Importing Libraries and Dataset

In [4]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

dataset = pd.read_csv("HousePricePrediction.xlsx - Sheet1.csv")

# Printing first 5 records of the dataset
print(dataset.head(5))
```

```
   Id  MSSubClass MSZoning  LotArea LotConfig BldgType  OverallCond  \
0   0          60       RL     8450    Inside     1Fam            5
1   1          20       RL     9600       FR2     1Fam            8
2   2          60       RL    11250    Inside     1Fam            5
3   3          70       RL     9550    Corner     1Fam            5
4   4          60       RL    14260       FR2     1Fam            5

   YearBuilt  YearRemodAdd Exterior1st  BsmtFinSF2  TotalBsmtSF  SalePrice
0       2003          2003     VinylSd         0.0        856.0   208500.0
1       1976          1976     MetalSd         0.0       1262.0   181500.0
2       2001          2002     VinylSd         0.0        920.0   223500.0
3       1915          1970     Wd Sdng         0.0        756.0   140000.0
4       2000          2000     VinylSd         0.0       1145.0   250000.0
```

In [5]:
```
dataset.shape
```

Out[5]:
```
(2919, 13)
```

In [ ]:
```

```

Data Preprocessing

In [6]:
```
obj = (dataset.dtypes == 'object')
object_cols = list(obj[obj].index)
print("Categorical variables:",len(object_cols))

int_ = (dataset.dtypes == 'int')
num_cols = list(int_[int_].index)
print("Integer variables:",len(num_cols))

fl = (dataset.dtypes == 'float')
fl_cols = list(fl[fl].index)
print("Float variables:",len(fl_cols))
```

```
Categorical variables: 4
Integer variables: 0
Float variables: 3
```

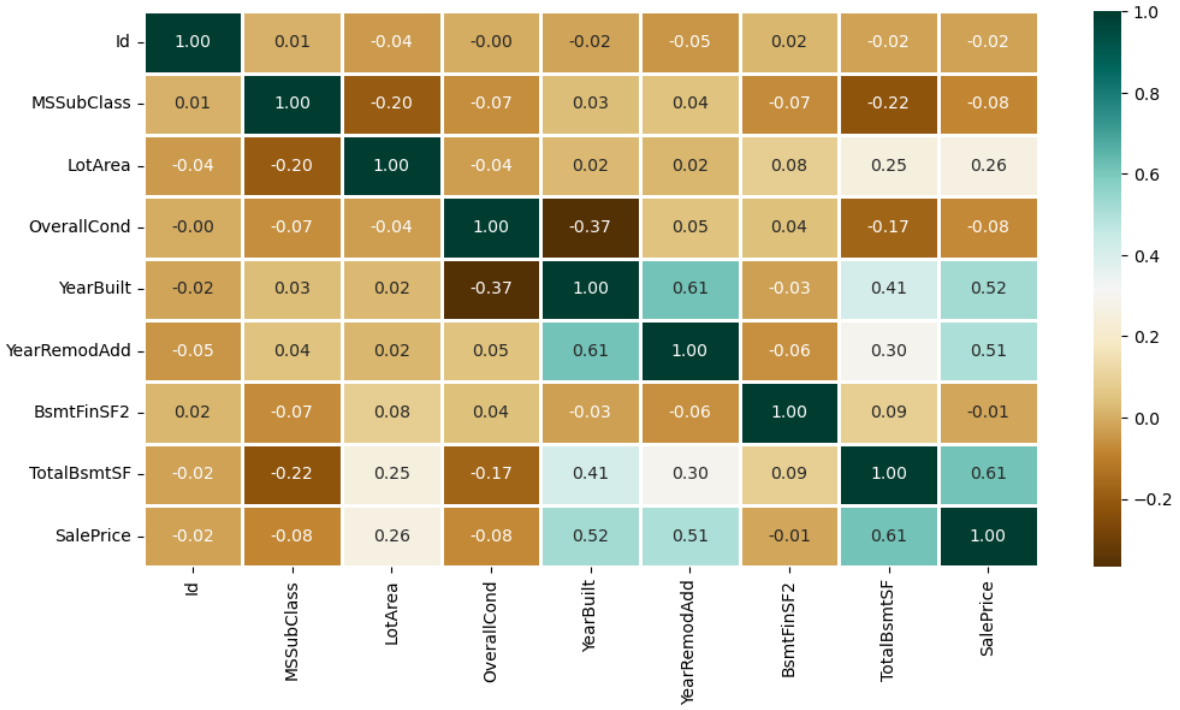
Exploratory Data Analysis

In [7]:
```
plt.figure(figsize=(12, 6))
sns.heatmap(dataset.corr(),
            cmap = 'BrBG',
            fmt = '.2f',
```

```
            linewidths = 2,
            annot = True)
```

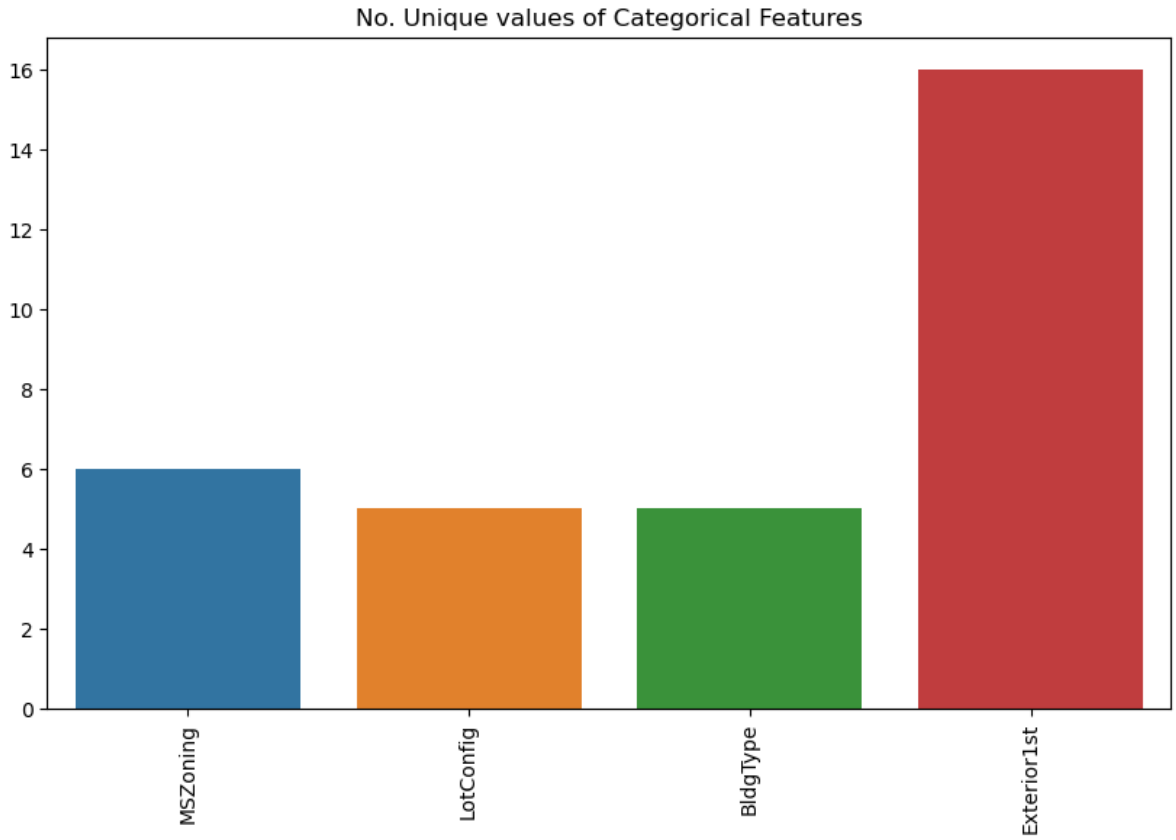
```
C:\Users\venut\AppData\Local\Temp\ipykernel_13384\3487798585.py:2: FutureWarning:
The default value of numeric_only in DataFrame.corr is deprecated. In a future ver
sion, it will default to False. Select only valid columns or specify the value of
numeric_only to silence this warning.
  sns.heatmap(dataset.corr(),
```

Out[7]:
```
<Axes: >
```



In [8]:
```
unique_values = []
for col in object_cols:
  unique_values.append(dataset[col].unique().size)
plt.figure(figsize=(10,6))
plt.title('No. Unique values of Categorical Features')
plt.xticks(rotation=90)
sns.barplot(x=object_cols,y=unique_values)
```

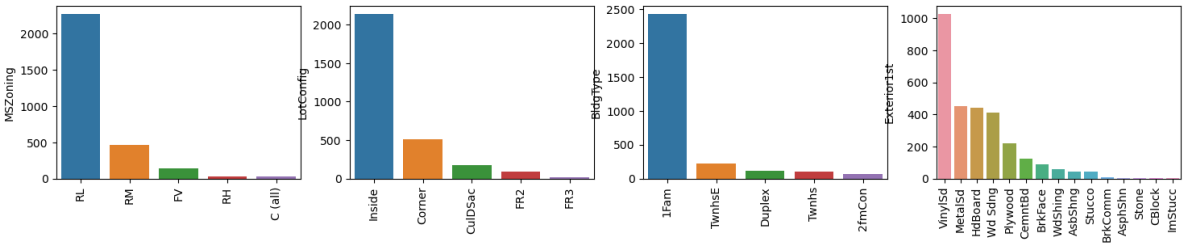
Out[8]:
```
<Axes: title={'center': 'No. Unique values of Categorical Features'}>
```



In [9]:
```
plt.figure(figsize=(18, 36))
plt.title('Categorical Features: Distribution')
plt.xticks(rotation=90)
index = 1

for col in object_cols:
    y = dataset[col].value_counts()
    plt.subplot(11, 4, index)
    plt.xticks(rotation=90)
    sns.barplot(x=list(y.index), y=y)
    index += 1
```

```
C:\Users\venut\AppData\Local\Temp\ipykernel_13384\2166598984.py:8: MatplotlibDeprecationWarning: Auto-removal of overlapping axes is deprecated since 3.6 and will be removed two minor releases later; explicitly call ax.remove() as needed.
  plt.subplot(11, 4, index)
```



Data Cleaning

In [10]:
```
dataset.drop(['Id'],
             axis=1,
             inplace=True)
```

In [11]:
```
dataset['SalePrice'] = dataset['SalePrice'].fillna(
  dataset['SalePrice'].mean())
```

In [12]:
```
new_dataset = dataset.dropna()
```

In [13]:
```
new_dataset.isnull().sum()
```

Out[13]:
```
MSSubClass      0
MSZoning        0
LotArea         0
LotConfig       0
BldgType        0
OverallCond     0
YearBuilt       0
YearRemodAdd    0
Exterior1st     0
BsmtFinSF2      0
TotalBsmtSF     0
SalePrice       0
dtype: int64
```

OneHotEncoder – For Label categorical features

In [14]:
```
from sklearn.preprocessing import OneHotEncoder

s = (new_dataset.dtypes == 'object')
object_cols = list(s[s].index)
print("Categorical variables:")
print(object_cols)
print('No. of. categorical features: ',
      len(object_cols))
```

```
Categorical variables:
['MSZoning', 'LotConfig', 'BldgType', 'Exterior1st']
No. of. categorical features:  4
```

In [23]:
```
OH_encoder = OneHotEncoder(sparse=False, handle_unknown='ignore')
OH_cols = pd.DataFrame(OH_encoder.fit_transform(new_dataset[object_cols]))
OH_cols.index = new_dataset.index
OH_cols.columns = OH_encoder.get_feature_names_out()
df_final = new_dataset.drop(object_cols, axis=1)
df_final = pd.concat([df_final, OH_cols], axis=1)
```

```
C:\Users\venut\anaconda3\lib\site-packages\sklearn\preprocessing\_encoders.py:828:
FutureWarning: `sparse` was renamed to `sparse_output` in version 1.2 and will be
removed in 1.4. `sparse_output` is ignored unless you leave `sparse` to its defaul
t value.
  warnings.warn(
```

In [18]:
```
df_final.
```

Out[18]:
```
MSSubClass      0
LotArea         0
OverallCond     0
YearBuilt       0
YearRemodAdd    0
BsmtFinSF2      0
TotalBsmtSF     0
SalePrice       0
0               0
1               0
2               0
3               0
4               0
5               0
6               0
7               0
8               0
9               0
10              0
11              0
12              0
13              0
14              0
15              0
16              0
17              0
18              0
19              0
20              0
21              0
22              0
23              0
24              0
25              0
26              0
27              0
28              0
29              0
dtype: int64
```

Splitting Dataset into Training and Testing

In [24]:
```
from sklearn.metrics import mean_absolute_error
from sklearn.model_selection import train_test_split

X = df_final.drop(['SalePrice'], axis=1)
Y = df_final['SalePrice']

# Split the training set into
# training and validation set
X_train, X_valid, Y_train, Y_valid = train_test_split(
    X, Y, train_size=0.8, test_size=0.2, random_state=0)
```

SVM – Support vector Machine

In [25]:
```
from sklearn import svm
from sklearn.svm import SVC
from sklearn.metrics import mean_absolute_percentage_error
```

```
model_SVR = svm.SVR()
model_SVR.fit(X_train,Y_train)
Y_pred = model_SVR.predict(X_valid)

print(mean_absolute_percentage_error(Y_valid, Y_pred))
```

```
0.1870512931870423
```