Exercise

Github url https://github.com/raraanil/Python_Assignment3_part3.git

In [ ]:

For this exercise, you will be working with the House Price Dataset.

Please grab the train.csv file from Kaggle and explore this dataset. You need to perform exploratory data analysis and see if there is any correlation between the variables and analyze the distribution of the dataset. The question is open-ended and basically you're asked to perform EDA.

1- Write a summary of your findings in one page (e.g., summary statistics, plots) and submit the pdf file. Therefore, for part 3 of your assignment, you need to submit at least one jupyter notebook file and one pdf file.

2- Push your code and project to github and provide the link to your code here. Ensure that your github project is organized to at least couple of main folders, ensure that you have the README file as well:

- Src
- Data
- Docs
- Results

Read this link for further info: https://gist.github.com/ericmjl/27e50331f24db3e8f957d1fe7bbbe510

In [10]:
```
import pandas as pd
import numpy as np
import seaborn as sns

df = pd.read_csv('train.csv')
df.columns
```

Out[10]:
```
Index(['Id', 'MSSubClass', 'MSZoning', 'LotFrontage', 'LotArea', 'Street',
       'Alley', 'LotShape', 'LandContour', 'Utilities', 'LotConfig',
       'LandSlope', 'Neighborhood', 'Condition1', 'Condition2', 'BldgType',
       'HouseStyle', 'OverallQual', 'OverallCond', 'YearBuilt', 'YearRemodAdd',
       'RoofStyle', 'RoofMatl', 'Exterior1st', 'Exterior2nd', 'MasVnrType',
       'MasVnrArea', 'ExterQual', 'ExterCond', 'Foundation', 'BsmtQual',
       'BsmtCond', 'BsmtExposure', 'BsmtFinType1', 'BsmtFinSF1',
       'BsmtFinType2', 'BsmtFinSF2', 'BsmtUnfSF', 'TotalBsmtSF', 'Heating',
       'HeatingQC', 'CentralAir', 'Electrical', '1stFlrSF', '2ndFlrSF',
       'LowQualFinSF', 'GrLivArea', 'BsmtFullBath', 'BsmtHalfBath', 'FullBath',
       'HalfBath', 'BedroomAbvGr', 'KitchenAbvGr', 'KitchenQual',
       'TotRmsAbvGrd', 'Functional', 'Fireplaces', 'FireplaceQu', 'GarageType',
       'GarageYrBlt', 'GarageFinish', 'GarageCars', 'GarageArea', 'GarageQual',
       'GarageCond', 'PavedDrive', 'WoodDeckSF', 'OpenPorchSF',
       'EnclosedPorch', '3SsnPorch', 'ScreenPorch', 'PoolArea', 'PoolQC',
       'Fence', 'MiscFeature', 'MiscVal', 'MoSold', 'YrSold', 'SaleType',
       'SaleCondition', 'SalePrice'],
      dtype='object')
```

In [2]:
```
df.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     1452 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
```

In [11]:
```
df.describe()['SalePrice']
```

Out[11]:
```
count      1460.000000
mean     180921.195890
std       79442.502883
min       34900.000000
25%      129975.000000
50%      163000.000000
75%      214000.000000
max      755000.000000
Name: SalePrice, dtype: float64
```

Average Sale price for the house is 163000.The maximum price is 755000 where as the minimum price is 34000.

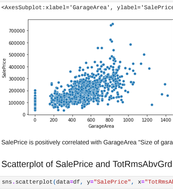
In [12]:
```
sns.histplot(df['SalePrice'])
```

Out[12]:
```
<AxesSubplot:xlabel='SalePrice', ylabel='Count'>
```

Distribution of SalePrice by BldgType

In [13]:
```
sns.histplot(data=df,x='SalePrice',hue='BldgType',multiple="stack").set_title('Saleprice by BldgType')
```

Out[13]:
```
Text(0.5, 1.0, 'Saleprice by BldgType')
```



BldgType: Type of dwelling 1Fam Single-family Detached
2FmCon Two-family Conversion; originally built as one-family dwelling Duplx Duplex TwnhsE Townhouse End Unit TwnhsI Townhouse Inside Unit

Most of the prices are within the range from 50000 to 300000 For Two-family Conversion, Duplex, Townhouse End Unit and Townhouse Inside Unit, most of house prices are ranging from 75000 to 210000 The highest and lowest house price both come to Single-family house type

Distribution of SalePrice by OverallQuality

In [16]:
```
sns.histplot(data=df,x='SalePrice',hue='OverallQual',multiple="stack").set_title('Saleprice by OverAll Quality')
```

Out[16]:
```
Text(0.5, 1.0, 'Saleprice by OverAll Quality')
```


OverallQual: Rates the overall material and finish of the house 10 Very Excellent 9 Excellent 8 Very Good 7 Good 6 Above Average 5 Average 4 Below Average 3 Fair 2 Poor 1 Very Poor

Maximum houses fall in the categories 4,5,6,7 which is Below Average, Average, Above Average and Good. The higher rate of overall quality,higher its sale price For each rate level of overall quality, the distribution of house price is almost symmetric

Correlation between SalePrice with other numeric variables

Scatterplot of SalePrice and GrLivArea

In [17]:
```
sns.scatterplot(data=df, x="SalePrice", y="GrLivArea")
```

Out[17]:
```
<AxesSubplot:xlabel='SalePrice', ylabel='GrLivArea'>
```


SalePrice is positively correlated with GrLivArea.with couple of outliers on the top left and right corner

Scatterplot of SalePrice and TotalBsmtSF

In [18]:
```
sns.scatterplot(data=df, y="SalePrice", x="TotalBsmtSF")
```

Out[18]:
```
<AxesSubplot:xlabel='TotalBsmtSF', ylabel='SalePrice'>
```


SalePrice is positively correlated with TotalBsmtSF "Total square feet of basement area". There are two outlier on top side also one outlier in the right corner

Scatterplot of SalePrice and GarageArea

In [19]:
```
sns.scatterplot(data=df, y="SalePrice", x="GarageArea")
```

Out[19]:
```
<AxesSubplot:xlabel='GarageArea', ylabel='SalePrice'>
```


SalePrice is positively correlated with GarageArea "Size of garage in square feet".There are couple of outliers on the top and the bottom right.

Scatterplot of SalePrice and TotRmsAbvGrd

In [20]:
```
sns.scatterplot(data=df, y="SalePrice", x="TotRmsAbvGrd")
```

Out[20]:
```
<AxesSubplot:xlabel='TotRmsAbvGrd', ylabel='SalePrice'>
```


SalePrice is positively correlated with TotRmsAbvGrd(Total rooms above grade). There is increase in Saleprice with increase in TotRmsAbvGrd. We can also see one outlier on buttom left.