-0.068692	-0.087688	-0.119110	0.138777	WD	AdjLand		
49	-0.068692	-0.087688	-0.119110	0.891994	New	Partial		
...		
1392	-0.068692	-0.087688	-0.859110	0.891994	WD	Normal		
1394	-0.068692	-0.087688	-0.859110	0.138777	WD	Normal		
1413	-0.068692	-0.087688	-0.119110	0.891994	WD	Normal		
1417	-0.068692	-0.087688	-0.859110	1.645210	WD	Normal		
1451	-0.068692	-0.087688	0.990891	0.891994	WD	Normal		
Id	SalePrice							
9	11.774528							
10	11.678448							
18	11.407576							
40	11.314487							
49	11.635152							
...	...							
1392	11.728045							
1394	12.001512							
1413	11.407576							
1417	11.715874							
1451	11.820418							

[68 rows x 74 columns]

No outliers detected in column: TotRmsAbvGrd
 No outliers detected in column: Fireplaces
 No outliers detected in column: GarageYrBlt
 No outliers detected in column: GarageCars
 No outliers detected in column: GarageArea
 Outliers detected in column: WoodDeckSF

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
54	-0.872563	RL	-0.084636	3.984244	Pave	IR1	Low	
	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
54	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	SalePrice	
Id								
54	-0.068692	-0.087688	1.730892	-1.367655	WD	Normal	12.861001	
[1 rows x 74 columns]								
Outliers detected in column: OpenPorchSF								
	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
496	-0.636078	C (all)	-0.447940	-0.264368	Pave	Reg	Lvl	
584	0.428102	RM	0.233255	0.298980	Pave	Reg	Lvl	
1329	-0.163109	RM	-0.447940	-0.007700	Pave	Reg	Lvl	
	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
496	AllPub	Inside	Gtl	...	1.522891	-0.116339	-0.270208	
584	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
1329	AllPub	Corner	Gtl	...	-0.359325	-0.116339	8.341462	
	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\	
Id								
496	-0.068692	-0.087688	1.730892	0.891994	WD	Abnorml		
584	-0.068692	-0.087688	0.250891	0.138777	WD	Normal		
1329	-0.068692	2.231080	-0.119110	0.138777	WD	Normal		
	SalePrice							
Id								
496	10.460271							
584	12.691584							
1329	12.452937							
[3 rows x 74 columns]								
Outliers detected in column: EnclosedPorch								
	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
198	0.428102	RL	4.729141	1.493526	Pave	Reg	Lvl	
	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
198	AllPub	Corner	Gtl	...	8.675309	-0.116339	-0.270208	

	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\	
Id								
198	12.679187	-0.087688	-1.229111	-1.367655	WD	Abnorml		
	SalePrice							
Id								
198	12.367345							
[1 rows x 74 columns]								
Outliers detected in column: 3SsnPorch								
	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
6	-0.163109	RL	0.687385	0.360616	Pave	IR1	Lvl	
56	-0.872563	RL	1.368580	-0.034259	Pave	IR1	Lvl	
121	0.546344	RL	-0.039223	1.096045	Pave	IR1	Low	
130	-0.872563	RL	-0.039223	-0.154726	Pave	Reg	Lvl	
160	0.073375	RL	2.912621	0.888085	Pave	IR1	HLS	
183	-0.872563	RL	-0.447940	-0.146006	Pave	Reg	Lvl	
188	-0.163109	RL	-0.447940	-0.010707	Pave	Reg	Lvl	
206	-0.872563	RL	1.323167	0.133713	Pave	Reg	Lvl	
238	0.073375	RL	-0.039223	-0.106619	Pave	IR1	Lvl	
259	0.073375	RL	0.460320	0.192243	Pave	Reg	Lvl	
281	0.073375	RL	0.551146	0.077188	Pave	Reg	Lvl	
547	-0.163109	RL	0.006190	-0.178378	Pave	IR1	Bnk	
705	-0.872563	RL	0.006190	-0.212153	Pave	Reg	Lvl	
727	-0.872563	RL	-0.039223	1.120299	Pave	IR1	Lvl	
745	1.492282	RL	-1.310787	-0.513320	Pave	IR1	HLS	
890	-0.872563	RL	2.640143	0.164682	Pave	Reg	Lvl	
923	-0.872563	RL	-0.220875	-0.028045	Pave	Reg	Lvl	
942	0.073375	RL	-0.039223	-0.176574	Pave	IR1	Lvl	
1081	-0.872563	RL	0.460320	0.052433	Pave	Reg	Lvl	
1157	0.546344	RL	0.687385	-0.116942	Pave	Reg	Lvl	
1162	-0.872563	RL	-0.039223	0.427063	Pave	IR1	Low	
1182	1.492282	RM	-0.266288	-0.494077	Pave	IR1	HLS	
1347	-0.872563	RL	-0.039223	1.028696	Pave	IR2	Lvl	
1438	-0.872563	RL	1.186928	0.193145	Pave	Reg	Lvl	
	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
6	AllPub	Inside	Gtl	...	-0.359325	10.802446	-0.270208	
56	AllPub	Inside	Gtl	...	-0.359325	13.770991	-0.270208	
121	AllPub	CulDSac	Sev	...	-0.359325	4.319417	-0.270208	
130	AllPub	Inside	Gtl	...	-0.359325	6.025478	-0.270208	
160	AllPub	Corner	Gtl	...	-0.359325	5.616023	-0.270208	
183	AllPub	Inside	Gtl	...	-0.359325	6.025478	-0.270208	
188	AllPub	Inside	Gtl	...	-0.359325	4.660629	-0.270208	
206	AllPub	Corner	Gtl	...	-0.359325	17.217233	-0.270208	
238	AllPub	CulDSac	Gtl	...	-0.359325	8.004507	-0.270208	

259	AllPub	Inside	Gtl	...	-0.359325	8.243356	-0.270208
281	AllPub	Inside	Gtl	...	-0.359325	6.571417	-0.270208
547	AllPub	Inside	Gtl	...	-0.359325	4.797114	-0.270208
705	AllPub	Inside	Gtl	...	-0.359325	4.797114	-0.270208
727	AllPub	Corner	Gtl	...	-0.359325	6.093720	-0.270208
745	AllPub	Inside	Gtl	...	0.786371	5.616023	-0.270208
890	AllPub	Inside	Gtl	...	-0.359325	5.411296	-0.270208
923	AllPub	Inside	Gtl	...	-0.359325	0.668448	-0.270208
942	AllPub	FR2	Gtl	...	-0.359325	5.616023	-0.270208
1081	AllPub	Inside	Gtl	...	-0.359325	7.253841	-0.270208
1157	AllPub	Inside	Gtl	...	-0.359325	3.159296	-0.270208
1162	AllPub	CulDSac	Gtl	...	-0.359325	7.253841	-0.270208
1182	AllPub	Inside	Mod	...	-0.359325	5.104205	-0.270208
1347	AllPub	CulDSac	Gtl	...	-0.359325	9.778810	-0.270208
1438	AllPub	FR2	Gtl	...	-0.359325	10.256507	-0.270208

Id	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
6	-0.068692	1.323736	1.360892	0.891994	WD	Normal	
56	-0.068692	-0.087688	0.250891	0.138777	WD	Normal	
121	-0.068692	-0.087688	1.360892	-1.367655	WD	Normal	
130	-0.068692	-0.087688	0.250891	-1.367655	WD	Abnorml	
160	-0.068692	-0.087688	-1.229111	-1.367655	New	Partial	
183	-0.068692	-0.087688	-0.119110	-0.614439	WD	Normal	
188	-0.068692	-0.087688	0.620891	0.891994	WD	Normal	
206	-0.068692	-0.087688	-0.489110	0.891994	WD	Normal	
238	-0.068692	-0.087688	-1.599111	1.645210	WD	Normal	
259	-0.068692	-0.087688	-0.489110	0.138777	WD	Normal	
281	-0.068692	-0.087688	-1.969111	-0.614439	WD	Normal	
547	-0.068692	-0.087688	-0.489110	-0.614439	WD	Normal	
705	-0.068692	-0.087688	-0.489110	1.645210	WD	Normal	
727	-0.068692	-0.087688	2.100892	0.891994	WD	Normal	
745	-0.068692	-0.087688	1.360892	0.138777	WD	Normal	
890	-0.068692	-0.087688	-1.599111	0.891994	WD	Normal	
923	-0.068692	-0.087688	1.360892	-1.367655	New	Partial	
942	-0.068692	-0.087688	-0.119110	0.891994	WD	Normal	
1081	-0.068692	-0.087688	1.360892	0.138777	COD	Abnorml	
1157	-0.068692	-0.087688	1.360892	0.138777	WD	Normal	
1162	-0.068692	-0.087688	1.730892	0.138777	WD	Normal	
1182	-0.068692	-0.087688	1.730892	0.138777	New	Partial	
1347	-0.068692	-0.087688	-0.119110	-1.367655	WD	Normal	
1438	-0.068692	-0.087688	1.730892	0.138777	New	Partial	

Id	SalePrice
6	11.870607
56	12.103492
121	12.100718

130	11.918397
160	12.676079
183	11.695255
188	11.813037
206	12.103492
238	12.178193
259	12.352339
281	12.339296
547	12.254868
705	12.269052
727	12.310437
745	12.100718
890	11.915058
923	12.043501
942	12.273736
1081	11.884496
1157	12.100162
1162	12.319406
1182	12.880294
1347	12.478010
1438	12.885673

[24 rows x 74 columns]

Outliers detected in column: ScreenPorch

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
186	0.428102	RM	0.91445	1.246078	Pave	IR2	Lvl	
1329	-0.163109	RM	-0.44794	-0.007700	Pave	Reg	Lvl	
1387	0.073375	RL	0.46032	0.618888	Pave	IR1	Lvl	

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
186	AllPub	Inside	Gtl	...	-0.359325	-0.116339	7.085593	
1329	AllPub	Corner	Gtl	...	-0.359325	-0.116339	8.341462	
1387	AllPub	Inside	Gtl	...	-0.359325	-0.116339	7.623823	

	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
Id							
186	-0.068692	-0.087688	-0.119110	-1.367655		WD	Normal
1329	-0.068692	2.231080	-0.119110	0.138777		WD	Normal
1387	12.853474	3.944952	0.250891	-1.367655		WD	Normal

	SalePrice
Id	
186	13.071072
1329	12.452937
1387	12.429220

[3 rows x 74 columns]

Outliers detected in column: PoolArea

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
198	0.428102	RL	4.729141	1.493526	Pave	Reg		Lvl
811	-0.872563	RL	0.369494	-0.037766	Pave	Reg		Lvl
1171	0.546344	RL	0.278668	-0.063824	Pave	Reg		Lvl
1183	0.073375	RL	4.093359	0.511751	Pave	IR1		Lvl
1299	0.073375	RL	11.041546	5.348867	Pave	IR3		Bnk
1387	0.073375	RL	0.460320	0.618888	Pave	IR1		Lvl
1424	0.546344	RL	-0.039223	0.919354	Pave	IR1		Lvl

	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch	\
Id				...				
198	AllPub	Corner	Gtl	...	8.675309	-0.116339	-0.270208	
811	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
1171	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208	
1183	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208	
1299	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208	
1387	AllPub	Inside	Gtl	...	-0.359325	-0.116339	7.623823	
1424	AllPub	CulDSac	Gtl	...	-0.359325	-0.116339	-0.270208	

	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\
Id							
198	12.679187	-0.087688	-1.229111	-1.367655		WD	Abnorml
811	16.065342	-0.087688	-1.969111	-1.367655		WD	Normal
1171	14.272672	-0.087688	0.250891	0.138777		WD	Normal
1183	13.749810	-0.087688	0.250891	-0.614439		WD	Abnorml
1299	11.882444	-0.087688	-1.969111	0.138777	New	Partial	
1387	12.853474	3.944952	0.250891	-1.367655		WD	Normal
1424	18.306180	-0.087688	0.620891	-1.367655		WD	Alloca

	SalePrice
Id	
198	12.367345
811	12.106258
1171	12.049425
1183	13.521141
1299	11.982935
1387	12.429220
1424	12.524421

[7 rows x 74 columns]

Outliers detected in column: MiscVal

	MSSubClass	MSZoning	LotFrontage	LotArea	Street	LotShape	LandContour	\
Id								
6	-0.163109	RL	0.687385	0.360616	Pave	IR1		Lvl
8	0.073375	RL	-0.039223	-0.013513	Pave	IR1		Lvl

17	-0.872563	RL	-0.039223	0.072578	Pave	IR1	Lvl
18	0.782828	RL	0.097016	0.027478	Pave	Reg	Lvl
52	-0.163109	RM	-0.811244	-0.428632	Pave	Reg	Lvl
85	0.546344	RL	-0.039223	-0.199124	Pave	IR1	Lvl
96	0.073375	RL	-0.039223	-0.075350	Pave	IR2	Lvl
99	-0.636078	RL	0.687385	0.010841	Pave	Reg	Lvl
100	-0.872563	RL	0.324081	-0.119949	Pave	IR1	Lvl
107	-0.636078	RM	-0.447940	0.028380	Pave	Reg	Lvl
215	0.073375	RL	-0.039223	0.038402	Pave	IR1	Lvl
250	-0.163109	RL	-0.039223	14.881285	Pave	IR2	Low
251	-0.636078	RL	-0.675005	-0.517830	Pave	IR1	Lvl
336	3.147673	RL	-0.039223	15.448542	Grvl	IR1	HLS
339	-0.872563	RL	0.959863	0.363623	Pave	Reg	Lvl
347	-0.872563	RL	-0.039223	0.226018	Pave	IR1	Lvl
393	-0.872563	RL	-0.039223	-0.218266	Pave	IR1	Lvl
440	-0.163109	RL	-0.130049	0.184125	Pave	Reg	Lvl
500	-0.872563	RL	0.006190	-0.298845	Pave	IR1	Lvl
503	-0.872563	RL	0.006190	-0.134982	Pave	Reg	Lvl
511	-0.872563	RL	0.233255	0.405115	Pave	Reg	Lvl
540	-0.872563	RL	-0.039223	0.090818	Pave	Reg	Lvl
590	-0.399594	RM	-0.902070	-0.141997	Pave	Reg	Lvl
612	0.546344	RL	-0.039223	-0.012210	Pave	IR1	Lvl
627	-0.872563	RL	-0.039223	0.182922	Pave	IR1	Lvl
635	0.782828	RL	-0.266288	-0.354568	Pave	Reg	Lvl
706	3.147673	RM	0.006190	-0.492774	Pave	Reg	Lvl
726	-0.872563	RL	-0.447940	-0.356473	Pave	Reg	Lvl
734	-0.872563	RL	0.460320	-0.051798	Pave	Reg	Lvl
761	-0.872563	RL	0.006190	-0.141997	Pave	Reg	Lvl
767	0.073375	RL	0.460320	-0.009604	Pave	Reg	Lvl
768	-0.163109	RL	0.233255	0.199559	Pave	IR1	Lvl
787	-0.163109	RM	-0.447940	0.028380	Pave	Reg	Lvl
795	0.073375	RL	-0.039223	0.031587	Pave	IR1	Lvl
801	0.073375	RL	0.414907	0.228624	Pave	IR1	HLS
813	-0.872563	C (all)	-0.175462	-0.180884	Grvl	Reg	Bnk
814	-0.872563	RL	0.233255	-0.076853	Pave	Reg	Lvl
868	-0.872563	RL	0.687385	-0.355470	Pave	Reg	Lvl
879	0.664586	RL	0.823624	0.126798	Pave	IR1	Lvl
891	-0.163109	RL	-0.447940	-0.245827	Pave	Reg	Lvl
913	-0.636078	RM	-0.856657	-0.440659	Pave	Reg	Lvl
954	0.073375	RL	-0.039223	0.055941	Pave	IR1	Lvl
1062	-0.636078	C (all)	2.276839	0.749979	Grvl	Reg	Low
1077	-0.163109	RL	-0.447940	0.028380	Pave	Reg	Lvl
1084	-0.872563	RL	0.460320	-0.172064	Pave	Reg	Lvl
1172	-0.872563	RL	0.278668	-0.139993	Pave	Reg	Lvl
1211	0.073375	RL	0.006190	0.070273	Pave	Reg	Lvl
1231	0.782828	RL	-0.039223	0.839176	Pave	IR1	Lvl
1253	-0.872563	RL	-0.357114	-0.066029	Pave	Reg	Lvl
1329	-0.163109	RM	-0.447940	-0.007700	Pave	Reg	Lvl

1387	0.073375	RL	0.460320	0.618888	Pave	IR1	Lvl
1458	0.309859	RL	-0.175462	-0.147810	Pave	Reg	Lvl
\\							
Id	Utilities	LotConfig	LandSlope	...	EnclosedPorch	3SsnPorch	ScreenPorch
6	AllPub	Inside	Gtl	...	-0.359325	10.802446	-0.270208
8	AllPub	Corner	Gtl	...	3.372372	-0.116339	-0.270208
17	AllPub	CulDSac	Gtl	...	-0.359325	-0.116339	-0.270208
18	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
52	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
85	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
96	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
99	AllPub	Corner	Gtl	...	0.900941	-0.116339	-0.270208
100	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
107	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
215	AllPub	FR2	Gtl	...	-0.359325	-0.116339	-0.270208
250	AllPub	CulDSac	Sev	...	-0.359325	-0.116339	-0.270208
251	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
336	AllPub	Corner	Sev	...	-0.359325	-0.116339	-0.270208
339	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
347	AllPub	CulDSac	Gtl	...	-0.359325	-0.116339	-0.270208
393	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
440	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
500	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
503	AllPub	Corner	Gtl	...	2.652220	-0.116339	-0.270208
511	AllPub	Inside	Gtl	...	-0.359325	-0.116339	2.743876
540	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
590	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
612	AllPub	FR2	Gtl	...	-0.359325	-0.116339	-0.270208
627	AllPub	Inside	Gtl	...	0.229890	-0.116339	-0.270208
635	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
706	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
726	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
734	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
761	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
767	AllPub	Inside	Gtl	...	2.193941	-0.116339	-0.270208
768	AllPub	Inside	Gtl	...	2.193941	-0.116339	-0.270208
787	AllPub	Inside	Gtl	...	2.848625	-0.116339	-0.270208
795	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
801	AllPub	Inside	Mod	...	2.668587	-0.116339	-0.270208
813	AllPub	Inside	Mod	...	-0.359325	-0.116339	-0.270208
814	AllPub	Inside	Gtl	...	4.141625	-0.116339	-0.270208
868	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
879	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
891	AllPub	Corner	Gtl	...	-0.359325	-0.116339	-0.270208
913	AllPub	Inside	Gtl	...	1.473789	-0.116339	1.882709
954	AllPub	Inside	Mod	...	-0.359325	-0.116339	-0.270208
1062	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208

1077	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
1084	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
1172	AllPub	Inside	Gtl	...	-0.359325	-0.116339	4.896794
1211	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
1231	AllPub	Inside	Gtl	...	2.013903	-0.116339	-0.270208
1253	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
1329	AllPub	Corner	Gtl	...	-0.359325	-0.116339	8.341462
1387	AllPub	Inside	Gtl	...	-0.359325	-0.116339	7.623823
1458	AllPub	Inside	Gtl	...	-0.359325	-0.116339	-0.270208
\\							
Id	PoolArea	MiscVal	MoSold	YrSold	SaleType	SaleCondition	\\
6	-0.068692	1.323736	1.360892	0.891994	WD	Normal	
8	-0.068692	0.618024	1.730892	0.891994	WD	Normal	
17	-0.068692	1.323736	-1.229111	1.645210	WD	Normal	
18	-0.068692	0.920472	1.360892	-1.367655	WD	Normal	
52	-0.068692	0.718840	0.990891	-1.367655	WD	Normal	
85	-0.068692	1.323736	-0.489110	0.891994	WD	Normal	
96	-0.068692	0.880146	-0.859110	0.891994	WD	Normal	
99	-0.068692	0.718840	-0.489110	1.645210	COD	Abnrm1	
100	-0.068692	0.718840	-1.969111	1.645210	WD	Normal	
107	-0.068692	0.819656	0.620891	-0.614439	WD	Normal	
215	-0.068692	0.819656	-1.229111	1.645210	WD	Normal	
250	-0.068692	0.920472	-0.119110	-0.614439	WD	Normal	
251	-0.068692	0.819656	-0.489110	1.645210	WD	Normal	
336	-0.068692	1.323736	0.620891	0.138777	WD	Normal	
339	-0.068692	0.718840	-0.489110	-1.367655	WD	Normal	
347	-0.068692	31.165268	-0.859110	-0.614439	WD	Normal	
393	-0.068692	2.331896	0.250891	-0.614439	WD	Normal	
440	-0.068692	1.525368	0.620891	0.891994	ConLI	Normal	
500	-0.068692	0.880146	-0.119110	-0.614439	WD	Normal	
503	-0.068692	0.718840	-0.859110	-0.614439	WD	Normal	
511	-0.068692	3.944952	-0.119110	0.891994	WD	Normal	
540	-0.068692	3.944952	-0.489110	1.645210	WD	Normal	
590	-0.068692	1.122104	0.620891	0.138777	WD	Normal	
612	-0.068692	0.920472	0.250891	-0.614439	WD	Normal	
627	-0.068692	1.122104	0.620891	-0.614439	WD	Normal	
635	-0.068692	1.122104	-0.119110	1.645210	WD	Normal	
706	-0.068692	6.969431	0.250891	1.645210	WD	Normal	
726	-0.068692	0.920472	1.730892	0.891994	WD	Normal	
734	-0.068692	0.718840	-1.229111	0.891994	WD	Normal	
761	-0.068692	0.819656	1.360892	0.891994	WD	Normal	
767	-0.068692	0.920472	-1.229111	1.645210	WD	Normal	
768	-0.068692	2.533528	0.250891	0.138777	WD	Normal	
787	-0.068692	2.331896	-0.119110	1.645210	WD	Normal	
795	-0.068692	0.920472	1.360892	0.138777	WD	Normal	
801	-0.068692	0.718840	-0.489110	0.138777	WD	Normal	
813	-0.068692	0.021193	-0.119110	1.645210	WD	Alloca	

814	-0.068692	0.920472	-0.859110	-0.614439	COD	Normal
868	-0.068692	0.718840	-0.489110	-0.614439	WD	Normal
879	-0.068692	0.718840	-0.119110	1.645210	WD	Normal
891	-0.068692	3.944952	0.250891	-0.614439	WD	Normal
913	-0.068692	1.162430	0.250891	-1.367655	WD	Abnorml
954	-0.068692	0.718840	0.990891	0.138777	WD	Normal
1062	-0.068692	1.041451	0.620891	0.138777	ConLD	Normal
1077	-0.068692	0.920472	-0.859110	-1.367655	WD	Normal
1084	-0.068692	1.323736	-1.229111	-1.367655	WD	Normal
1172	-0.068692	2.735160	1.730892	0.138777	WD	Normal
1211	-0.068692	0.718840	-0.489110	1.645210	WD	Normal
1231	-0.068692	16.647766	0.620891	-0.614439	WD	Normal
1253	-0.068692	1.122104	1.730892	0.891994	WD	Normal
1329	-0.068692	2.231080	-0.119110	0.138777	WD	Normal
1387	12.853474	3.944952	0.250891	-1.367655	WD	Normal
1458	-0.068692	4.953112	-0.489110	1.645210	WD	Normal

SalePrice

Id	SalePrice
6	11.870607
8	12.206078
17	11.911708
18	11.407576
52	11.648339
85	12.034697
96	12.128117
99	11.326608
100	11.767188
107	11.512935
215	11.993813
250	12.531776
251	11.245059
336	12.341263
339	12.218500
347	11.928348
393	11.575910
440	11.608245
500	11.695255
503	11.849405
511	12.013101
540	12.513561
590	11.283525
612	11.904974
627	11.848690
635	11.877576
706	10.915107
726	11.699413
734	11.786009

```
761  11.755879
767  12.188423
768  11.982935
787  11.842236
795  12.178193
801  12.206078
813  10.933000
814  11.969724
868  11.767575
879  11.904974
891  11.719134
913  11.385103
954  12.055256
1062 11.302217
1077 12.043560
1084 11.982935
1172 12.001512
1211 12.149508
1231 12.154785
1253 11.775297
1329 12.452937
1387 12.429220
1458 12.493133
```

[52 rows x 74 columns]

No outliers detected in column: MoSold

No outliers detected in column: YrSold

No outliers detected in column: SalePrice

[53]: check_outlier(data_train, feature)

No outliers detected in column: SalePrice

[53]: False

```
[54]: # Add new feature: Age of the house
#Add new feature: Total Square Footage
data_train["NEW_HouseAge"] = data_train["YrSold"] - data_train["YearBuilt"]
data_train["NEW_TotalSF"] = data_train["TotalBsmtSF"] + data_train["1stFlrSF"] +
    data_train["2ndFlrSF"]
data_test["NEW_HouseAge"] = data_test["YrSold"] - data_test["YearBuilt"]
data_test["NEW_TotalSF"] = data_test["TotalBsmtSF"] + data_test["1stFlrSF"] +
    data_test["2ndFlrSF"]
```

7 Label- Ordinal- One-Hot- Encoding / Scale

```
[56]: # Define a dictionary for Ordinal Encoding with specified categories
ordinal_columns = {
    'ExterQual': ['Fa', 'TA', 'Gd', 'Ex'], # Poor (Fa), Average (TA), Good (Gd), Excellent (Ex)
    'ExterCond': ['Fa', 'TA', 'Gd', 'Ex'], # Poor (Fa), Average (TA), Good (Gd), Excellent (Ex)
}
# List to store encoders for potential reuse
encoders = {}

# ----- Processing Data for Training -----
# Extract and remove 'SalePrice' from training data
sale_price = data_train['SalePrice'] # Extract 'SalePrice' column
data_train = data_train.drop(columns=['SalePrice'], errors='ignore') # Drop 'SalePrice' for preprocessing

# Process categorical features
for col in categoric_features:
    if col in ordinal_columns:
        # Apply Ordinal Encoding for specified columns
        try:
            oe = OrdinalEncoder(categories=[ordinal_columns[col]], handle_unknown='use_encoded_value', unknown_value=-1)
            data_train[col] = oe.fit_transform(data_train[[col]])
            encoders[col] = oe # Save the encoder for later use
            print(f"Ordinal Encoding applied on {col}.")
        except ValueError as e:
            print(f"Error in Ordinal Encoding for {col}: {e}")
        elif col in data_train.columns and data_train[col].nunique() < 10: # If the number of categories is less than 10
            # Apply One-Hot Encoding for features with a small number of categories
            data_train = pd.get_dummies(data_train, columns=[col], drop_first=True)
            print(f"One-Hot Encoding applied on {col}.")
    elif col == 'Neighborhood': # Example for Target Encoding
        # Apply Target Encoding for 'Neighborhood' feature
        try:
            if 'SalePrice' in data_train.columns:
                target_mean = data_train.groupby(col)['SalePrice'].mean()
                data_train[col] = data_train[col].map(target_mean)
                print(f"Target Encoding applied on {col}.")
            else:
                print(f"SalePrice column not found. Skipping Target Encoding for {col}.")
        except:
            print(f"Error in Target Encoding for {col}: {e}")
    else:
        print(f"No encoding applied for {col}.")
```

```

        except Exception as e:
            print(f"Error in Target Encoding for {col}: {e}")
    elif col in data_train.columns:
        # Apply Label Encoding for other categorical features
        try:
            le = LabelEncoder()
            data_train[col] = le.fit_transform(data_train[col].astype(str))
            encoders[col] = le # Save the encoder for later use
            print(f"Label Encoding applied on {col}.")
        except Exception as e:
            print(f"Error in Label Encoding for {col}: {e}")

# ----- Processing Data for Testing -----
# Drop 'SalePrice' column from the test data if it exists
data_test = data_test.drop(columns=['SalePrice'], errors='ignore') # Drop
# 'SalePrice' from test data

# Align the test data with the training data columns
data_train, data_test = data_train.align(data_test, join='left', axis=1)

# Fill missing columns in the test data with 0 (or another appropriate value)
data_test = data_test.fillna(0)

# Apply the same encoding transformations to test data
for col in categoric_features:
    if col in ordinal_columns:
        # Apply Ordinal Encoding for test data
        try:
            data_test[col] = encoders[col].transform(data_test[[col]])
            print(f"Ordinal Encoding applied on {col} for test data.")
        except Exception as e:
            print(f"Error in Ordinal Encoding for {col} in test data: {e}")
    elif col in data_test.columns and data_test[col].nunique() < 10: # If the
# number of categories is less than 10
        # Apply One-Hot Encoding for test data
        data_test = pd.get_dummies(data_test, columns=[col], drop_first=True)
        print(f"One-Hot Encoding applied on {col} for test data.")
    elif col in data_test.columns:
        # Apply Label Encoding for test data
        try:
            data_test[col] = encoders[col].transform(data_test[col].astype(str))
            print(f"Label Encoding applied on {col} for test data.")
        except Exception as e:
            print(f"Error in Label Encoding for {col} in test data: {e}")

```

```

# ----- Adding 'SalePrice' back to Training Data -----
data_train['SalePrice'] = sale_price # Re-add 'SalePrice' column to the
                                    # training data

# ----- Converting Boolean Columns to Integer -----
# Check for boolean columns
bool_columns = data_train.select_dtypes(include=['bool']).columns
if len(bool_columns) > 0:
    # Convert boolean columns to integer
    data_train[bool_columns] = data_train[bool_columns].astype(int)
    data_test[bool_columns] = data_test[bool_columns].astype(int)
    print(f"Converted boolean columns to integer: {bool_columns}")

# ----- Final Check -----
# Check the data types of the columns
print(data_train.dtypes)

# Verify the shapes of the training and test data to ensure they match
print(f"Training data shape: {data_train.shape}")
print(f"Test data shape: {data_test.shape}")

```

One-Hot Encoding applied on MSZoning.
 One-Hot Encoding applied on Street.
 One-Hot Encoding applied on LotShape.
 One-Hot Encoding applied on LandContour.
 One-Hot Encoding applied on Utilities.
 One-Hot Encoding applied on LotConfig.
 One-Hot Encoding applied on LandSlope.
 SalePrice column not found. Skipping Target Encoding for Neighborhood.
 One-Hot Encoding applied on Condition1.
 One-Hot Encoding applied on Condition2.
 One-Hot Encoding applied on BldgType.
 One-Hot Encoding applied on HouseStyle.
 One-Hot Encoding applied on RoofStyle.
 One-Hot Encoding applied on RoofMatl.
 Label Encoding applied on Exterior1st.
 Label Encoding applied on Exterior2nd.
 Ordinal Encoding applied on ExterQual.
 Ordinal Encoding applied on ExterCond.
 One-Hot Encoding applied on Foundation.
 One-Hot Encoding applied on BsmtQual.
 One-Hot Encoding applied on BsmtCond.
 One-Hot Encoding applied on BsmtExposure.
 One-Hot Encoding applied on BsmtFinType1.
 One-Hot Encoding applied on BsmtFinType2.

```

One-Hot Encoding applied on Heating.
One-Hot Encoding applied on HeatingQC.
One-Hot Encoding applied on CentralAir.
One-Hot Encoding applied on Electrical.
One-Hot Encoding applied on KitchenQual.
One-Hot Encoding applied on Functional.
One-Hot Encoding applied on GarageType.
One-Hot Encoding applied on GarageFinish.
One-Hot Encoding applied on GarageQual.
One-Hot Encoding applied on GarageCond.
One-Hot Encoding applied on PavedDrive.
One-Hot Encoding applied on SaleType.
One-Hot Encoding applied on SaleCondition.
Error in Label Encoding for Neighborhood in test data: 'Neighborhood'
Label Encoding applied on Exterior1st for test data.
Label Encoding applied on Exterior2nd for test data.
Ordinal Encoding applied on ExterQual for test data.
Ordinal Encoding applied on ExterCond for test data.
Converted boolean columns to integer: Index(['MSZoning_FV', 'MSZoning_RH',
'MSZoning_RL', 'MSZoning_RM',
'Street_Pave', 'LotShape_IR2', 'LotShape_IR3', 'LotShape_Reg',
'LandContour_HLS', 'LandContour_Low',
...
'SaleType_ConLI', 'SaleType_ConLw', 'SaleType_New', 'SaleType_0th',
'SaleType_WD', 'SaleCondition_AdjLand', 'SaleCondition_Alloca',
'SaleCondition_Family', 'SaleCondition_Normal',
'SaleCondition_Partial'],
dtype='object', length=133)
MSSubClass          float64
LotFrontage         float64
LotArea             float64
Neighborhood        object
OverallQual         float64
...
SaleCondition_Alloca int32
SaleCondition_Family int32
SaleCondition_Normal int32
SaleCondition_Partial int32
SalePrice            float64
Length: 177, dtype: object
Training data shape: (1460, 177)
Test data shape: (1459, 176)

```

```
[57]: le = LabelEncoder()
data_train['Neighborhood'] = le.fit_transform(data_train['Neighborhood'])
data_test['Neighborhood'] = le.transform(data_test['Neighborhood'])
```

```
print(data_train['Neighborhood'].head())
```

```
Id
1    5
2   24
3    5
4    6
5   15
Name: Neighborhood, dtype: int32
```

```
[58]: data_train.reset_index(inplace=True)
       data_test.reset_index(inplace=True)
```

```
C:\Users\izadi\AppData\Local\Temp\ipykernel_24696\3411960026.py:1:
PerformanceWarning: DataFrame is highly fragmented. This is usually the result
of calling `frame.insert` many times, which has poor performance. Consider
joining all columns at once using pd.concat(axis=1) instead. To get a de-
fragmented frame, use `newframe = frame.copy()`
    data_train.reset_index(inplace=True)
C:\Users\izadi\AppData\Local\Temp\ipykernel_24696\3411960026.py:2:
PerformanceWarning: DataFrame is highly fragmented. This is usually the result
of calling `frame.insert` many times, which has poor performance. Consider
joining all columns at once using pd.concat(axis=1) instead. To get a de-
fragmented frame, use `newframe = frame.copy()`
    data_test.reset_index(inplace=True)
```

8 Modelling

8.1 Linear Regression

```
[60]: y = data_train["SalePrice"]
X = data_train.drop(["Id", "SalePrice"], axis=1)
X_train, X_test, y_train, y_test = train_test_split(X,y,test_size=0.3,random_state=42)
```

```
[61]: # Linear Regression

reg_model = LinearRegression().fit(X_train,y_train) #built model
reg_pred = reg_model.predict(X_test) #make prediction

print('Linear Regression Results :')
print('MAE:', mean_absolute_error(y_test, reg_pred))
print('MSE:', mean_squared_error(y_test, reg_pred))
print('RMSE:', np.sqrt(mean_squared_error(y_test, reg_pred)))
```

```
Linear Regression Results :
MAE: 0.09907442898562975
MSE: 0.034254639424272294
```

RMSE: 0.1850800892161885

```
[62]: liner_r2_score=r2_score(y_test, reg_pred)
liner_r2_score
```

```
[62]: 0.7980792059243104
```

```
[63]: X_train_ols = sm.add_constant(X_train)
ols_model = sm.OLS(y_train, X_train_ols).fit()
print("OLS Regression Results:")
print(ols_model.summary())
```

OLS Regression Results:

OLS Regression Results

```
=====
Dep. Variable: SalePrice R-squared: 0.937
Model: OLS Adj. R-squared: 0.924
Method: Least Squares F-statistic: 75.03
Date: Wed, 05 Feb 2025 Prob (F-statistic): 0.00
Time: 09:20:11 Log-Likelihood: 912.14
No. Observations: 1022 AIC: -1486.
Df Residuals: 853 BIC: -653.2
Df Model: 168
Covariance Type: nonrobust
=====
```

```
=====
          coef    std err      t    P>|t|   [0.025
0.975]
-----
const      8.6822   0.305   28.513   0.000   8.085
9.280
MSSubClass -0.0076   0.024   -0.325   0.746  -0.054
0.039
LotFrontage  0.0069   0.005    1.312   0.190  -0.003
0.017
LotArea      0.0165   0.007    2.487   0.013   0.003
0.030
Neighborhood 0.0010   0.001    1.426   0.154  -0.000
0.002
OverallQual  0.0747   0.008    9.778   0.000   0.060
0.090
OverallCond  0.0432   0.005    7.862   0.000   0.032
0.054
YearBuilt     0.0341   0.008    4.355   0.000   0.019
0.049
YearRemodAdd 0.0227   0.007    3.476   0.001   0.010
0.035
```

Exterior1st	-0.0084	0.002	-3.580	0.000	-0.013
-0.004					
Exterior2nd	0.0053	0.002	2.570	0.010	0.001
0.009					
MasVnrArea	0.0041	0.005	0.843	0.400	-0.005
0.014					
ExterQual	0.0174	0.011	1.543	0.123	-0.005
0.040					
ExterCond	-0.0150	0.012	-1.260	0.208	-0.038
0.008					
BsmtFinSF1	0.0135	0.006	2.424	0.016	0.003
0.024					
BsmtFinSF2	0.0111	0.007	1.505	0.133	-0.003
0.025					
BsmtUnfSF	-0.0151	0.004	-3.374	0.001	-0.024
-0.006					
TotalBsmtSF	0.0029	0.006	0.451	0.652	-0.010
0.015					
1stFlrSF	0.0147	0.009	1.716	0.086	-0.002
0.032					
2ndFlrSF	0.0278	0.008	3.475	0.001	0.012
0.043					
LowQualFinSF	0.0084	0.006	1.433	0.152	-0.003
0.020					
GrLivArea	0.0347	0.005	6.492	0.000	0.024
0.045					
BsmtFullBath	0.0092	0.006	1.591	0.112	-0.002
0.021					
BsmtHalfBath	0.0018	0.004	0.437	0.662	-0.006
0.010					
FullBath	0.0091	0.007	1.375	0.169	-0.004
0.022					
HalfBath	0.0082	0.006	1.377	0.169	-0.003
0.020					
BedroomAbvGr	0.0018	0.006	0.281	0.778	-0.011
0.014					
KitchenAbvGr	-0.0162	0.008	-2.068	0.039	-0.032
-0.001					
TotRmsAbvGrd	0.0109	0.009	1.266	0.206	-0.006
0.028					
Fireplaces	0.0238	0.005	5.065	0.000	0.015
0.033					
GarageYrBlt	-0.0183	0.008	-2.434	0.015	-0.033
-0.004					
GarageCars	0.0217	0.009	2.339	0.020	0.003
0.040					
GarageArea	0.0333	0.009	3.607	0.000	0.015
0.051					

WoodDeckSF	0.0058	0.004	1.451	0.147	-0.002
0.014					
OpenPorchSF	-9.322e-05	0.004	-0.023	0.981	-0.008
0.008					
EnclosedPorch	0.0102	0.004	2.351	0.019	0.002
0.019					
3SsnPorch	0.0055	0.003	1.658	0.098	-0.001
0.012					
ScreenPorch	0.0118	0.004	2.992	0.003	0.004
0.020					
PoolArea	-0.0021	0.005	-0.425	0.671	-0.012
0.007					
MiscVal	-0.0052	0.009	-0.551	0.582	-0.024
0.013					
MoSold	0.0008	0.004	0.215	0.830	-0.007
0.008					
YrSold	0.0162	0.005	3.441	0.001	0.007
0.025					
NEW_HouseAge	-0.0179	0.004	-4.474	0.000	-0.026
-0.010					
NEW_TotalSF	0.0454	0.003	13.506	0.000	0.039
0.052					
MSZoning_FV	0.4144	0.070	5.887	0.000	0.276
0.553					
MSZoning_RH	0.3937	0.074	5.349	0.000	0.249
0.538					
MSZoning_RL	0.3871	0.068	5.715	0.000	0.254
0.520					
MSZoning_RM	0.3204	0.068	4.730	0.000	0.187
0.453					
Street_Pave	0.0753	0.071	1.058	0.291	-0.064
0.215					
LotShape_IR2	0.0260	0.023	1.125	0.261	-0.019
0.071					
LotShape_IR3	0.0082	0.049	0.168	0.867	-0.088
0.105					
LotShape_Reg	-0.0049	0.009	-0.548	0.584	-0.022
0.013					
LandContour_HLS	0.0809	0.030	2.661	0.008	0.021
0.141					
LandContour_Low	0.0149	0.037	0.400	0.689	-0.058
0.088					
LandContour_Lvl	0.0328	0.023	1.436	0.151	-0.012
0.078					
Utilities_NoSeWa	-0.1578	0.128	-1.232	0.218	-0.409
0.094					
LotConfig_CulDSac	0.0217	0.018	1.231	0.219	-0.013
0.056					

LotConfig_FR2	-0.0439	0.022	-1.985	0.047	-0.087
-0.001					
LotConfig_FR3	-0.0783	0.072	-1.088	0.277	-0.220
0.063					
LotConfig_Inside	-0.0087	0.010	-0.870	0.384	-0.028
0.011					
LandSlope_Mod	0.0205	0.022	0.916	0.360	-0.023
0.065					
LandSlope_Sev	-0.0505	0.084	-0.598	0.550	-0.216
0.115					
Condition1_Feedr	0.0896	0.028	3.253	0.001	0.036
0.144					
Condition1_Norm	0.1191	0.023	5.288	0.000	0.075
0.163					
Condition1_PosA	0.0179	0.056	0.317	0.751	-0.093
0.128					
Condition1_PosN	0.1242	0.042	2.983	0.003	0.042
0.206					
Condition1_RRAe	0.0143	0.050	0.287	0.775	-0.083
0.112					
Condition1_RRAn	0.0871	0.037	2.336	0.020	0.014
0.160					
Condition1_RRNe	0.0933	0.113	0.827	0.408	-0.128
0.315					
Condition1_RRNn	0.0983	0.062	1.596	0.111	-0.023
0.219					
Condition2_Feedr	0.2104	0.135	1.561	0.119	-0.054
0.475					
Condition2_Norm	0.0357	0.102	0.349	0.727	-0.165
0.237					
Condition2_PosA	-4.2e-15	8.39e-16	-5.005	0.000	-5.85e-15
-2.55e-15					
Condition2_PosN	-0.9111	0.137	-6.661	0.000	-1.180
-0.643					
Condition2_RRAe	-0.2683	0.289	-0.929	0.353	-0.835
0.298					
Condition2_RRAn	-0.0309	0.155	-0.199	0.842	-0.335
0.273					
Condition2_RRNn	2.835e-15	8.05e-16	3.521	0.000	1.25e-15
4.42e-15					
BldgType_2fmCon	0.0524	0.077	0.682	0.496	-0.099
0.203					
BldgType_Duplex	-0.0278	0.042	-0.659	0.510	-0.111
0.055					
BldgType_Twnhs	-0.0603	0.062	-0.975	0.330	-0.182
0.061					
BldgType_TwnhsE	-0.0081	0.059	-0.138	0.890	-0.123
0.107					

HouseStyle_1.5Unf 0.110	0.0261	0.043	0.611	0.541	-0.058
HouseStyle_1Story 0.019	-0.0321	0.026	-1.231	0.219	-0.083
HouseStyle_2.5Fin 0.062	-0.0771	0.071	-1.087	0.277	-0.216
HouseStyle_2.5Unf 0.107	0.0147	0.047	0.313	0.754	-0.078
HouseStyle_2Story -0.008	-0.0479	0.020	-2.373	0.018	-0.088
HouseStyle_SFoyer 0.000	-0.0742	0.038	-1.959	0.050	-0.149
HouseStyle_SLvl 0.014	-0.0487	0.032	-1.513	0.131	-0.112
RoofStyle_Gable 0.090	-0.1483	0.121	-1.221	0.223	-0.387
RoofStyle_Gambrel 0.156	-0.0957	0.128	-0.746	0.456	-0.348
RoofStyle_Hip 0.090	-0.1488	0.122	-1.222	0.222	-0.388
RoofStyle_Mansard 0.242	-0.0310	0.139	-0.223	0.824	-0.304
RoofStyle_Shed 0.509	0.1054	0.205	0.513	0.608	-0.298
RoofMatl_CompShg 2.990	2.6602	0.168	15.840	0.000	2.331
RoofMatl_Membran 3.99e-15	2.884e-15	5.63e-16	5.121	0.000	1.78e-15
RoofMatl_Metal 3.174	2.6719	0.256	10.437	0.000	2.169
RoofMatl_Roll 3.079	2.6726	0.207	12.896	0.000	2.266
RoofMatl_Tar&Grv 2.967	2.5504	0.212	12.003	0.000	2.133
RoofMatl_WdShake 3.013	2.6381	0.191	13.819	0.000	2.263
RoofMatl_WdShngl 3.039	2.6884	0.179	15.057	0.000	2.338
Foundation_CBlock 0.049	0.0137	0.018	0.752	0.452	-0.022
Foundation_PConc 0.083	0.0446	0.020	2.259	0.024	0.006
Foundation_Slab 0.040	-0.0461	0.044	-1.054	0.292	-0.132
Foundation_Stone 0.184	0.0593	0.064	0.931	0.352	-0.066
Foundation_Wood -0.021	-0.1621	0.072	-2.256	0.024	-0.303

BsmtQual_Fa	-0.0657	0.034	-1.935	0.053	-0.132
0.001					
BsmtQual_Gd	-0.0566	0.017	-3.263	0.001	-0.091
-0.023					
BsmtQual_TA	-0.0828	0.022	-3.730	0.000	-0.126
-0.039					
BsmtCond_Gd	0.0460	0.030	1.542	0.123	-0.013
0.105					
BsmtCond_Po	0.1318	0.158	0.833	0.405	-0.179
0.442					
BsmtCond_TA	0.0654	0.024	2.770	0.006	0.019
0.112					
BsmtExposure_Gd	0.0318	0.017	1.928	0.054	-0.001
0.064					
BsmtExposure_Mn	-0.0136	0.017	-0.787	0.432	-0.048
0.020					
BsmtExposure_No	-0.0123	0.012	-0.996	0.319	-0.036
0.012					
BsmtFinType1_BLQ	-0.0070	0.015	-0.458	0.647	-0.037
0.023					
BsmtFinType1_GLQ	0.0168	0.014	1.202	0.230	-0.011
0.044					
BsmtFinType1_LwQ	-0.0018	0.021	-0.085	0.932	-0.043
0.039					
BsmtFinType1_Rec	0.0117	0.017	0.686	0.493	-0.022
0.045					
BsmtFinType1_Unf	-0.0070	0.016	-0.429	0.668	-0.039
0.025					
BsmtFinType2_BLQ	-0.0406	0.042	-0.964	0.335	-0.123
0.042					
BsmtFinType2_GLQ	0.0289	0.053	0.549	0.583	-0.074
0.132					
BsmtFinType2_LwQ	-0.0027	0.040	-0.069	0.945	-0.080
0.075					
BsmtFinType2_Rec	0.0237	0.037	0.634	0.526	-0.050
0.097					
BsmtFinType2_Unf	0.0422	0.039	1.070	0.285	-0.035
0.120					
Heating_GasA	0.0404	0.119	0.340	0.734	-0.193
0.274					
Heating_GasW	0.0623	0.123	0.507	0.612	-0.179
0.304					
Heating_Grav	-0.3593	0.136	-2.649	0.008	-0.626
-0.093					
Heating_OthW	-0.0303	0.148	-0.204	0.839	-0.322
0.261					
Heating_Wall	0.1883	0.142	1.327	0.185	-0.090
0.467					

HeatingQC_Fa	-0.0067	0.026	-0.263	0.793	-0.057
0.044					
HeatingQC_Gd	-0.0249	0.012	-2.137	0.033	-0.048
-0.002					
HeatingQC_Po	-0.1151	0.131	-0.877	0.381	-0.373
0.142					
HeatingQC_TA	-0.0340	0.012	-2.863	0.004	-0.057
-0.011					
CentralAir_Y	0.0535	0.021	2.562	0.011	0.013
0.094					
Electrical_FuseF	-0.0408	0.031	-1.324	0.186	-0.101
0.020					
Electrical_FuseP	-0.0856	0.099	-0.867	0.386	-0.279
0.108					
Electrical_Mix	-8.867e-17	4.35e-16	-0.204	0.839	-9.43e-16
7.65e-16					
Electrical_SBrkr	-0.0231	0.018	-1.319	0.188	-0.057
0.011					
KitchenQual_Fa	-0.0013	0.035	-0.036	0.971	-0.070
0.067					
KitchenQual_Gd	-0.0616	0.019	-3.193	0.001	-0.099
-0.024					
KitchenQual_TA	-0.0556	0.023	-2.461	0.014	-0.100
-0.011					
Functional_Maj2	-0.1971	0.073	-2.699	0.007	-0.340
-0.054					
Functional_Min1	0.0452	0.048	0.935	0.350	-0.050
0.140					
Functional_Min2	0.0587	0.049	1.193	0.233	-0.038
0.155					
Functional_Mod	-0.0625	0.054	-1.153	0.249	-0.169
0.044					
Functional_Sev	-0.4297	0.145	-2.959	0.003	-0.715
-0.145					
Functional_Typ	0.0908	0.042	2.154	0.031	0.008
0.174					
GarageType_Attchd	0.0711	0.067	1.066	0.287	-0.060
0.202					
GarageType_Basment	0.0619	0.075	0.829	0.407	-0.085
0.209					
GarageType_BuiltIn	0.0577	0.070	0.829	0.407	-0.079
0.194					
GarageType_CarPort	0.1438	0.083	1.739	0.082	-0.018
0.306					
GarageType_Detchd	0.0847	0.066	1.283	0.200	-0.045
0.214					
GarageFinish_RFn	0.0079	0.011	0.738	0.461	-0.013
0.029					

GarageFinish_Unf 0.025	-0.0010	0.013	-0.075	0.941	-0.027
GarageQual_Fa 0.075	-0.2319	0.156	-1.485	0.138	-0.538
GarageQual_Gd 0.117	-0.1967	0.160	-1.229	0.219	-0.511
GarageQual_Po -0.195	-0.6835	0.249	-2.746	0.006	-1.172
GarageQual_TA 0.087	-0.2148	0.154	-1.399	0.162	-0.516
GarageCond_Fa 0.456	0.1115	0.176	0.635	0.525	-0.233
GarageCond_Gd 0.544	0.1874	0.182	1.032	0.302	-0.169
GarageCond_Po 0.898	0.5032	0.201	2.502	0.013	0.108
GarageCond_TA 0.502	0.1611	0.174	0.927	0.354	-0.180
PavedDrive_P 0.082	0.0223	0.030	0.732	0.464	-0.037
PavedDrive_Y 0.061	0.0239	0.019	1.269	0.205	-0.013
SaleType_CWD 0.228	0.1030	0.064	1.614	0.107	-0.022
SaleType_Con 0.291	0.1262	0.084	1.508	0.132	-0.038
SaleType_ConLD 0.216	0.1034	0.057	1.801	0.072	-0.009
SaleType_ConLI 0.229	-0.0171	0.125	-0.137	0.891	-0.263
SaleType_ConLw 0.131	-0.0153	0.075	-0.205	0.838	-0.162
SaleType_New 0.305	0.0567	0.127	0.448	0.654	-0.192
SaleType_Oth 0.500	0.2649	0.120	2.216	0.027	0.030
SaleType_WD 0.044	-0.0055	0.025	-0.218	0.827	-0.055
SaleCondition_AdjLand 0.185	0.0461	0.071	0.651	0.515	-0.093
SaleCondition_Alloca 0.347	0.2273	0.061	3.721	0.000	0.107
SaleCondition_Family 0.090	0.0261	0.033	0.802	0.423	-0.038
SaleCondition_Normal 0.101	0.0686	0.017	4.120	0.000	0.036
SaleCondition_Partial 0.303	0.0593	0.124	0.477	0.633	-0.184

```
=====
Omnibus:                 261.441   Durbin-Watson:           1.913
Prob(Omnibus):            0.000    Jarque-Bera (JB):      4530.677
Skew:                      -0.695   Prob(JB):                  0.00
Kurtosis:                  13.221   Cond. No.             1.04e+16
=====
```

Notes:

- [1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
- [2] The smallest eigenvalue is 3.78e-27. This might indicate that there are strong multicollinearity problems or that the design matrix is singular.

9 Ridge-Lasso Model

```
[65]: # 1. Ridge Model
ridge = Ridge(alpha=1.0)  # Set the alpha parameter for Ridge regularization
ridge.fit(X_train, y_train)
ridge_pred = ridge.predict(X_train)

# 2. Lasso Model
lasso = Lasso(alpha=0.0001)
lasso.fit(X_train, y_train)
lasso_pred = lasso.predict(X_train)
# Evaluate the models using MSE and R^2
ridge_mse = mean_squared_error(y_train, ridge_pred)
lasso_mse = mean_squared_error(y_train, lasso_pred)
lasso_mae = mean_absolute_error(y_train, lasso_pred)
ridge_mae = mean_absolute_error(y_train, ridge_pred)
ridge_r2 = r2_score(y_train, ridge_pred)
lasso_r2 = r2_score(y_train, lasso_pred)

# Output the results
print(f'Ridge MAE: {ridge_mae}')
print(f'Lasso MAE: {lasso_mae}')
print(f'Ridge MSE: {ridge_mse}, R^2: {ridge_r2}')
print(f'Lasso MSE: {lasso_mse}, R^2: {lasso_r2}')
```

```
Ridge MAE: 0.07911973928748224
Lasso MAE: 0.07419926954911113
Ridge MSE: 0.012771905353704703, R^2: 0.9176025466675709
Lasso MSE: 0.011089882199498056, R^2: 0.9284540539810514

C:\ProgramData\anaconda3\Lib\site-
packages\sklearn\linear_model\_coordinate_descent.py:697: ConvergenceWarning:
Objective did not converge. You might want to increase the number of iterations,
check the scale of the features or consider increasing regularisation. Duality
gap: 1.839e-01, tolerance: 1.584e-02
```

```
model = cd_fast.enet_coordinate_descent(
```

10 Random Forest Regressor

```
[67]: # Initialize the Random Forest Regressor
rf_model = RandomForestRegressor(n_estimators=100, random_state=42) # You can ↴tune the hyperparameters

# Fit the model on the training data
rf_model.fit(X_train, y_train)

# Make predictions (log scale)
rf_pred_log = rf_model.predict(X_test)

# Calculate metrics in the original scale
rf_mae = mean_absolute_error(y_test, rf_pred_log)
rf_mse = mean_squared_error(y_test, rf_pred_log)
rf_rmse = np.sqrt(rf_mse)
rf_r2 = r2_score(y_test, rf_pred_log)

# Print evaluation metrics
print('Random Forest Results:')
print('MAE:', rf_mae)
print('MSE:', rf_mse)
print('RMSE:', rf_rmse)
print('R²:', rf_r2)
```

Random Forest Results:

```
MAE: 0.09089577051997495
MSE: 0.018691285352520404
RMSE: 0.1367160756916333
R²: 0.8898204960230316
```

11 KNN Regressor

```
[69]: # Define the KNN model
knn = KNeighborsRegressor()

# Initial settings for GridSearchCV
param_grid = {
    'n_neighbors': [3, 5, 7, 10], # Number of neighbors
    'weights': ['uniform', 'distance'], # Type of weighting
    'metric': ['minkowski', 'euclidean', 'manhattan'] # Types of distance ↴metrics
}
```

```

# Search for the best hyperparameters
grid_search = GridSearchCV(estimator=knn, param_grid=param_grid, cv=5, u
    ↪scoring='neg_mean_squared_error', n_jobs=-1)
grid_search.fit(X_train, y_train)

# Best model with optimal settings
best_knn = grid_search.best_estimator_
print(f"Best Parameters for KNN: {grid_search.best_params_}")

# Prediction with the optimized model
knn_pred_log = best_knn.predict(X_test)

# Calculate evaluation metrics
knn_mae = mean_absolute_error(y_test, knn_pred_log)
knn_mse = mean_squared_error(y_test, knn_pred_log)
knn_rmse = np.sqrt(knn_mse)
knn_r2 = r2_score(y_test, knn_pred_log)

print(f"KNN Results:\nMAE: {knn_mae}\nMSE: {knn_mse}\nRMSE: {knn_rmse}\nR²: u
    ↪{knn_r2}")

```

Best Parameters for KNN: {'metric': 'manhattan', 'n_neighbors': 7, 'weights': 'distance'}

KNN Results:

MAE: 0.10820146155474418

MSE: 0.02596909013547263

RMSE: 0.16114927904111961

R²: 0.8469200263173056

[70]: # CatBoost Regressor

```

cb_model = CatBoostRegressor(loss_function='RMSE', logging_level='Silent')
cb_model.fit(X_train, y_train)
preds = cb_model.predict(X_test)

print('CastBoost Regression Results :')
print('MAE:', mean_absolute_error(y_test, preds))
print('MSE:', mean_squared_error(y_test, preds))
print('RMSE:', np.sqrt(mean_squared_error(y_test, preds)))

```

CastBoost Regression Results :

MAE: 0.07773776983114379

MSE: 0.014622267870046576

RMSE: 0.12092256972975135

[71]: # 1. Splitting features and target from the training data

```
X_train = data_train.drop(columns=['SalePrice', 'Id']) # Remove 'SalePrice' u
    ↪and 'Id'
```

```

y_train = data_train['SalePrice'] # Define the target column

# 2. Splitting features from the test data
X_test = data_test.drop(columns=['Id']) # Remove 'Id'

# 3. Ensuring column names match between training and test datasets
assert list(X_train.columns) == list(X_test.columns), "Columns in train and test sets do not match!"

# 4. Defining the CatBoost Regressor model
cb_model = CatBoostRegressor(loss_function='RMSE', logging_level='Silent', random_state=42)

# 5. Performing Cross-Validation on the training data
scores = cross_val_score(
    cb_model,
    X_train,
    y_train,
    scoring=make_scorer(mean_squared_error, squared=False), # Use RMSE as the evaluation metric
    cv=5 # Number of folds in Cross-Validation
)

# Displaying Cross-Validation results
print("Cross-Validation Results (RMSE for each fold):", scores)
print("Mean RMSE:", scores.mean())
print("Standard Deviation of RMSE:", scores.std())

# 6. Training the model on the entire training dataset
cb_model.fit(X_train, y_train)

# 7. Making predictions on the test data
test_predictions = cb_model.predict(X_test)

```

```

C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_regression.py:492:
FutureWarning: 'squared' is deprecated in version 1.4 and will be removed in 1.6. To calculate the root mean squared error, use the function 'root_mean_squared_error'.
    warnings.warn(
C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_regression.py:492:
FutureWarning: 'squared' is deprecated in version 1.4 and will be removed in 1.6. To calculate the root mean squared error, use the function 'root_mean_squared_error'.
    warnings.warn(
C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_regression.py:492:
FutureWarning: 'squared' is deprecated in version 1.4 and will be removed in 1.6. To calculate the root mean squared error, use the

```

```

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C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_regression.py:492:
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C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_regression.py:492:
FutureWarning: 'squared' is deprecated in version 1.4 and will be removed in
1.6. To calculate the root mean squared error, use the
function'root_mean_squared_error'.
    warnings.warn(
Cross-Validation Results (RMSE for each fold): [0.1118078  0.13564016  0.12962723
0.11169712  0.1281989 ]
Mean RMSE: 0.12339424202339286
Standard Deviation of RMSE: 0.009828180956341859

```

12 Hyperparameter Optimization

```
[73]: cb = CatBoostRegressor(loss_function='RMSE', logging_level='Silent')
cb_params = {"iterations": [300, 350],
             "learning_rate": [0.1, 0.2],
             "depth": [3, 5]}
cb_random = GridSearchCV(estimator=cb, param_grid=cb_params, n_jobs=-1)

cb_random.fit(X_train, y_train)
```

```
[73]: GridSearchCV(estimator=<catboost.core.CatBoostRegressor object at
0x0000020D572BF290>,
                  n_jobs=-1,
                  param_grid={'depth': [3, 5], 'iterations': [300, 350],
                  'learning_rate': [0.1, 0.2]})
```

```
[74]: print(cb_random.best_params_)

final_model = cb.set_params(**cb_random.best_params_, random_state=17).
    fit(X_train, y_train)

{'depth': 5, 'iterations': 350, 'learning_rate': 0.1}
```

13 Feature Importance

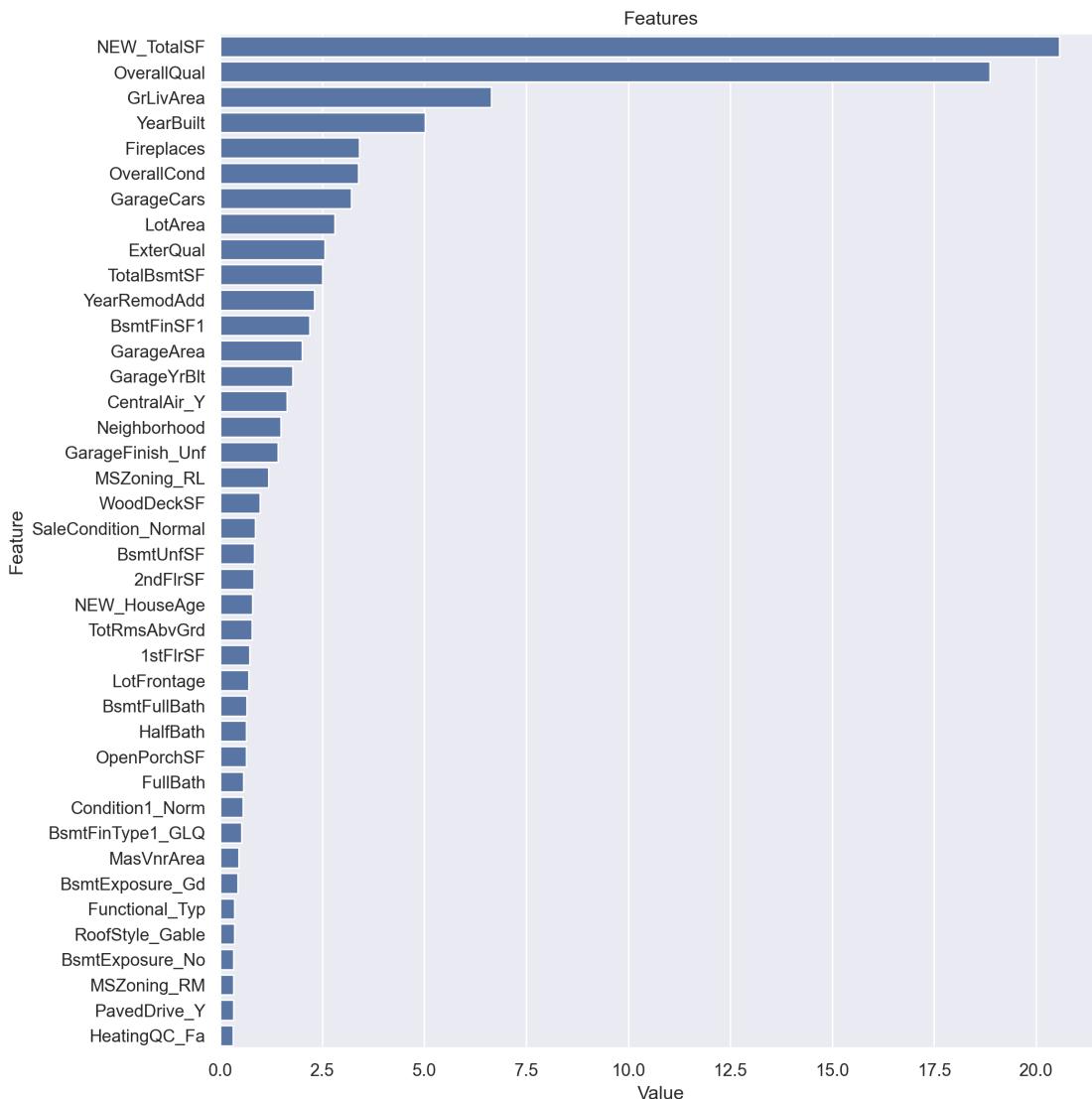
```
[76]: def plot_importance(model, features, dataframe, save=False):
    num = len(dataframe)
    feature_imp = pd.DataFrame({"Value": model.feature_importances_, "Feature": features.columns})
```

```

plt.figure(figsize=(10, 10))
sns.set_theme(font_scale=1)
sns.barplot(x="Value", y="Feature", data=feature_imp.
sort_values(by="Value", ascending=False)[0:40])
plt.title("Features")
plt.tight_layout()
plt.show()
if save:
    plt.savefig("importances.png")

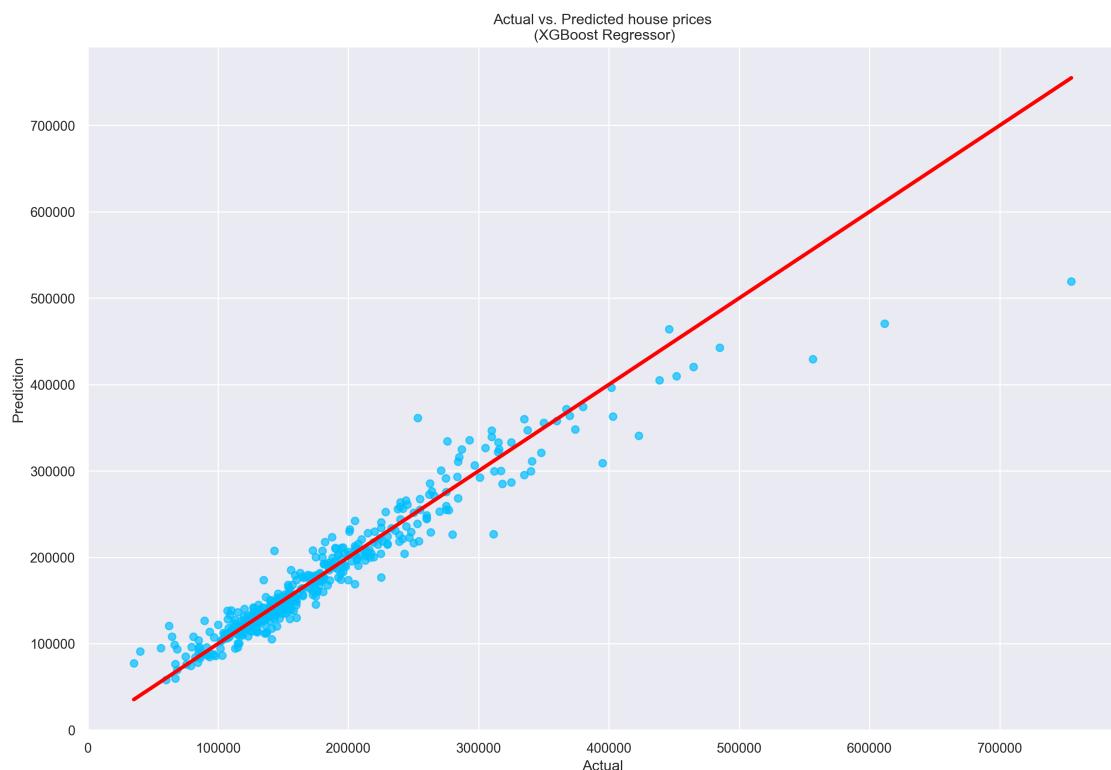
plot_importance(final_model, X, data_train)

```



```
[77]: #Actual vs. Prediction
plt.scatter(x = np.exp(y_test), y = np.exp(preds), c = 'deepskyblue', alpha = 0.7)
plt.xlabel('Actual')
plt.ylabel('Prediction')
plt.title('Actual vs. Predicted house prices\n (XGBoost Regressor)')

#Add 45 degree line
xp = np.linspace(np.exp(y_test.min()), np.exp(y_test.max()), 100)
plt.plot(xp, xp, c = 'red', linewidth = 3)
plt.show()
```



```
[78]: # Predict the prices
prediction_log = final_model.predict(data_test.drop(columns=["Id"]))

# Convert predictions to the original scale
prediction = np.expm1(prediction_log)

# Create the output DataFrame
submission_df = pd.DataFrame({
    "Id": data_test["Id"],
    "SalePrice": prediction}
```

```
})
submission_df["Id"] = submission_df["Id"].astype(int)

# Save the output file as CSV
submission_df.to_csv("submission.csv", index=False)

print("Submission file 'submission.csv' has been saved.")
```

Submission file 'submission.csv' has been saved.

[]: