Random Forest Regression model of Air bnb booking prices prediction

The choice of using a Random Forest Regression model in a particular analysis or prediction task depends on the characteristics of the data and the problem going to be solved. Random Forest Regression is a machine learning algorithm that is commonly used for regression tasks, and it offers several advantages:

Non-Linearity: Random Forest Regression can capture non-linear relationships between input features (predictors) and the target variable. In many real-world problems, the relationship between variables is not strictly linear, and Random Forest can model these relationships effectively.

Robustness: Random Forest is robust to outliers and noisy data. It works well even when the data contains outliers or is not perfectly clean. The ensemble nature of Random Forest helps reduce the impact of individual noisy data points.

Feature Importance: Random Forest provides a feature importance score, which can help identify the most important features in making predictions. This is valuable for feature selection and understanding which variables have the most significant impact on the target variable.

Ensemble Learning: Random Forest is an ensemble learning method that combines multiple decision trees to make predictions. This ensemble approach tends to reduce overfitting and increase the model's generalization capabilities.

Parallelization: Random Forest can be easily parallelized, making it efficient for processing large datasets and taking advantage of multi-core processors.

Handling Missing Data: Random Forest can handle missing data effectively without the need for imputation. It does this by making predictions based on available data in the ensemble of decision trees.

Reduced Risk of Overfitting: The ensemble nature of Random Forest, along with techniques like bagging and random feature selection, helps reduce the risk of overfitting the model to the training data.

```
# Import all libraries
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
import numpy as np # linear algebra
import matplotlib.pyplot as plt # ploting the data
import seaborn as sns # ploting the data
import math # calculation
```

Import Libraries

import pandas as pd: This import brings in the pandas library and assigns it the alias "pd." Pandas is a popular library for data manipulation and analysis. It provides data structures like dataframes and tools for working with structured data, such as reading and writing data from/to CSV files.

import numpy as np: This import brings in the numpy library and assigns it the alias "np." Numpy is a fundamental library for numerical and array operations in Python. It provides support for working with multi-dimensional arrays and mathematical functions to operate on these arrays efficiently.

import matplotlib.pyplot as plt: This import brings in the pyplot module from the matplotlib library and assigns it the alias "plt." Matplotlib is a powerful library for creating visualizations and plots in Python. The pyplot module provides an interface for creating various types of charts, graphs, and plots.

import seaborn as sns: This import brings in the seaborn library and assigns it the alias "sns." Seaborn is a data visualization library built on top of matplotlib. It simplifies the process of creating aesthetically pleasing and informative statistical graphics, making it easier to create complex visualizations.

import math: This import brings in the built-in math module in Python. The math module provides various mathematical functions and constants for performing mathematical operations in your code. It includes functions for basic arithmetic, trigonometry, logarithms, and more.

```
# load the data
data = pd.read_csv('AB_NYC_2019.csv')
```

pd.read_csv('AB_NYC_2019.csv'): This line of code uses the read_csv function from the pandas library (imported as pd) to read data from a CSV file named 'AB_NYC_2019.csv'. The data is read and stored in a pandas DataFrame.

pd is the alias for the pandas library that is imported earlier. read_csv is a function provided by pandas to read data from a CSV (Comma-Separated Values) file. 'AB_NYC_2019.csv' is the name of the CSV file from which you want to read data. Make sure that the file is located in the same directory as your Python script or specify the full file path if it's in a different location.

```
# Visualize data info
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 48895 entries, 0 to 48894
Data columns (total 16 columns):
 #   Column                          Non-Null Count  Dtype  
---  ------                          --------------  -----  
 0   id                              48895 non-null  int64  
 1   name                            48879 non-null  object 
 2   host_id                         48895 non-null  int64  
 3   host_name                       48874 non-null  object 
 4   neighbourhood_group             48895 non-null  object 
 5   neighbourhood                   48895 non-null  object 
 6   latitude                        48895 non-null  float64
 7   longitude                       48895 non-null  float64
 8   room_type                       48895 non-null  object 
 9   price                           48895 non-null  int64  
 10  minimum_nights                  48895 non-null  int64  
 11  number_of_reviews               48895 non-null  int64  
 12  last_review                     38843 non-null  object 
 13  reviews_per_month               38843 non-null  float64
 14  calculated_host_listings_count  48895 non-null  int64  
 15  availability_365                48895 non-null  int64  
dtypes: float64(3), int64(7), object(6)
memory usage: 6.0+ MB
```

The code **data.info()** is used to visualize and print information about the data stored in the data DataFrame. It provides an overview of the DataFrame's structure, including details such as the number of rows and columns, data types, and non-null values for each column. This information can be helpful for understanding the dataset and identifying potential data cleaning or preprocessing tasks. Here's what each part of the output typically means:

```
# Drop the data that are not of interest and/or causing privacy issues
data.drop(['id','host_name','last_review'], axis=1, inplace=True)
# Visualize the first 5 rows
data.head()
```

	name	host_id	neighbourhood_group	neighbourhood	latitude	longitude	room_type	price	minimum_nights	number_of_reviews
0	Clean & quiet apt home by the park	2787	Brooklyn	Kensington	40.64749	-73.97237	Private room	149	1	9
1	Skylit Midtown Castle	2845	Manhattan	Midtown	40.75362	-73.98377	Entire home/apt	225	1	45
2	THE VILLAGE OF HARLEM....NEW YORK !	4632	Manhattan	Harlem	40.80902	-73.94190	Private room	150	3	0
3	Cozy Entire Floor of Brownstone	4869	Brooklyn	Clinton Hill	40.68514	-73.95976	Entire home/apt	89	1	270
4	Entire Apt: Spacious Studio/Loft by central park	7192	Manhattan	East Harlem	40.79851	-73.94399	Entire home/apt	80	10	9

data.drop(['id', 'host_name', 'last_review'], axis=1, inplace=True): This line of code drops the specified columns from the **'data'** DataFrame. The columns to be dropped are 'id', 'host_name', and 'last_review'. The **axis=1** argument indicates that the operation should be performed along columns (i.e., dropping columns). The **inplace=True** argument means that the DataFrame is modified in place, and the changes are reflected without the need to assign the result to a new variable.

data.head(): This line of code displays the first 5 rows of the DataFrame, allowing you to see the DataFrame's structure and content after the specified columns have been dropped.

```
# Determine the number of missing values for every column
data.isnull().sum()
```

```
name                              16
host_id                            0
neighbourhood_group                0
```

```
neighbourhood                         0
latitude                              0
longitude                             0
room_type                             0
price                                 0
minimum_nights                        0
number_of_reviews                     0
reviews_per_month                 10052
calculated_host_listings_count        0
availability_365                      0
dtype: int64
```

```
#replacing all NaN values in 'reviews_per_month' with 0
data.fillna({'reviews_per_month':0}, inplace=True)
```

```
#examine the dataset
(data[['price', 'minimum_nights', 'number_of_reviews', 'reviews_per_month',
       'calculated_host_listings_count', 'availability_365']]
 .describe())
```

	price	minimum_nights	number_of_reviews	reviews_per_month	calculated_host_listings_count	availability_365
count	48895.000000	48895.000000	48895.000000	48895.000000	48895.000000	48895.000000
mean	152.720687	7.029962	23.274466	1.090910	7.143982	112.781327
std	240.154170	20.510550	44.550582	1.597283	32.952519	131.622289
min	0.000000	1.000000	0.000000	0.000000	1.000000	0.000000
25%	69.000000	1.000000	1.000000	0.040000	1.000000	0.000000
50%	106.000000	3.000000	5.000000	0.370000	1.000000	45.000000
75%	175.000000	5.000000	24.000000	1.580000	2.000000	227.000000
max	10000.000000	1250.000000	629.000000	58.500000	327.000000	365.000000

```
# Exclude property with listed price of 0
data = data.loc[data['price'] > 0]
# data_copy = data.copy()
```

```
#examine the dataset
data.describe()
```

	host_id	latitude	longitude	price	minimum_nights	number_of_reviews	reviews_per_month	calculated_host_list
count	4.888400e+04	48884.000000	48884.000000	48884.000000	48884.000000	48884.000000	48884.000000	48
mean	6.762203e+07	40.728953	-73.952176	152.755053	7.029887	23.271991	1.090800	
std	7.861666e+07	0.054532	0.046159	240.170260	20.512224	44.551331	1.597213	
min	2.438000e+03	40.499790	-74.244420	10.000000	1.000000	0.000000	0.000000	
25%	7.817310e+06	40.690100	-73.983080	69.000000	1.000000	1.000000	0.040000	
50%	3.079257e+07	40.723080	-73.955685	106.000000	3.000000	5.000000	0.370000	
75%	1.074344e+08	40.763120	-73.936290	175.000000	5.000000	24.000000	1.580000	
max	2.743213e+08	40.913060	-73.712990	10000.000000	1250.000000	629.000000	58.500000	

```
# Recode data as categorical
data_encoded = data.copy()
data_encoded['minimum_nights'] = pd.qcut(data['minimum_nights'], q=2, labels=["minimum_nights_low", "minimum_nights_high"])
data_encoded['number_of_reviews'] = pd.qcut(data['number_of_reviews'], q=3, labels=["number_of_reviews_low", "minimum_nights_medium", "number
data_encoded['reviews_per_month'] = pd.qcut(data['reviews_per_month'], q=2, labels=["reviews_per_month_low", "reviews_per_month_high"])
data_encoded['calculated_host_listings_count'] = pd.cut(data['calculated_host_listings_count'],
                                                bins=[0, 2, 327],
                                                labels=["calculated_host_listings_count_low", "calculated_host_listings_count_high"])
data_encoded['availability_365'] = pd.qcut(data['availability_365'], q=2, labels=["availability_low", "availability_high"])
```

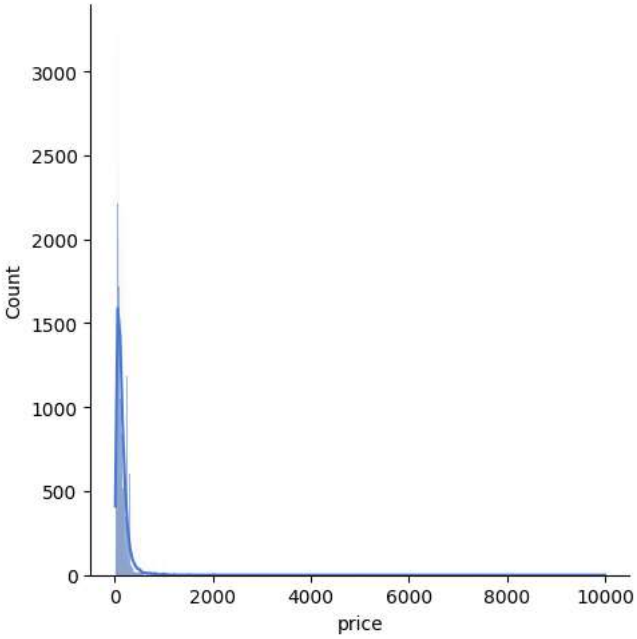
```
data_encoded.isnull().sum()
```

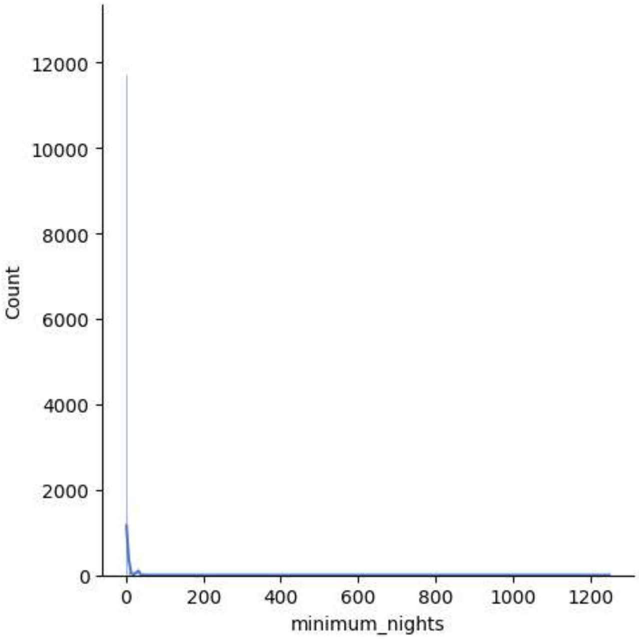
```
name                              16
host_id                            0
neighbourhood_group                0
neighbourhood                      0
latitude                           0
longitude                          0
room_type                          0
price                              0
minimum_nights                     0
number_of_reviews                  0
reviews_per_month                  0
calculated_host_listings_count     0
availability_365                   0
dtype: int64
```

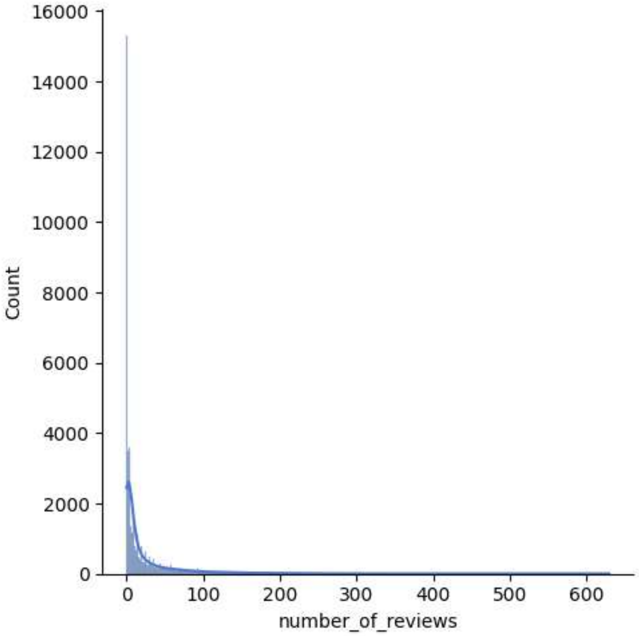
```
data_encoded.head()
```

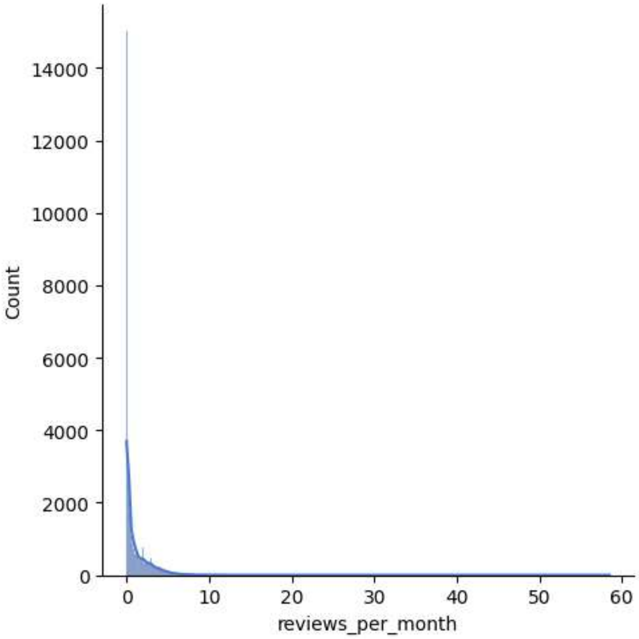
	name	host_id	neighbourhood_group	neighbourhood	latitude	longitude	room_type	price	minimum_nights	number_of_
0	Clean & quiet apt home by the park	2787	Brooklyn	Kensington	40.64749	-73.97237	Private room	149	minimum_nights_low	minimum_nights
1	Skylit Midtown Castle	2845	Manhattan	Midtown	40.75362	-73.98377	Entire home/apt	225	minimum_nights_low	number_of_revi
2	THE VILLAGE OF HARLEM....NEW YORK !	4632	Manhattan	Harlem	40.80902	-73.94190	Private room	150	minimum_nights_low	number_of_rev
3	Cozy Entire Floor of Brownstone	4869	Brooklyn	Clinton Hill	40.68514	-73.95976	Entire home/apt	89	minimum_nights_low	number_of_revi
4	Entire Apt: Spacious Studio/Loft by central park	7192	Manhattan	East Harlem	40.79851	-73.94399	Entire home/apt	80	minimum_nights_high	minimum_nights

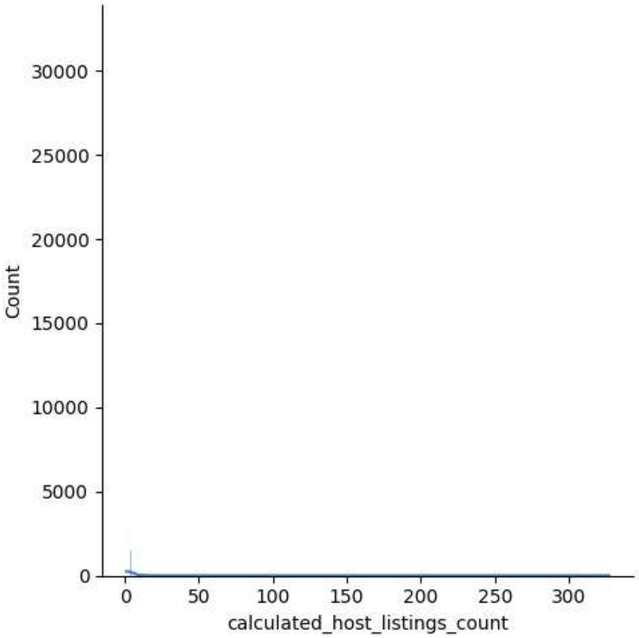
```
import seaborn as sns
import matplotlib.pyplot as plt

# Replace distplot with displot or histplot
sns.displot(data['price'], kde=True)  # For the 'price' column
sns.displot(data['minimum_nights'], kde=True)  # For the 'minimum_nights' column
sns.displot(data['number_of_reviews'], kde=True)  # For the 'number_of_reviews' column
sns.displot(data['reviews_per_month'], kde=True)  # For the 'reviews_per_month' column
sns.displot(data['calculated_host_listings_count'], kde=True)  # For the 'calculated_host_listings_count' column
sns.displot(data['availability_365'], kde=True)  # For the 'availability_365' column

plt.show()
```

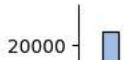

Count
3000
2500
2000
1500
1000
500
0
0
2000
4000
6000
8000
10000
price


Count
12000
10000
8000
6000
4000
2000
0
0
200
400
600
800
1000
1200
minimum_nights


Count
16000
14000
12000
10000
8000
6000
4000
2000
0
0
100
200
300
400
500
600
number_of_reviews

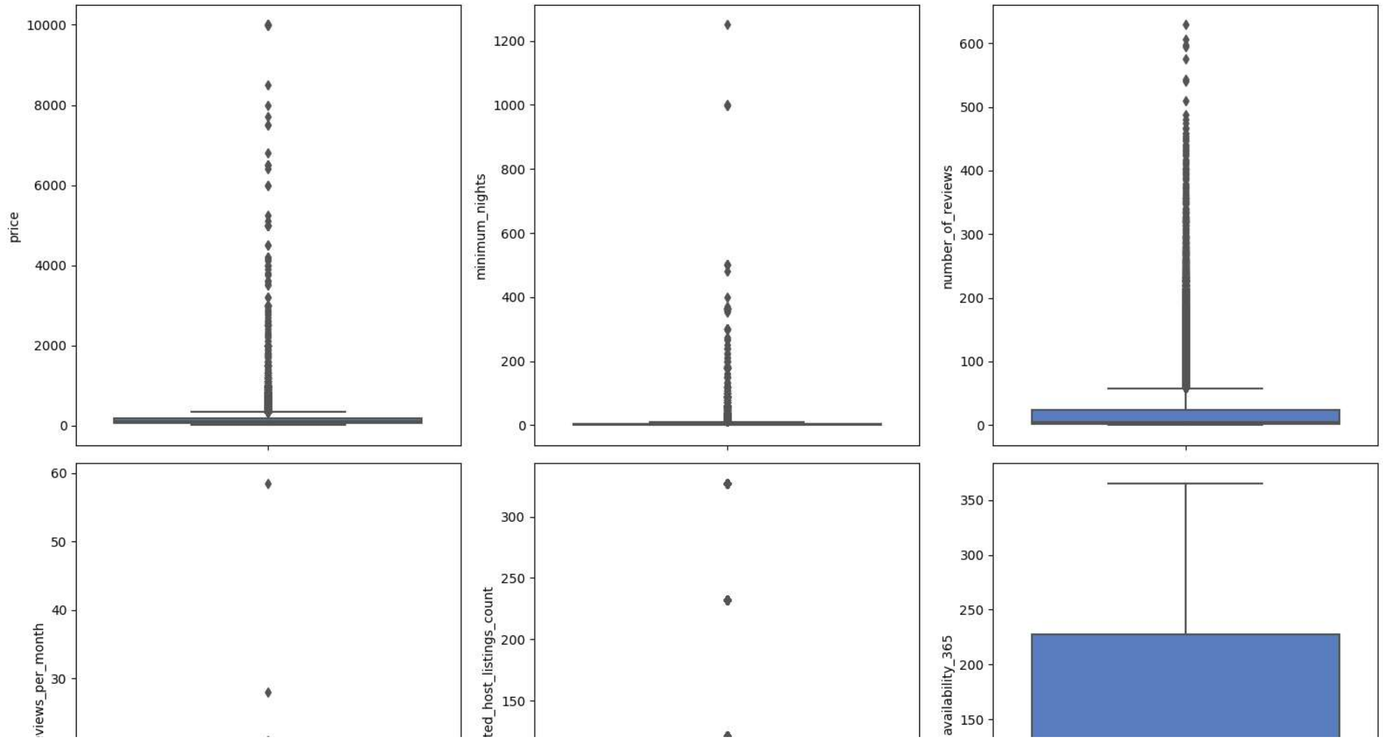




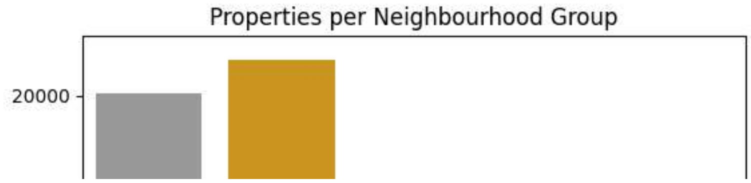


```
from pylab import *
import seaborn as sns
import matplotlib.pyplot as plt

f, ax = plt.subplots(2, 3, figsize=(15, 10))

subplot(2, 3, 1)
sns.boxplot(y=data['price'])

subplot(2, 3, 2)
sns.boxplot(y=data['minimum_nights'])

subplot(2, 3, 3)
sns.boxplot(y=data['number_of_reviews'])

subplot(2, 3, 4)
sns.boxplot(y=data['reviews_per_month'])

subplot(2, 3, 5)
sns.boxplot(y=data['calculated_host_listings_count'])

subplot(2, 3, 6)
```

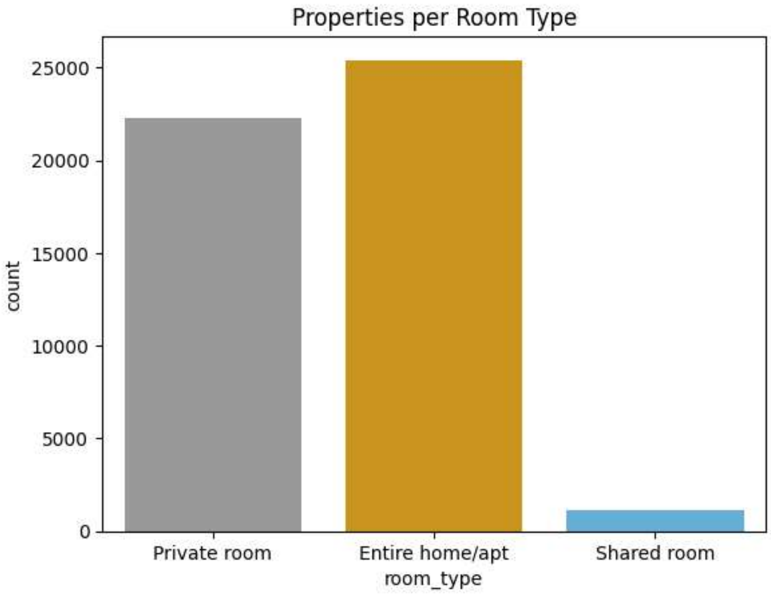
```
sns.boxplot(y=data['availability_365'])

plt.tight_layout()  # Avoid overlap of plots

# Explicitly remove any overlapping axes
for i in range(6, len(ax.flat)):
    plt.delaxes(ax.flat[i])

plt.show()
```



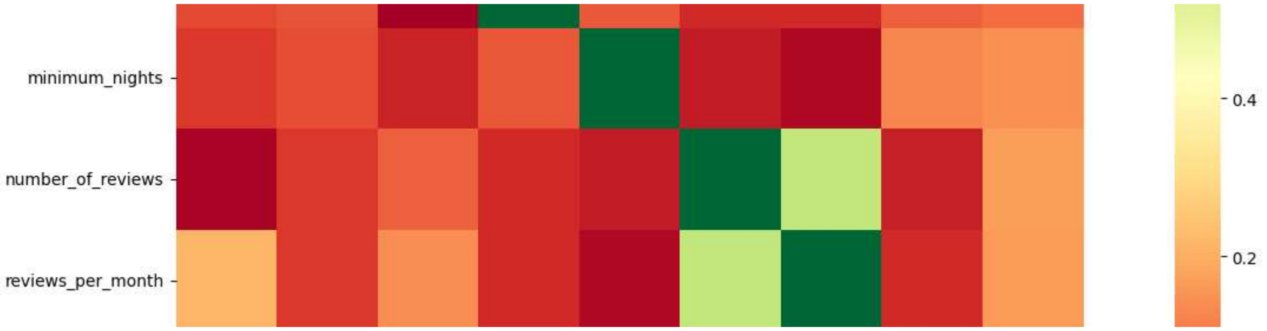
```
# Set up color blind friendly color palette
# The palette with grey:
cbPalette = ["#999999", "#E69F00", "#56B4E9", "#009E73", "#F0E442", "#0072B2", "#D55E00", "#CC79A7"]
# The palette with black:
cbbPalette = ["#000000", "#E69F00", "#56B4E9", "#009E73", "#F0E442", "#0072B2", "#D55E00", "#CC79A7"]

# sns.palplot(sns.color_palette(cbPalette))
# sns.palplot(sns.color_palette(cbbPalette))

sns.set_palette(cbPalette)
#sns.set_palette(cbbPalette)


title = 'Properties per Neighbourhood Group'
sns.countplot(data=data, x='neighbourhood_group')
plt.title(title)
plt.show()
```

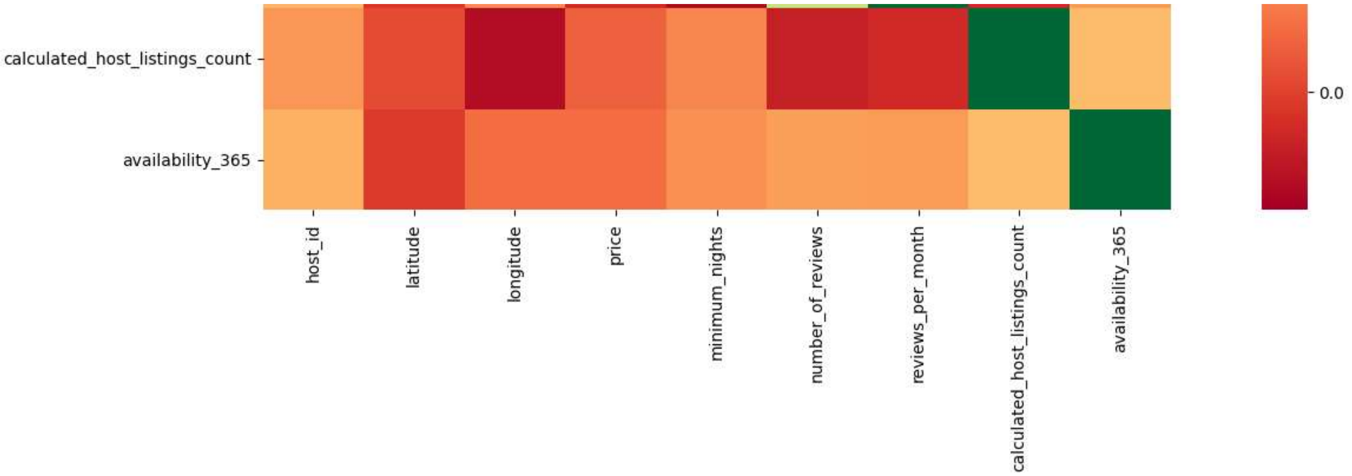

Properties per Neighbourhood Group

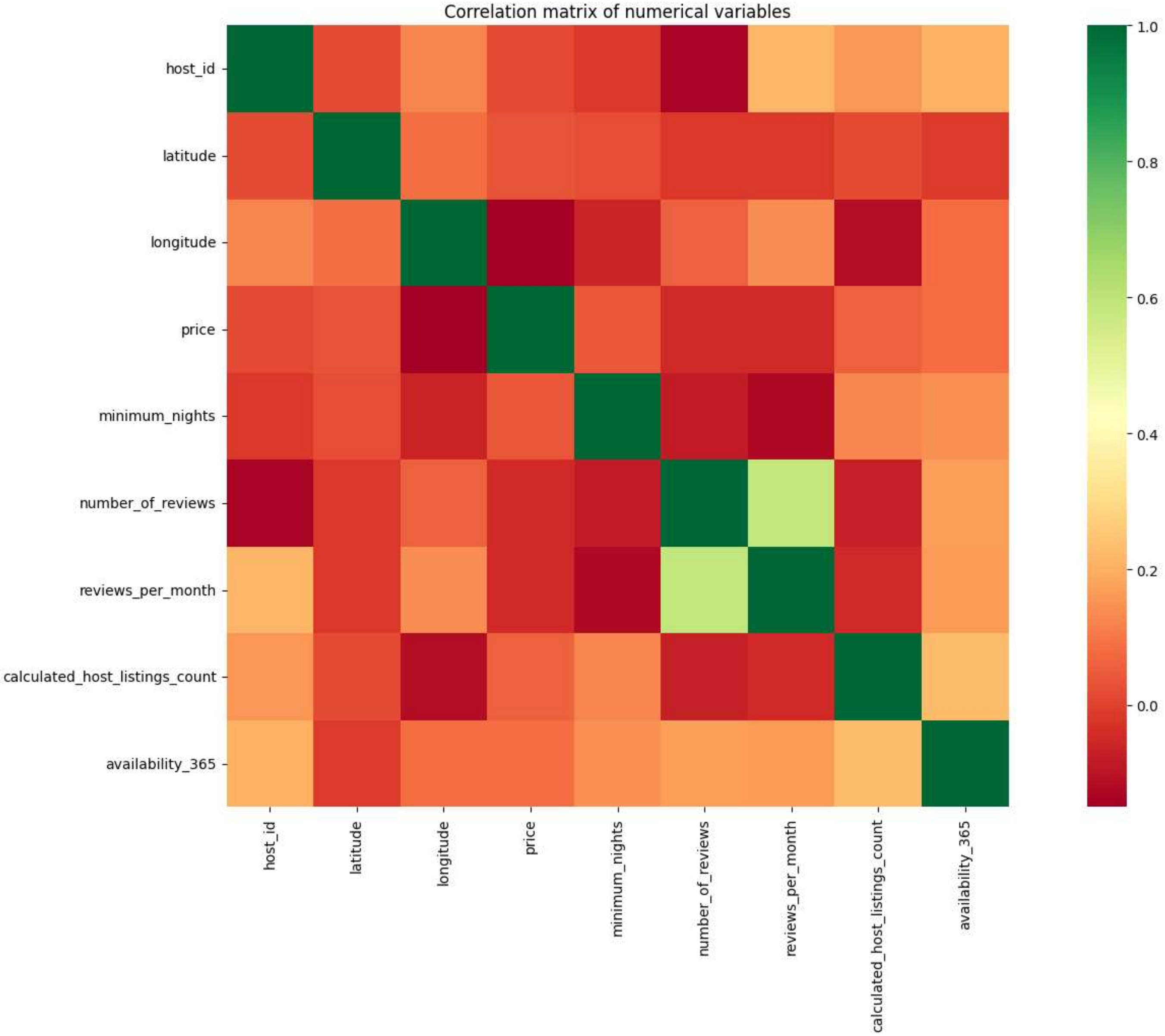
```
title = 'Properties per Room Type'
sns.countplot(data=data, x='room_type')
plt.title(title)
plt.show()
```

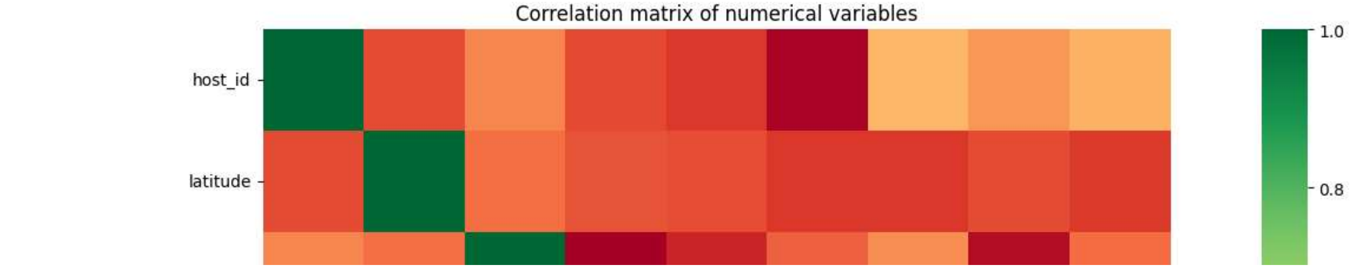

Properties per Room Type

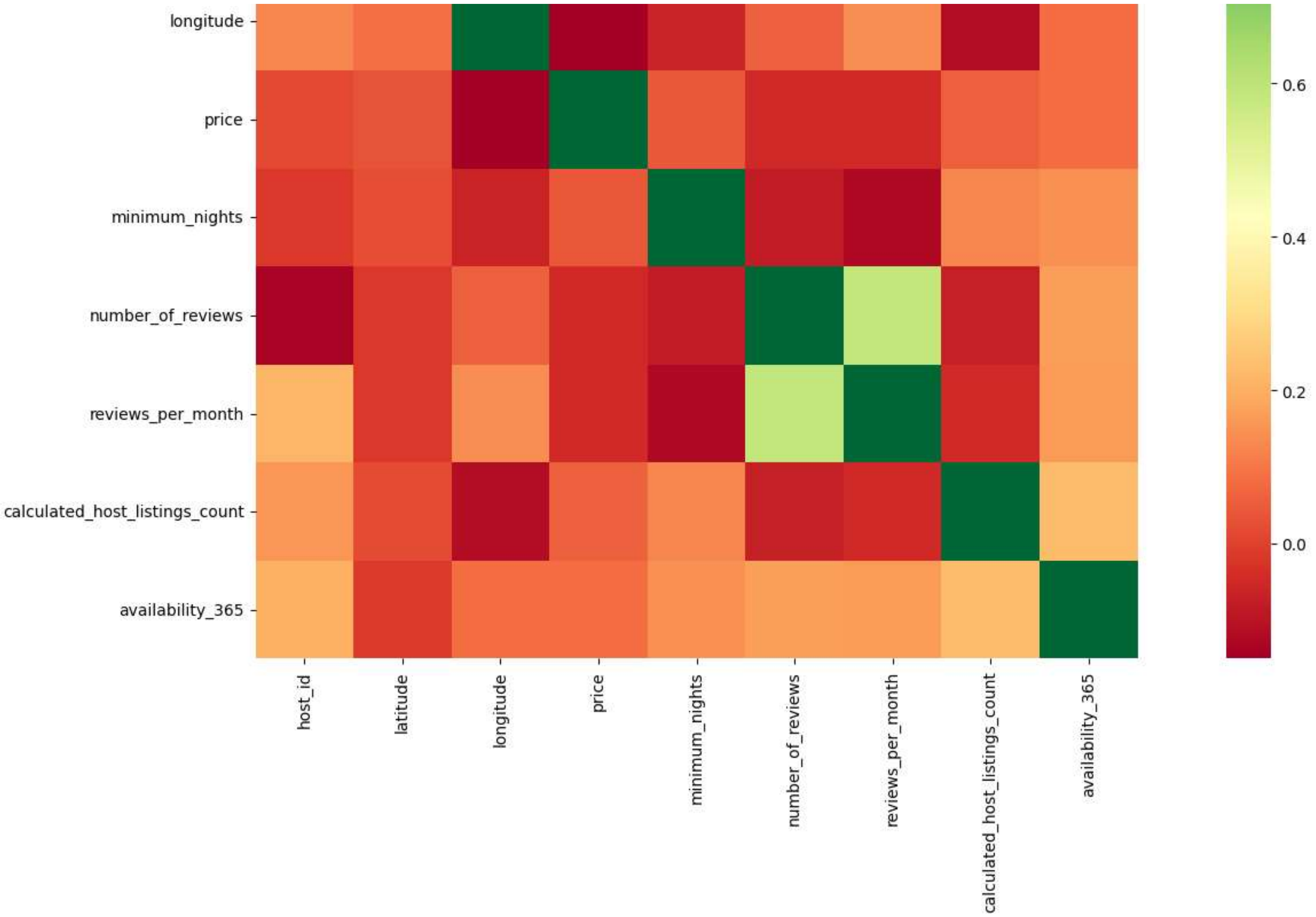
```
import matplotlib.pyplot as plt
import seaborn as sns

# Calculate the correlation matrix with explicit numeric_only parameter
correlation_matrix = data.corr(numeric_only=True)

plt.figure(figsize=(20, 10))
title = 'Correlation matrix of numerical variables'
sns.heatmap(correlation_matrix, square=True, cmap='RdYlGn')
plt.title(title)
plt.show()  # This is necessary to display the plot in a Jupyter Notebook cell
```


minimum_nights
number_of_reviews
reviews_per_month
0.4
0.2

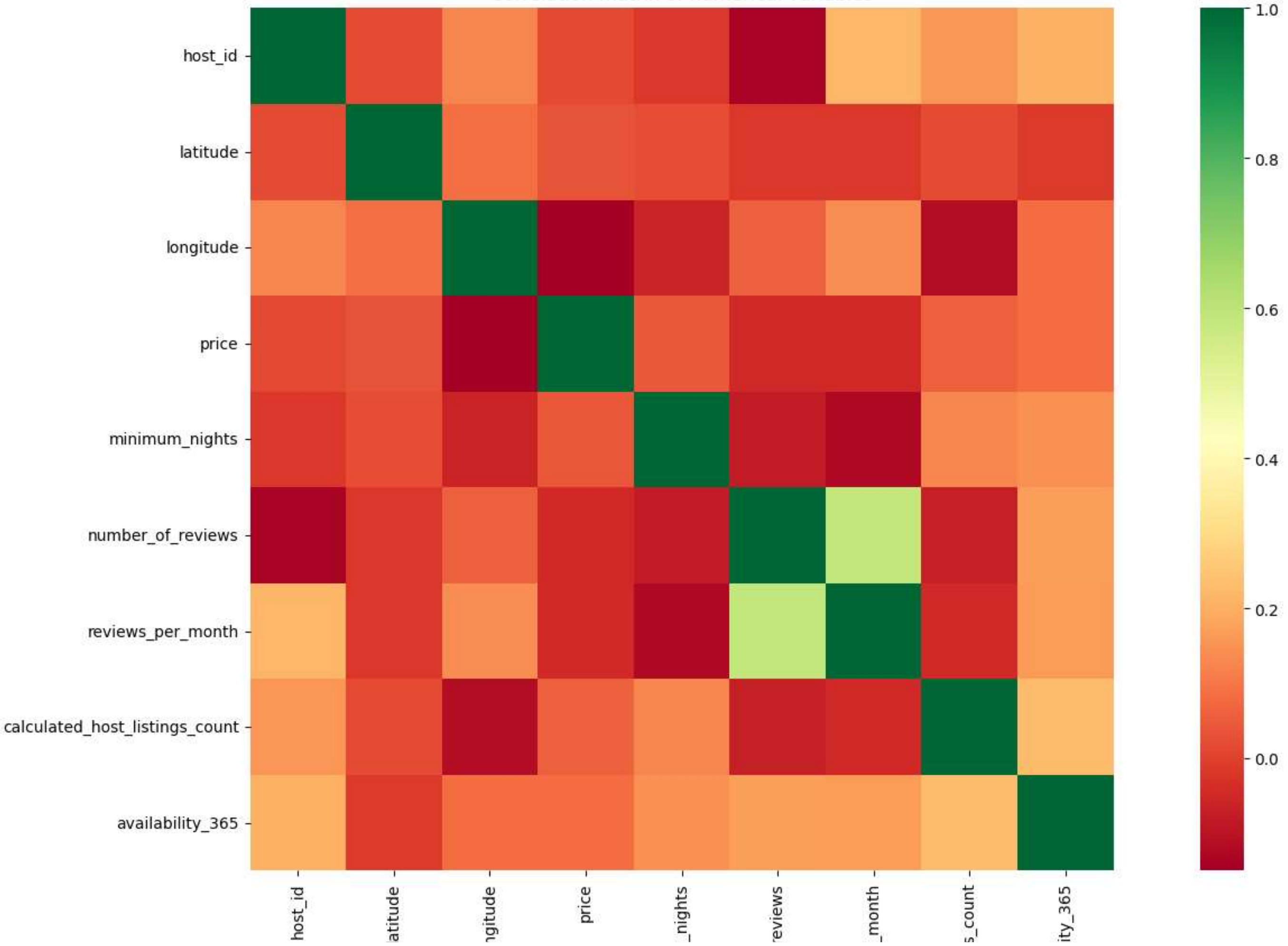

calculated_host_listings_count
availability_365
host_id
latitude
longitude
price
minimum_nights
number_of_reviews
reviews_per_month
calculated_host_listings_count
availability_365
0.0


Correlation matrix of numerical variables
host_id
latitude
longitude
price
minimum_nights
number_of_reviews
reviews_per_month
calculated_host_listings_count
availability_365
host_id
latitude
longitude
price
minimum_nights
number_of_reviews
reviews_per_month
calculated_host_listings_count
availability_365
1.0
0.8
0.6
0.4
0.2
0.0


Correlation matrix of numerical variables
host_id
latitude
1.0
0.8



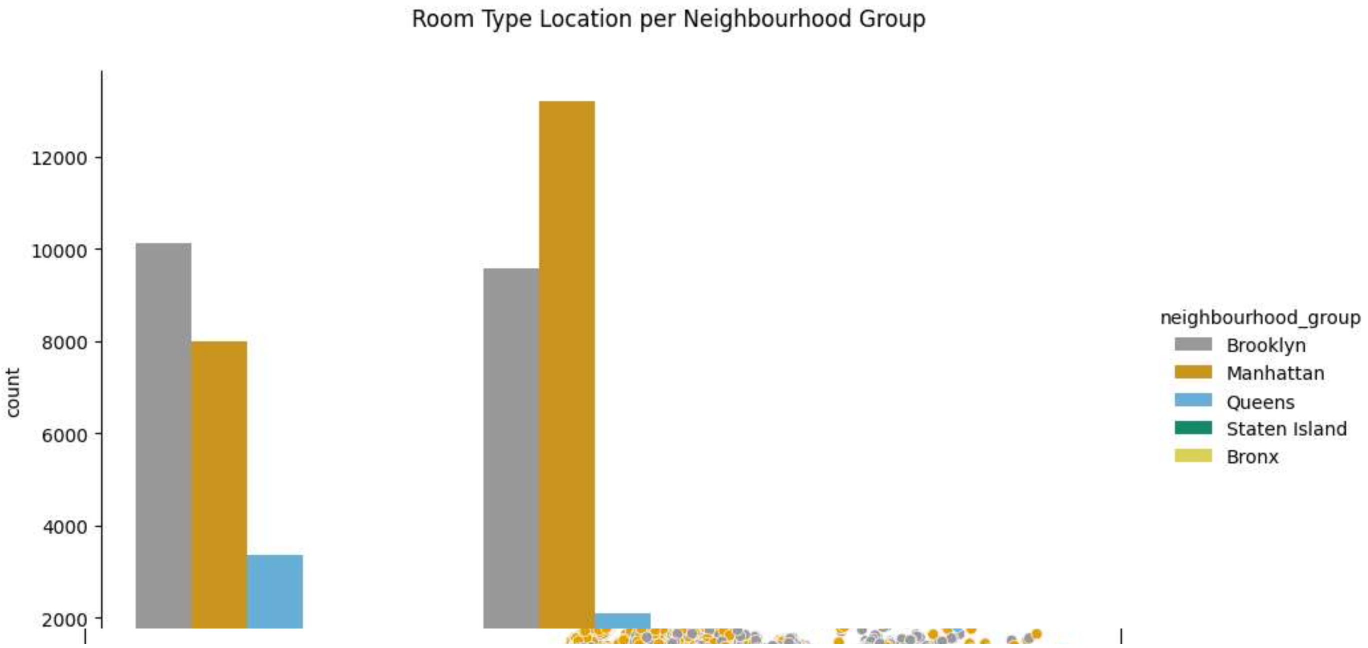
Correlation matrix of numerical variables



```
# Scatter plot for "Neighbourhood Group Location"
title1 = 'Neighbourhood Group Location'
plt.figure(figsize=(10, 6))
sns.scatterplot(data=data, x='longitude', y='latitude', hue='neighbourhood_group')
plt.title(title1)
plt.show()

# Scatter plot for "Room Type Location per Neighbourhood Group"
title2 = 'Room Type Location per Neighbourhood Group'
plt.figure(figsize=(10, 6))
sns.scatterplot(data=data, x='longitude', y='latitude', hue='room_type')
plt.title(title2)
plt.show()
```

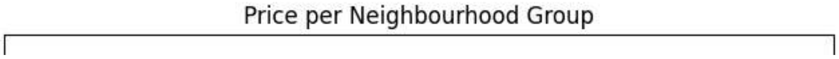
Neighbourhood Group Location

```
# Define the title
title = 'Room Type Location per Neighbourhood Group'

# Create a countplot using sns.catplot
g = sns.catplot(x='room_type', kind='count', hue='neighbourhood_group', data=data, height=6, aspect=1.5)
g.fig.subplots_adjust(top=0.9)  # Adjust the title position
g.fig.suptitle(title)  # Set the title

# Show the plot
plt.show()
```

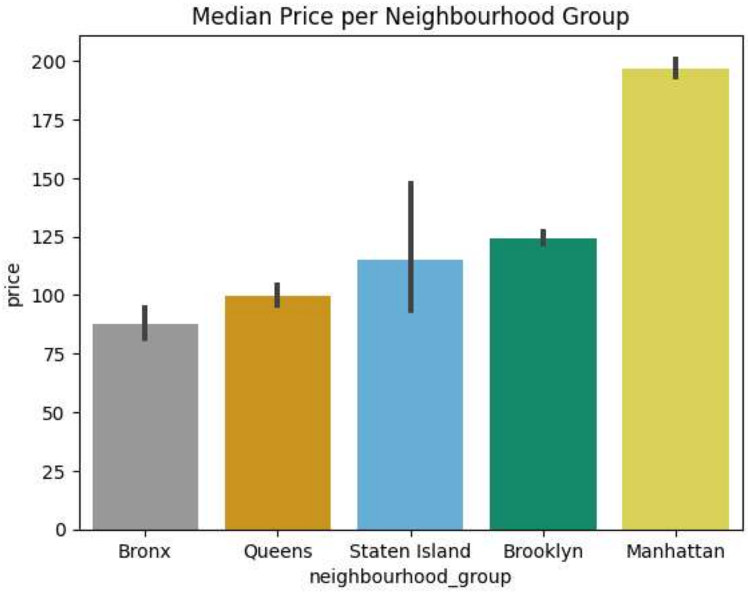


```
x= 'neighbourhood_group'
y= 'price'
title = 'Price per Neighbourhood Group'

f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x=x, y=y, data=data)
plt.title(title)
plt.ioff()
plt.show()
```

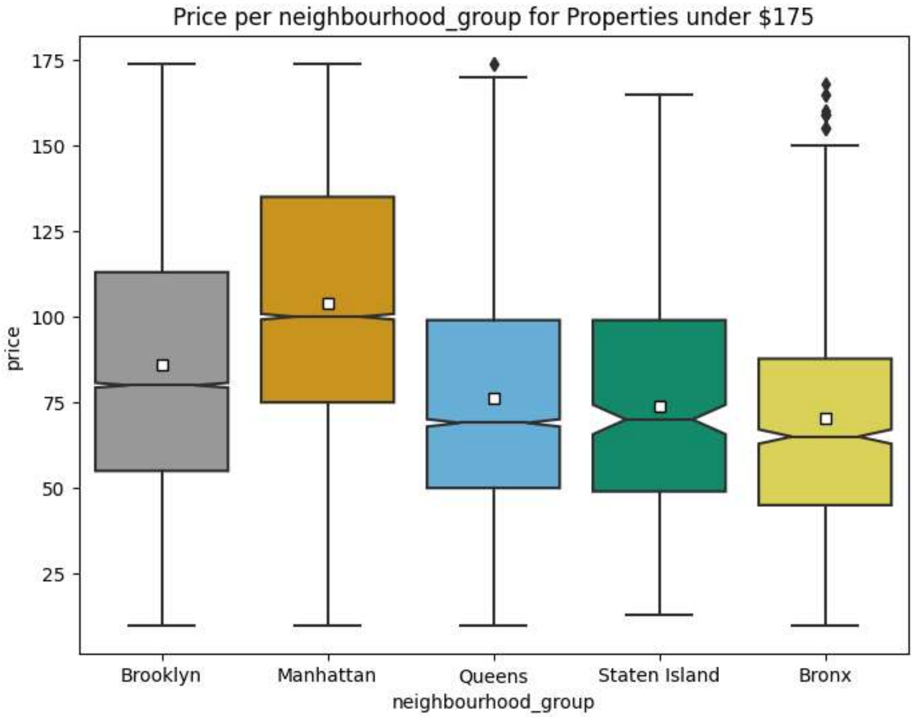
```
<Figure size 1000x600 with 0 Axes>
```

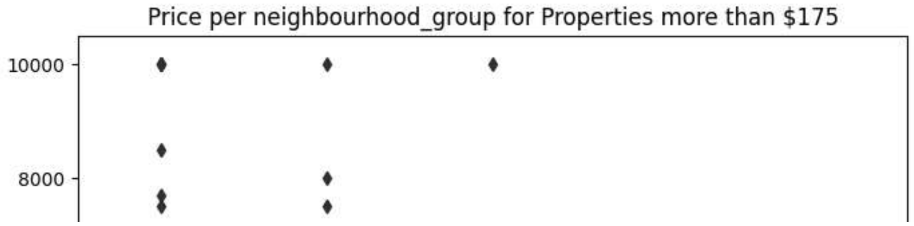


```
title = 'Median Price per Neighbourhood Group'
result = data.groupby(["neighbourhood_group"])['price'].aggregate(np.median).reset_index().sort_values('price')
sns.barplot(x='neighbourhood_group', y="price", data=data, order=result['neighbourhood_group'])
plt.title(title)
plt.ioff()
plt.show()
```



```
x='neighbourhood_group'
y='price'

title = 'Price per neighbourhood_group for Properties under $175'
data_filtered = data.loc[data['price'] < 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x=x, y=y, data=data_filtered, notch=True, showmeans=True,
           meanprops={"marker":"s","markerfacecolor":"white", "markeredgecolor":"black"})
plt.title(title)
plt.ioff()
f
title = 'Price per neighbourhood_group for Properties more than $175'
data_filtered = data.loc[data['price'] > 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x=x, y=y, data=data_filtered, notch=False, showmeans=True,
           meanprops={"marker":"s","markerfacecolor":"white", "markeredgecolor":"black"})
plt.title(title)
plt.ioff()
plt.show()
```





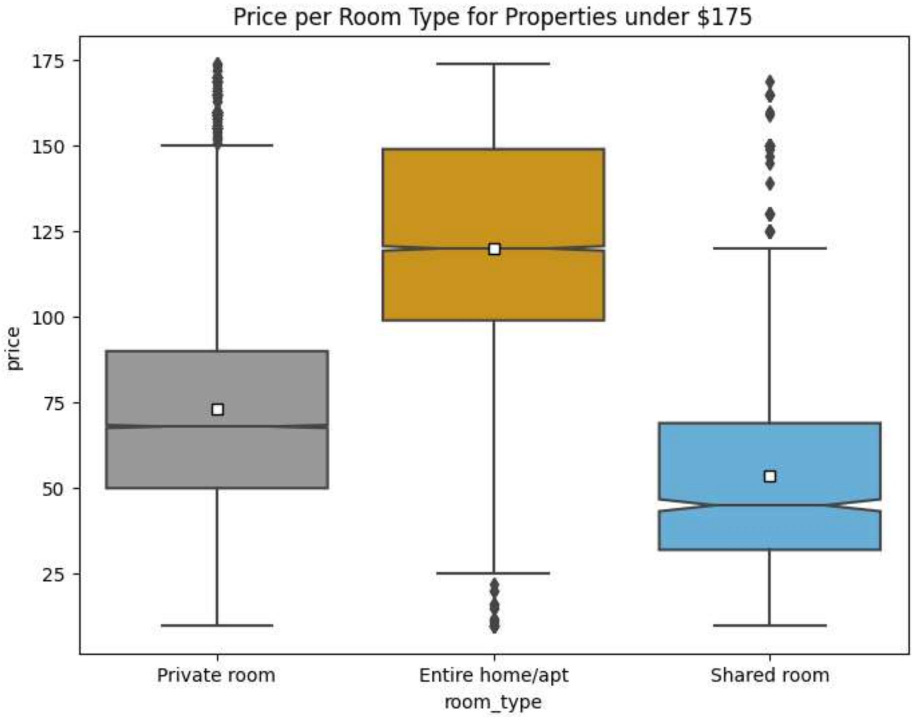
```
import statsmodels.api as sm
from statsmodels.formula.api import ols

data_filtered = data.loc[data['price'] < 175]

mod = ols('price ~ neighbourhood_group',data=data_filtered).fit()

aov_table = sm.stats.anova_lm(mod, typ=2)
print(aov_table)
```

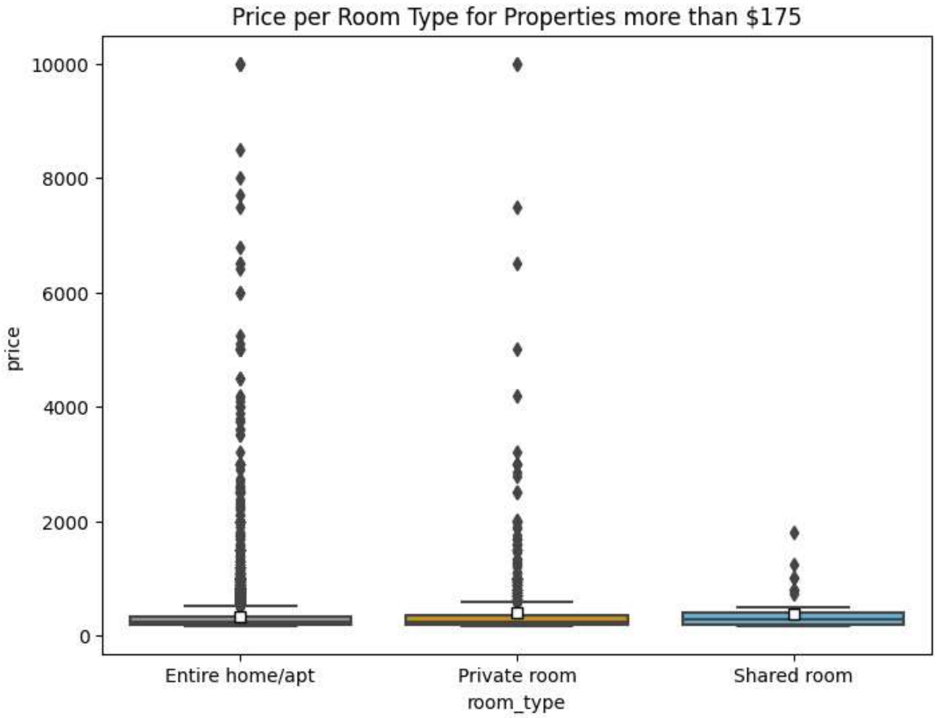
```
                           sum_sq       df           F  PR(>F)
neighbourhood_group  4.188339e+06      4.0  806.494493     0.0
Residual             4.666018e+07  35939.0         NaN     NaN
```

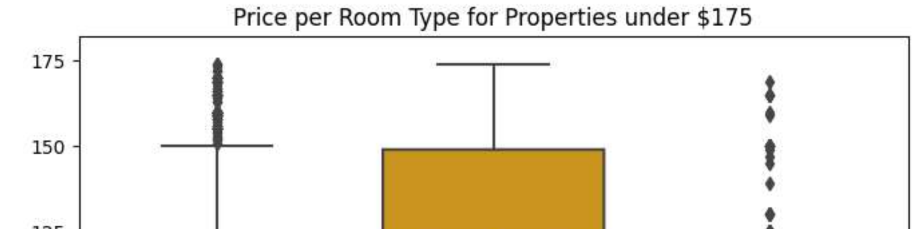
```
pair_t = mod.t_test_pairwise('neighbourhood_group')
pair_t.result_frame
```

	coef	std err	t	P>|t|	Conf. Int. Low	Conf. Int. Upp.	pvalue-hs	reject-hs
Brooklyn-Bronx	15.539434	1.161363	13.380342	9.863414e-41	13.263127	17.815740	4.931707e-40	True
Manhattan-Bronx	33.543248	1.170763	28.650759	1.605347e-178	31.248517	35.837978	1.284278e-177	True
Queens-Bronx	6.060759	1.235087	4.907151	9.281261e-07	3.639951	8.481566	2.784376e-06	True
Staten Island-Bronx	3.662572	2.283992	1.603584	1.088146e-01	-0.814120	8.139264	2.057885e-01	False
Manhattan-Brooklyn	18.003814	0.422746	42.587799	0.000000e+00	17.175220	18.832408	0.000000e+00	True

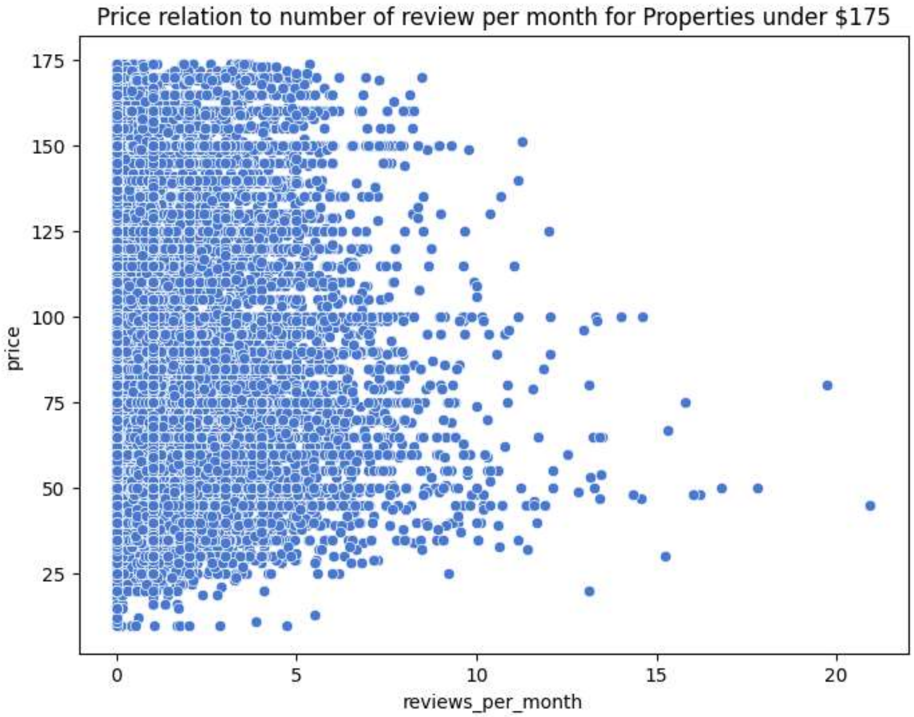
```
title = 'Price per Room Type for Properties under $175'
data_filtered = data.loc[data['price'] < 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x='room_type', y='price', data=data_filtered, notch=True, showmeans=True,
           meanprops={"marker":"s","markerfacecolor":"white", "markeredgecolor":"black"})
plt.title(title)
plt.ioff()

title = 'Price per Room Type for Properties more than $175'
data_filtered = data.loc[data['price'] > 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x='room_type', y='price', data=data_filtered, notch=False, showmeans=True,
           meanprops={"marker":"s","markerfacecolor":"white", "markeredgecolor":"black"})
plt.title(title)
plt.ioff()
plt.show()
```

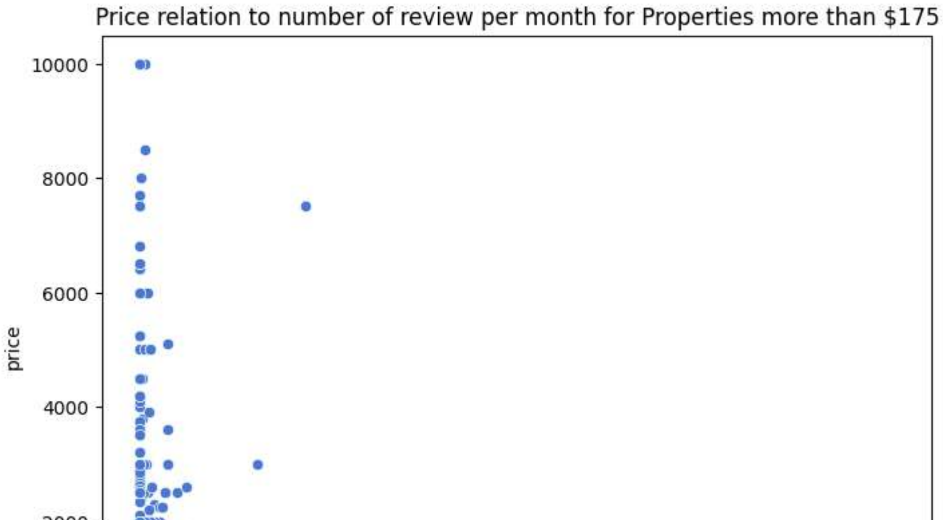




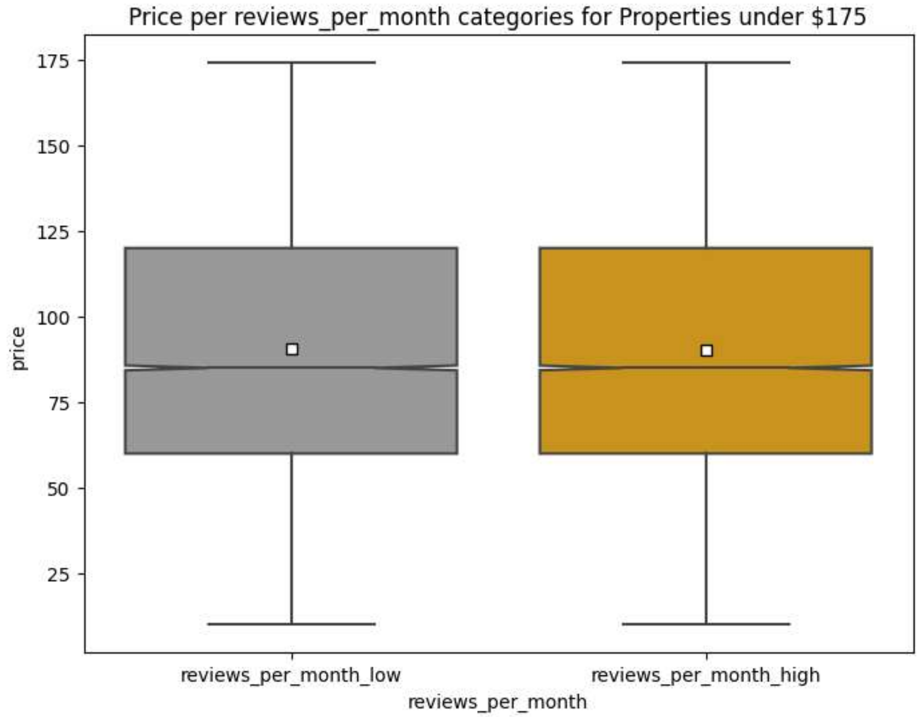


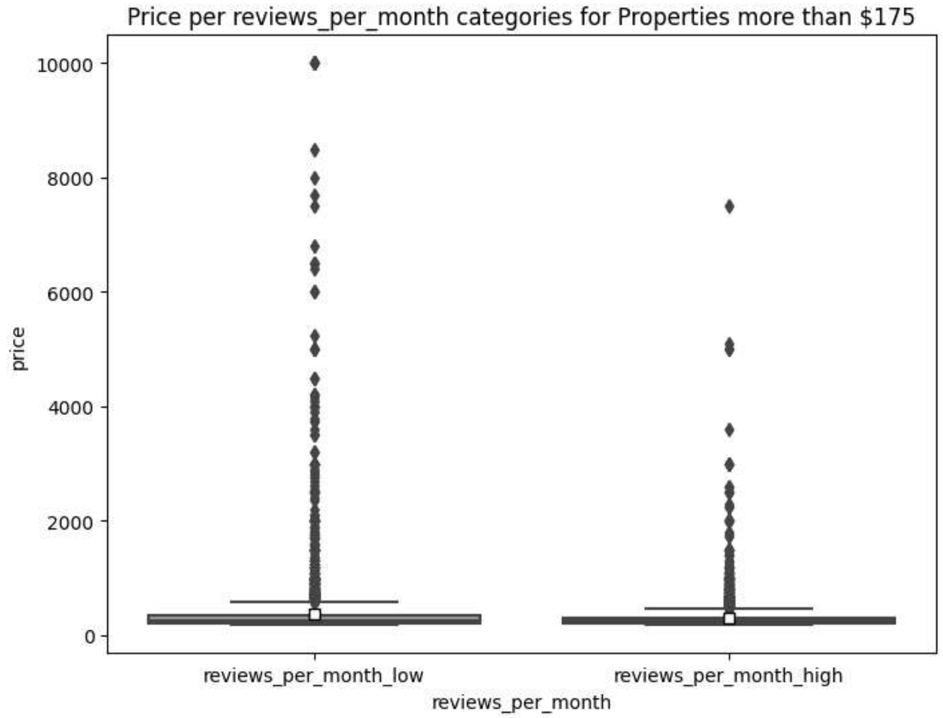
```
sns.set_palette("muted")
x = 'reviews_per_month'
y = 'price'

title = 'Price relation to number of review per month for Properties under $175'
data_filtered = data.loc[(data['price'] < 175) & (data['reviews_per_month'] < 30)]
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x=x, y=y, data=data_filtered)
plt.title(title)
plt.ioff()

title = 'Price relation to number of review per month for Properties more than $175'
data_filtered = data.loc[data['price'] > 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x=x, y=y, data=data_filtered)
plt.title(title)
plt.ioff()
sns.set_palette(cbPalette)
plt.show()
```

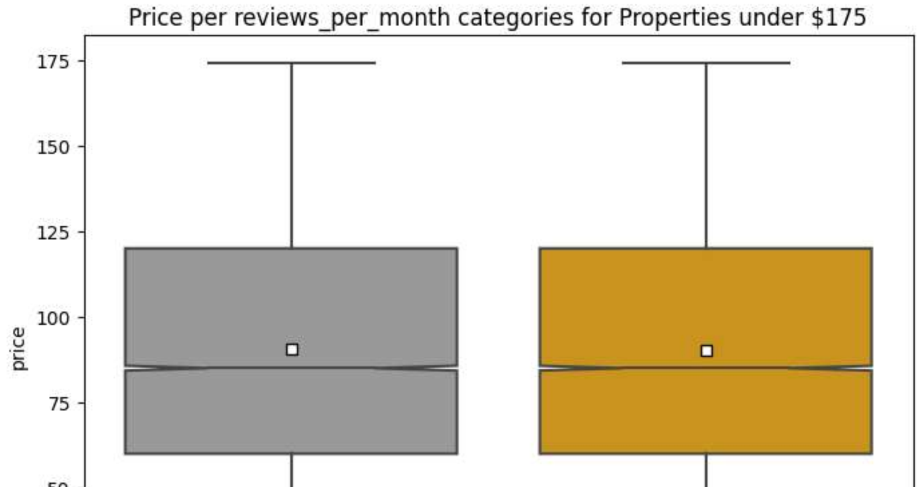


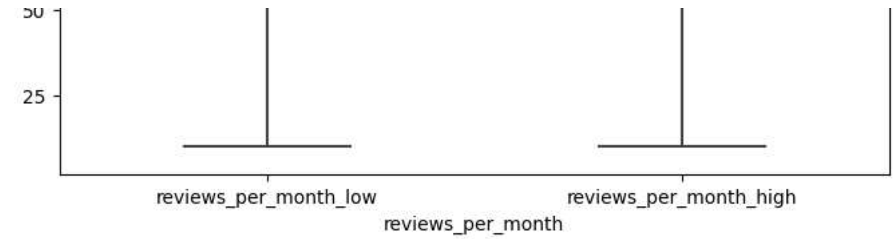


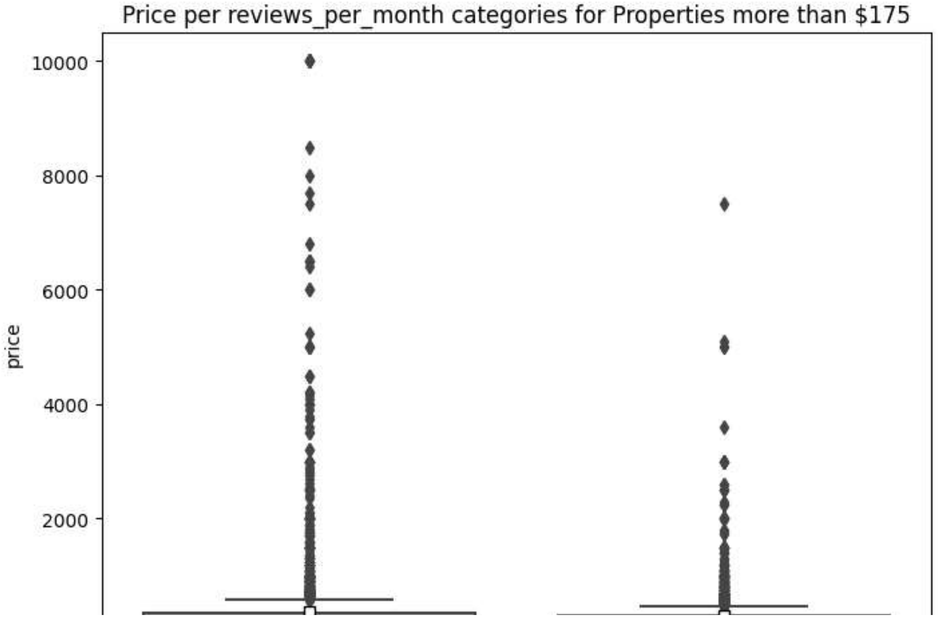
```
x='reviews_per_month'
y='price'

title = 'Price per reviews_per_month categories for Properties under $175'
data_filtered = data_encoded.loc[data_encoded['price'] < 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x=x, y=y, data=data_filtered, notch=True, showmeans=True,
           meanprops={"marker":"s","markerfacecolor":"white", "markeredgecolor":"black"})
plt.title(title)
plt.ioff()

title = 'Price per reviews_per_month categories for Properties more than $175'
data_filtered = data_encoded.loc[data_encoded['price'] > 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x=x, y=y, data=data_filtered, notch=False, showmeans=True,
           meanprops={"marker":"s","markerfacecolor":"white", "markeredgecolor":"black"})
plt.title(title)
plt.ioff()
plt.show()
```


Price per reviews_per_month categories for Properties under $175

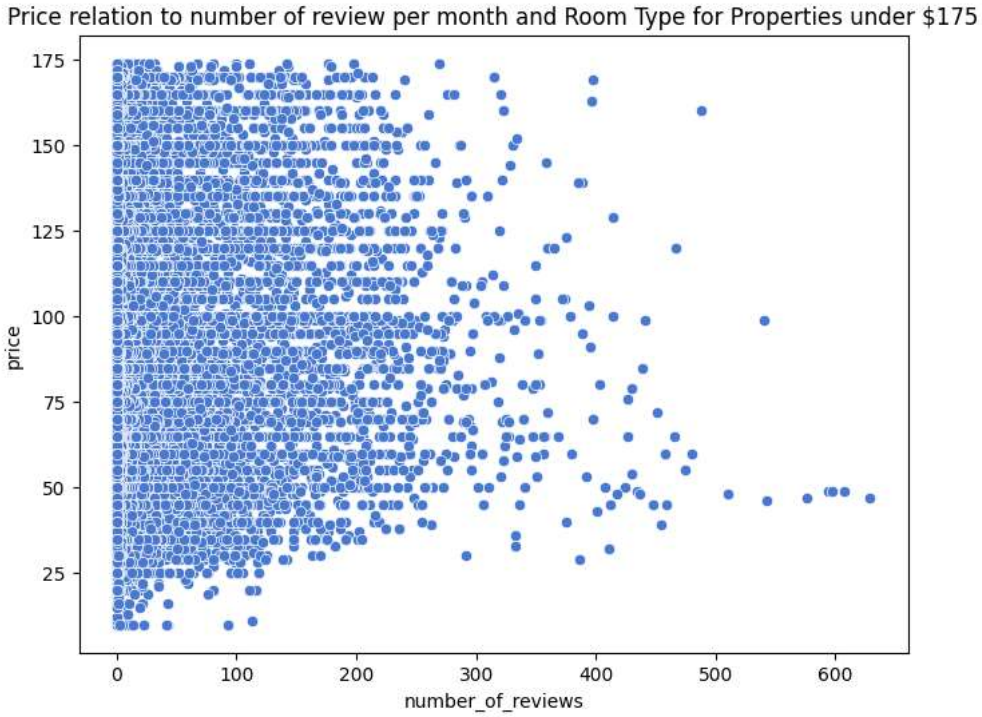

Price per reviews_per_month categories for Properties more than $175

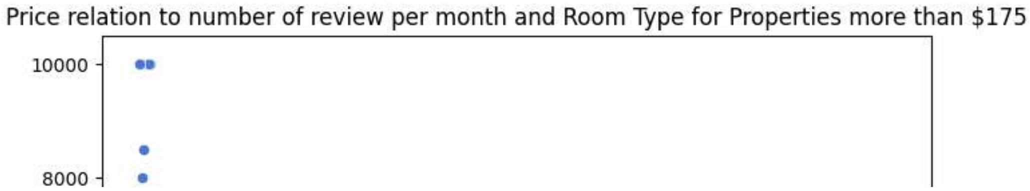

Price per reviews_per_month categories for Properties under $175



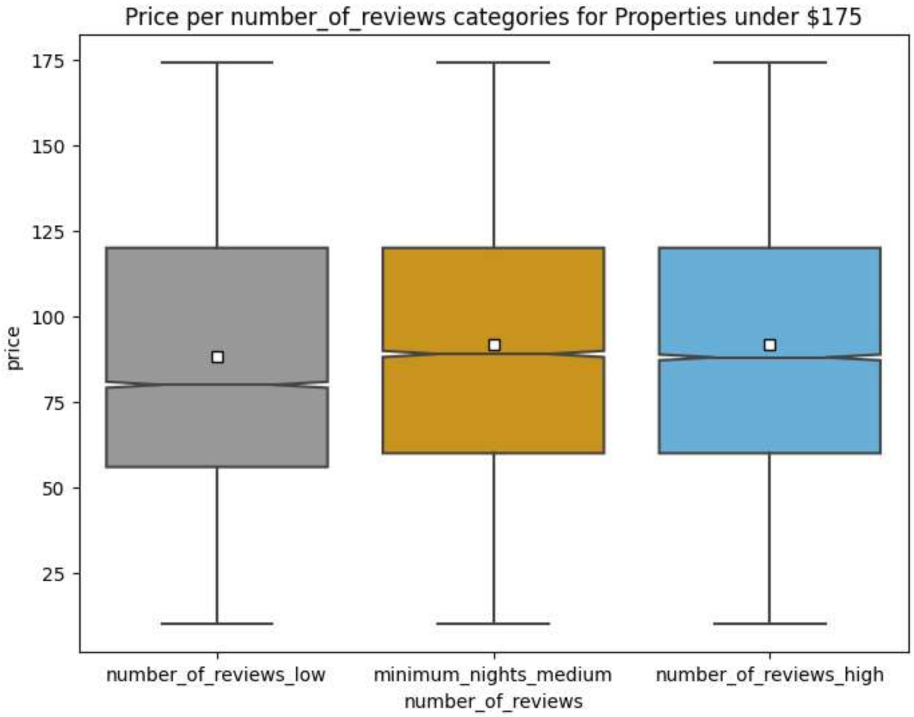


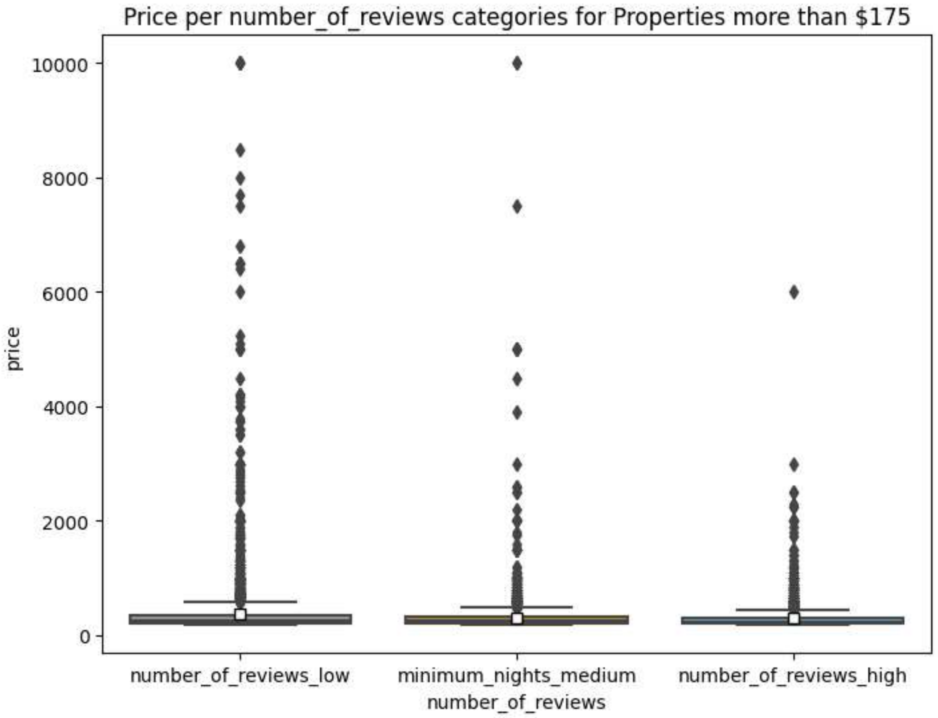
```
sns.set_palette("muted")
x = 'number_of_reviews'
y = 'price'

title = 'Price relation to number of review per month and Room Type for Properties under $175'
data_filtered = data.loc[data['price'] < 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x=x, y=y, data=data_filtered)
plt.title(title)
plt.ioff()

title = 'Price relation to number of review per month and Room Type for Properties more than $175'
data_filtered = data.loc[data['price'] > 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x=x, y=y, data=data_filtered)
plt.title(title)
plt.ioff()
sns.set_palette(cbPalette)
plt.show()
```

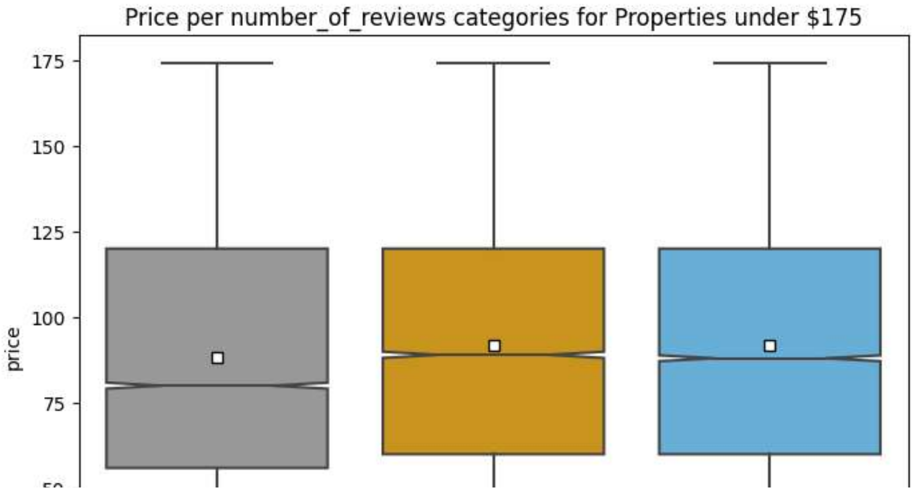


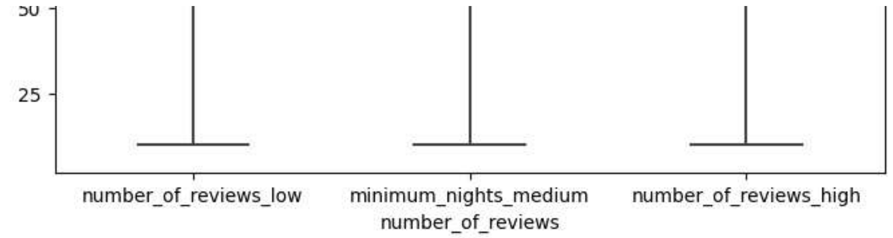


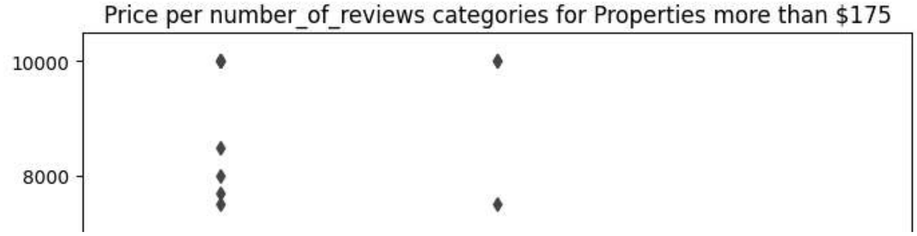
```
x = 'number_of_reviews'
y='price'

title = 'Price per number_of_reviews categories for Properties under $175'
data_filtered = data_encoded.loc[data_encoded['price'] < 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x=x, y=y, data=data_filtered, notch=True, showmeans=True,
           meanprops={"marker":"s","markerfacecolor":"white", "markeredgecolor":"black"})
plt.title(title)
plt.ioff()

title = 'Price per number_of_reviews categories for Properties more than $175'
data_filtered = data_encoded.loc[data_encoded['price'] > 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.boxplot(x=x, y=y, data=data_filtered, notch=False, showmeans=True,
           meanprops={"marker":"s","markerfacecolor":"white", "markeredgecolor":"black"})
plt.title(title)
plt.ioff()
plt.show()
```


Price per number_of_reviews categories for Properties under $175
price
175
150
125
100
75
50
25
number_of_reviews_low
minimum_nights_medium
number_of_reviews_high
number_of_reviews

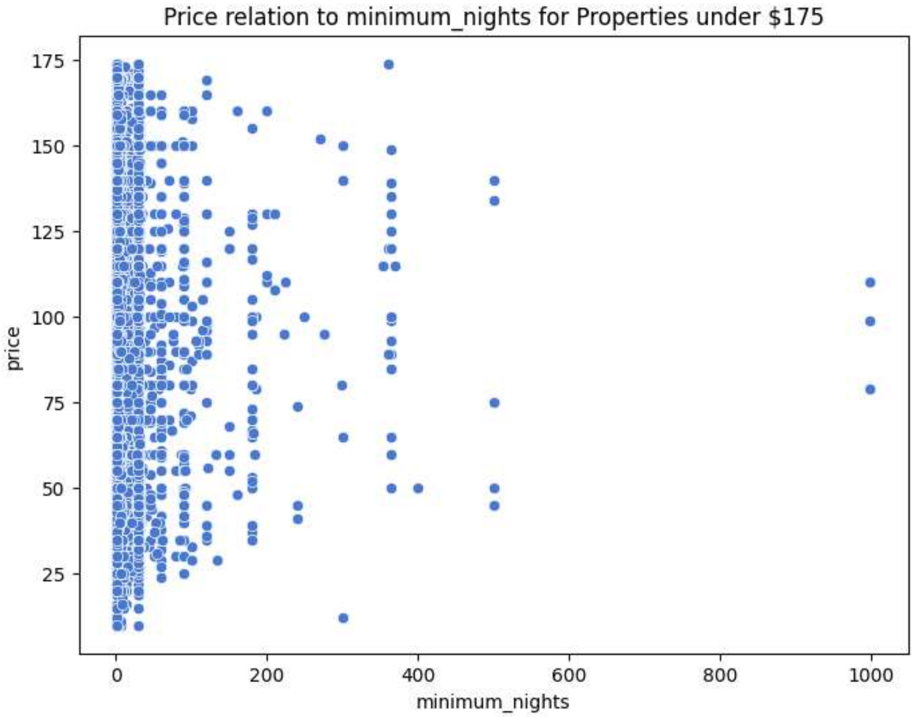

Price per number_of_reviews categories for Properties more than $175
price
10000
8000
6000
4000
2000
0
number_of_reviews_low
minimum_nights_medium
number_of_reviews_high
number_of_reviews

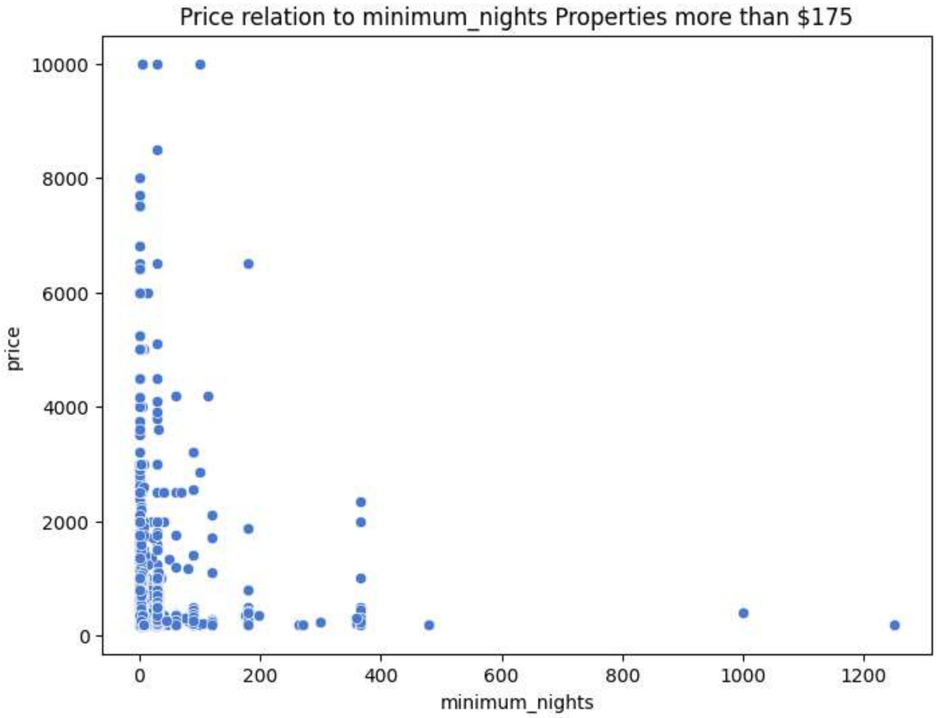

Price per number_of_reviews categories for Properties under $175
price
175
150
125
100
75
50

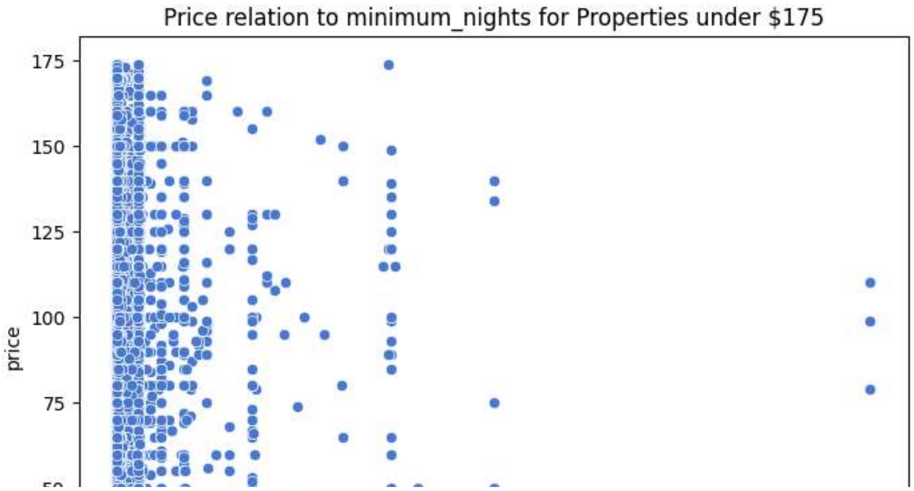




```
sns.set_palette("muted")
x = 'minimum_nights'
y = 'price'

title = 'Price relation to minimum_nights for Properties under $175'
data_filtered = data.loc[data['price'] < 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x=x, y=y, data=data_filtered)
plt.title(title)
plt.ioff()

title = 'Price relation to minimum_nights Properties more than $175'
data_filtered = data.loc[data['price'] > 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x=x, y=y, data=data_filtered)
plt.title(title)
plt.ioff()
sns.set_palette(cbPalette)
plt.show()
```


Price relation to minimum_nights for Properties under $175
price
175
150
125
100
75
50
25
minimum_nights
0
200
400
600
800
1000


Price relation to minimum_nights Properties more than $175
price
10000
8000
6000
4000
2000
0
minimum_nights
0
200
400
600
800
1000
1200


Price relation to minimum_nights for Properties under $175
price
175
150
125
100
75

```
sns.set_palette("muted")
x = 'calculated_host_listings_count'
y = 'price'

title = 'Price relation to calculated_host_listings_count for Properties under $175'
data_filtered = data.loc[data['price'] < 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x=x, y=y, data=data_filtered)
plt.title(title)
plt.ioff()

title = 'Price relation to calculated_host_listings_count for Properties more than $175'
data_filtered = data.loc[data['price'] > 175]
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x=x, y=y, data=data_filtered)
plt.title(title)
plt.ioff()
sns.set_palette(cbPalette)
plt.show()
```