

DATA CLEANING

A Data frame that contains type of houses with thier corressponding Location and Prices in Greater Accra, Ghana

CLEANING THE DATAFRAME

1. Check for missing data in each column
2. Check for duplicates data in each column
3. Check for null values in each column
4. Check and clean each column which has both 'categorical and numeric' data in each column
5. Check for the value count for each column
6. Check how many unique values are in each column
7. Replace mis-splet values values with the correct spellings
8. Present the final data frame

```
In [ ]: import pandas as pd
import numpy as np
```

```
In [ ]: df = pd.read_pickle("apt_data_v1.pkl")
df
```

```
Out[ ]:
```

| | Bedrooms | House Type | Location | Price |
|------|----------|---------------------|--------------------------|------------|
| 0 | 1 | apartment | Adjiringanor | 96497 |
| 1 | 1 | 48 m | 1 1 48 m | 1 1 1 48 m |
| 2 | 1 | apartment | Airport Residential Area | 1045000 |
| 3 | 1 | apartment | Airport Residential Area | 2322000 |
| 4 | 3 | apartment | Airport Residential Area | 4755000 |
| ... | ... | ... | ... | ... |
| 1592 | 3 | apartment | Cantonments | 5108702 |
| 1593 | 4 | apartment | East Legon | 5108702 |
| 1594 | 4 | apartment | West Legon | 3973435 |
| 1595 | 4 | apartment | Lakeside Estate | 1400000 |
| 1596 | 1 | furnished apartment | Shiashie | 845000 |

1597 rows × 4 columns

QUESTION 1. > WHAT IS LOWEST, HIGHEST, MEAN, AND MEDIAN.

QUESTION 2. > FIND OUTLIERS IN THE DATA

In []:

```
In [ ]: print(f"THE NUMBER OF ROWS AND COLUMNS IN THE ENTIRE DATA FRAME ARE {df.shape} RESPECTIVELY")
```

THE NUMBER OF ROWS AND COLUMNS IN THE ENTIRE DATA FRAME ARE (1597, 4) RESPECTIVELY

```
In [ ]: print(f"\nHOW MANY NULL VALUES DO WE HAVE IN THE DATAFRAME:\nNULL VALUES = {df.info()}")
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1597 entries, 0 to 1596
Data columns (total 4 columns):
#   Column      Non-Null Count  Dtype
---  -
0   Bedrooms    1597 non-null   object
1   House Type   1597 non-null   object
2   Location     1597 non-null   object
3   Price        1597 non-null   object
dtypes: object(4)
memory usage: 50.0+ KB
```

HOW MANY NULL VALUES DO WE HAVE IN THE DATAFRAME:
NULL VALUES = None

INVESTIGATING EACH COLUMN

```
In [ ]: ##                                BEDROOM COLUMN CLEANING PROCESS
print(f"Unique values in Bedrooms columns are: {df['Bedrooms'].nunique()} in number")
print(f"\nList the unique values\n{df['Bedrooms'].unique()}")
print(f"\nTotal Unique value count in Bedroom Column are as follow:\n {df['Bedrooms'].value_counts()}")
```

Unique values in Bedrooms columns are: 11 in number

List the unique values
['1' '3' '2' '5' '4' '8' 'F' 'A' '6' '7' '9']

Total Unique value count in Bedroom Column are as follow:

Bedrooms

```
2    518
3    479
1    371
4    123
5     41
A     22
6     19
F     13
8      5
7      4
9      2
```

Name: count, dtype: int64

```
In [ ]: ###We need to take 'F' and 'A' out of the Bedroom Column and replace them with null values
df['Bedrooms'] = df['Bedrooms'].str.replace('F', '')
df['Bedrooms'] = df['Bedrooms'].str.replace('A', '')
print(f"\nList the unique values\n{df['Bedrooms'].unique()}")
```

List the unique values
['1' '3' '2' '5' '4' '8' '' '6' '7' '9']

```
In [ ]: #                                HOUSE TYPE COLUMN CLEANING PROCESS
print(f"Unique values in House Type columns are: {df['House Type'].nunique()} in number")
```

```
print(f"\nList the unique values\n{df['House Type'].unique()}")
print(f"\nTotal Unique value count in House Type Column are as follow:\n {df['House Ty
```

Unique values in House Type columns are: 7 in number

List the unique values

```
[' apartment ' '48 m' ' penthouseapartment ' ' furnished apartment '
 'hed apartment ' 'ent ' '']
```

Total Unique value count in House Type Column are as follow:

| House Type | |
|---------------------|------|
| apartment | 1188 |
| furnished apartment | 369 |
| ent | 21 |
| hed apartment | 13 |
| penthouseapartment | 4 |
| 48 m | 1 |
| | 1 |

Name: count, dtype: int64

```
In [ ]: #Remove '48 m', 'hed apartment ', out of the HOUSE TYPE Column and replace them with a
df['House Type'] = df['House Type'].str.replace('48 m', '')
df['House Type'] = df['House Type'].str.replace(' furnished apartment ', 'furnish apar
df['House Type'] = df['House Type'].str.replace('hed apartment ', 'furnish apartment')

#df['House Type'] = df['House Type'].str.replace('ent ', '')

print(f"\nList the unique values\n{df['House Type'].unique()}")
```

List the unique values

```
[' apartment ' ' ' penthouseapartment ' 'furnish apartment' 'ent ']
```

```
In [ ]: print(f"\nTotal Unique value count in House Type Column are as follow:\n {df['House Ty

Total Unique value count in House Type Column are as follow:
House Type
apartment          1188
furnish apartment   382
ent                 21
penthouseapartment   4
                    2
Name: count, dtype: int64
```

```
In [ ]: # LOCATION COLUMN CLEANING PROCESS
print(f"Unique values in Location columns are: {df['Location'].nunique()} in number")
print(f"\nList the unique values\n{df['Location'].unique()}")
```

Unique values in Location columns are: 308 in number

List the unique values

```
[ 'Adjiringanor' '1 1 48 m' 'Airport Residential Area'
'Airport Residential' 'Sakumono' 'Cantonments' 'Osu' 'Ridge Osu'
'Oyarifa' 'Tse Addo' 'East Legon' 'Borteyman, Accra' 'Achimota' 'Labone'
'Cantoments' 'Adenta' 'Shaishie' 'Spintex' 'Airport City' 'Dansoman'
'North Dzorwulu' 'Dubai' 'Airport Area'
'Kass Towers Airport Residential ( USD' 'West hills' 'Ridge'
'North Ridge' 'East Airport ( Palace Mall )' 'Ashaley Botwe'
'East Legon Hills' 'North Legon' 'Airport West' 'SPINTEX' 'Dzorwulu'
'Airport Residential area. Kass tower. An individual seller.' 'Shiashie'
'Ashongman' 'Cantonments, Accra, Greater Accra' 'Airport' 'Abelemkpe'
'Ridge Road' 'Airport, chanise development lane' 'ridge'
'chanise development lane' 'Roman Ridge' 'Abelemkpe, off aquatec lane'
'Accra' 'Cantonments' 'East Legon shiashie' 'Cantonments Embassy Gardens'
'Labone coffee shop' 'Airport Road' 'Cantonments Labone'
'Kwashieman Santa Maria' 'West legon west land' 'Dawhenya'
'off president kuffour street' 'Spintex- regymanuel'
'Cantonments, off the USA embassy' 'west Airport' 'Airport Rd'
'Clifton Home' 'Tranquil Nyaniba Estate' 'Adenta Frafraha' 'Lashibi'
'airport residential' 'Spintex Road' 'Tsado' 'Sakumono (Lashibi)'
'East Legon (Mimpeasem)' 'Amasaman Kuntunse' 'Tema' 'Spintex Adegon'
'Nsawam' 'West Legon' 'Nungua' 'Abokobi'
' bedroom furnished apartment for sale' 'Ayi Mensah' 'South Airport'
'East Legon Trassaco Valley' 'East Airport' 'cantonments' 'Labadi'
'Greater Accra Region' 'oyarifa' 'Sakomono' 'Odorkor' 'Tema Community 25'
'Afienea' 'Big Adan Private island' 'Big Adan private island'
'Big Adan private Island' 'Borteyman Estate' 'awudome estate' 'TESADDO'
'East Airport TesAdo' 'Osu Oxford street' 'Kwabanya' 'Spintex road'
'Pantang' 'osu' 'East Legon Bawaleshi' 'Spintex manet' 'Accra balashi'
'Tema community 25' 'TSEADDO' 'Bawaleshi' 'Spintex Ecobank Road'
'Sointex' 'Spintex Manet' 'East Legon Gh L' 'East Legon Adjiriganor'
'Spintex Community 17' 'TesAddo' 'Airport Residential area.'
'East Legon American house' 'Atimatim-Edwenase, Kumasi'
'Tsopoli -Beautiful Estate plots available' 'Tesano' 'Oyibi' 'Lakeside'
'East Legon Adjirnganor' 'Dowanya community 25' 'Fumesua'
'Kodie Bowire-Kumasi' 'Ablekuma' 'Taifa' 'Maakro' 'Ofankor Barrier'
'North Kaneshie' 'Takoradi' 'Madina' 'Ada' 'Old Ashongman'
'Ngleshie Amanfro' 'Westlands' 'Weija' 'East Cantonments'
'East Legon-Shiashie' 'Independence Ave' 'Haatso'
'Teshie completion BY SEPT 2023' 'Teshie' 'Asylum Down' 'Apolonia City'
'Cantonments Road' 'Tantra' 'Cantonment' '- Accra - Sakumono' 'Kasoa'
'Airport Reseidential' 'Shaishi' 'Amrahia' 'Labone estates'
'Lakeside Estate' 'East legon' 'North legon'
'Dzorwulu, Accra, Greater Accra' 'East Legon ogbojo'
'Westhills Hall Mall Weija (Newly Built)' 'Adenta Sakora'
'OSU, BRAVIA RESIDENCY 1& 2 BEDROOM APARTMENTS' 'Batsona- Spintex'
'community 6 lakeside Estate' 'Ofankor' 'Pokuase' 'Sakumono estate'
'Ringway Estate, Osu, Accra 10 off' 'East Legon Adjringanor'
'East legon Adjringanor' 'TSOPOLI FANTABULOUS LANDS Ne' 'Downtown Dubai'
'Liberation Road' 'Nyaniba Estates Osu' 'Airport Hills' 'West Hills Mall'
'Osu, Accra' 'Cantonments - Duplex' 'Haatso-Atomic Rd' 'Amasaman'
'Ring Road' 'East Legon,ARS' 'East Legon Shiashie'
'East Legon in Clifton Shaishie (Rent/Sale)' 'Buduburam' 'Dzowulo'
'Tetteh Quashie'
'4bedroom mansion with pool for sale at East Legon Ogbojo 430,000'
'East legon shiashie' 'Cantonments,Accra' 'Shiashi' 'Dzorwulu, Accra'
'Kanda' 'Oyarifa Rd Close to the MAIN ROAD with a maiden's quarters'
'Aburi' 'Klagon' 'Nyaniba Estates' 'Airport residential' 'Kwabanya for'
```

'Oyibi Valley View University area' 'East Legon Adjiriganor for USD'
 'Burj Khalifa District downtown, Dubai' 'Trasacco Valley'
 'Dansoman ssnit flat' 'East Legon, Accra, Greater Accra'
 'East Legon Okponglo' 'Adenta Pantang Road' 'Agbogba' 'Lakeside Nsuonano'
 'Spintex Batsonaa' 'Nanakrom Estate, close to ridge view gardens'
 'Villagio' 'Shiashie, Signature' 'Amasaman-Dobro' 'East legon-Shaishie'
 'Tantra yellow house' 'Demarcated land for sale'
 'East legon Lagos Avenue' 'East Legon Lagos Avenue' 'RIDGE'
 'West Trasacco' 'Lakeside community' 'New Legon' 'Oyarifa/Ghana Flag'
 'Ashaiman Gbestile station' 'Appolonia' 'Community 25'
 'East Dzorzulu Vilagio' 'bedroom apartment for sale'
 'Spintex, Greda Estate' 'Shiashie-East Legon' 'EAST LEGON OGBOJO' 'OSU'
 'Westland' 'Achimota Road'
 'Ningo Prampram- Titled Estate Land with class'
 'Ningo Prampram - Well demarcated site with good roads.' 'Prampram'
 'OSU Oxford Street Studio and one bedroom apartments 2years payment plan'
 'Ashongman Estates' 'Borteyman (Off Tema Motorway)'
 'Airport Residential Area, Accra' 'Community Eighteen'
 'West Legon 16 units in 2 bedrooms are 13 units & 3 bedrooms are 3 units FULLY F'
 'Airport Residential area' 'Trasacco' ' ' 'TSE ADDO' 'Libration Road'
 'Eastlegon' 'East legon Adjiringano' 'Kaneshie' 'Burma Hills'
 'Adjiringanor Road' 'MATAHEKO/YERGOLA' 'Ningo Prampram, DWELLYS COURT'
 'Cantoment' 'New Dawhenya' 'AIRPORT' 'East legon Shiashi' 'Oyarifa Rd'
 'Sakumono Newly Built' 'Nungua Behind GCB Training Centre'
 'Airport Hills Swimming Pool Penthouse'
 'North Legon 0.50 Acres Plot Size' 'Malejor off the DODOWA Road' 'labone'
 'Batsona' 'Kokrobite' 'ABLAJIE (AGBOGBA)' 'Sapeiman' 'Sekondi'
 'Ningo Prampram' 'Prampram Junction' 'SAPEIMAN' 'Anyaa' 'Atomic Down'
 'Kisseman' 'East legon Ivy' 'Tema Comm 25 palace Mall' 'East LEGON hills'
 'Cantonments,' 'Community 22' 'Tema Community 20' 'Osu ringway estate'
 'Teshie Manet agbliza' 'Tantra Hills' 'La' 'Brown Link'
 'Ring Road Central' 'Madina Estate' 'Kumasi'
 '2Bedroom apartment for sale Eastlegon'
 '2bedrooms furnish apartment for sale at Eastlegon' 'Eastlegon hills'
 'East' 'Dome' 'Ablorman' 'TEMA' 'Tsopoli -Airport city'
 'Airport city -Tsopoli'
 '3RD BUADE CLOSE TO MARANATA CHURCH, ADDOGONO NUNGUA @ SPINTEX'
 'Paraku Estates' 'CFC Estates' 'Adent SNNIT' 'East Legon, American house'
 '3']

```
In [ ]: print(f"\nTotal Unique value count in Location Column are as follow:\n {df['Location']
```

Total Unique value count in Location Column are as follow:

| Location | |
|-----------------------------------|-----|
| East Legon | 226 |
| Cantonments | 213 |
| Airport Residential Area | 162 |
| Labone | 63 |
| Airport Area | 41 |
| Osu | 38 |
| Spintex | 35 |
| Adjiringanor | 31 |
| Airport Residential | 30 |
| Sakumono | 26 |
| Tse Addo | 26 |
| Oyarifa | 24 |
| Airport | 22 |
| Dzorwulu | 19 |
| Airport West | 18 |
| Ridge | 18 |
| Cantonments, Accra, Greater Accra | 18 |
| East Legon Hills | 17 |
| Tema | 14 |
| North Ridge | 13 |
| Lakeside Estate | 12 |
| East Airport | 12 |
| ridge | 12 |
| Roman Ridge | 11 |
| Achimota | 11 |
| Abelemkpe | 11 |
| East legon | 11 |
| Nungua | 10 |
| Adenta | 10 |
| West Legon | 10 |
| Kwabanya | 9 |
| Dzorwulu, Accra, Greater Accra | 9 |
| North Legon | 9 |
| Dansoman | 9 |
| Shiashie | 8 |
| Kanda | 8 |
| East Cantonments | 7 |
| Eastlegon | 6 |
| Ridge Road | 5 |
| Ablekuma | 5 |
| East Legon, Accra, Greater Accra | 5 |
| Airport Rd | 4 |
| Ofankor | 4 |
| Lashibi | 4 |
| Weiija | 4 |
| Airport Reseidential | 4 |
| Airport Hills | 4 |
| Spintex Road | 4 |
| Madina | 4 |
| Tesano | 4 |
| Airport City | 4 |
| Old Ashongman | 3 |
| Ningo Prampram | 3 |
| Dubai | 3 |
| Cantonment | 3 |
| Haatso | 3 |
| Ashaley Botwe | 3 |
| Ashongman | 3 |

| | |
|-----------|---|
| Westlands | 3 |
| Pokuase | 3 |

Name: count, dtype: int64

```
In [ ]: print(f"\nTotal Unique value count from bottom in the Location Column are as follow:\n")
```

Total Unique value count from bottom in the Location Column are as follow:

| | |
|--|---|
| Location | |
| Bawaleshi | 1 |
| Spintex Ecobank Road | 1 |
| Sointex | 1 |
| Spintex Manet | 1 |
| East Legon Gh L | 1 |
| Teshie completion BY SEPT 2023 | 1 |
| Tsado | 1 |
| Asylum Down | 1 |
| Downtown Dubai | 1 |
| Nyaniba Estates Osu | 1 |
| Kwashieman Santa Maria | 1 |
| West Hills Mall | 1 |
| Osu, Accra | 1 |
| Cantonments - Duplex | 1 |
| Haatso-Atomic Rd | 1 |
| Amasaman | 1 |
| Ring Road | 1 |
| East Legon,ARS | 1 |
| East Legon Shiashie | 1 |
| East Legon in Clifton Shaishie (Rent/Sale) | 1 |
| Buduburam | 1 |
| Dzowulo | 1 |
| Cantonments Labone | 1 |
| 4bedroom mansion with pool for sale at East Legon Ogbojo 430,000 | 1 |
| East legon shiashie | 1 |
| Cantonments,Accra | 1 |
| Shiashi | 1 |
| Dzorwulu, Accra | 1 |
| Oyarifa Rd Close to the MAIN ROAD with a maiden's quarters | 1 |
| Aburi | 1 |
| Sakomono | 1 |
| Nyaniba Estates | 1 |
| Liberation Road | 1 |
| TSOPOLI FANTABULOUS LANDS Ne | 1 |
| Apolonia City | 1 |
| East legon Adjringanor | 1 |
| Cantonments Road | 1 |
| airport residential | 1 |
| Adenta Frafraha | 1 |
| - Accra - Sakumono | 1 |
| Tranquil Nyaniba Estate | 1 |
| Clifton Home | 1 |
| Shaishi | 1 |
| west Airport | 1 |
| 1 1 48 m | 1 |
| Cantonments, off the USA embassy | 1 |
| Spintex- regymanuel | 1 |
| North legon | 1 |
| East Legon ogbojo | 1 |
| Westhills Hall Mall WeiJa (Newly Built) | 1 |
| Adenta Sakora | 1 |
| OSU, BRAVIA RESIDENCY 1& 2 BEDROOM APARTMENTS | 1 |
| Batsona- Spintex | 1 |
| community 6 lakeside Estate | 1 |
| Dawhenya | 1 |
| West legon west land | 1 |
| Sakumono estate | 1 |
| Ringway Estate, Osu, Accra 10 off | 1 |

East Legon Adjiringanor

1

Labone estates

1

Name: count, dtype: int64

```
In [ ]: df = df.rename(columns={'Location': 'Location/ Suburb'})
df
```

```
Out [ ]:
```

| | Bedrooms | House Type | Location/ Suburb | Price |
|------|----------|-------------------|--------------------------|---------|
| 0 | 1 | apartment | Adjiringanor | 96497 |
| 1 | 1 | | 1 1 48 m 1 1 1 48 m | |
| 2 | 1 | apartment | Airport Residential Area | 1045000 |
| 3 | 1 | apartment | Airport Residential Area | 2322000 |
| 4 | 3 | apartment | Airport Residential Area | 4755000 |
| ... | ... | ... | ... | ... |
| 1592 | 3 | apartment | Cantonments | 5108702 |
| 1593 | 4 | apartment | East Legon | 5108702 |
| 1594 | 4 | apartment | West Legon | 3973435 |
| 1595 | 4 | apartment | Lakeside Estate | 1400000 |
| 1596 | 1 | furnish apartment | Shiashie | 845000 |

1597 rows × 4 columns

```
In [ ]: # Replace duplicates with appropriate values

# Create a new column 'Main Location' based on conditions
df['Main Location'] = ''
df.loc[df['Location/ Suburb'].str.contains('East Legon'), 'Main Location'] = 'East Legon'
df.loc[df['Location/ Suburb'].str.contains('Cantonments'), 'Main Location'] = 'Cantonments'
df.loc[df['Location/ Suburb'].str.contains('Cantoments'), 'Main Location'] = 'Cantonments'
df.loc[df['Location/ Suburb'].str.contains('Airport'), 'Main Location'] = 'Airport Residential Area'
df.loc[df['Location/ Suburb'].str.contains('Labone'), 'Main Location'] = 'Labone'
df.loc[df['Location/ Suburb'].str.contains('Osu'), 'Main Location'] = 'Osu'
df.loc[df['Location/ Suburb'].str.contains('Sakumono'), 'Main Location'] = 'Sakumono'
df.loc[df['Location/ Suburb'].str.contains('Tsado'), 'Main Location'] = 'Tse Addo'
df.loc[df['Location/ Suburb'].str.contains('Tse Addo'), 'Main Location'] = 'Tse Addo'
df.loc[df['Location/ Suburb'].str.contains('Haatso-Atomic'), 'Main Location'] = 'Haatso'
df.loc[df['Location/ Suburb'].str.contains('ridge'), 'Main Location'] = 'Ridge'
df.loc[df['Location/ Suburb'].str.contains('Adjiringanor'), 'Main Location'] = 'East Legon'
df.loc[df['Location/ Suburb'].str.contains('Tema'), 'Main Location'] = 'Tema'
df.loc[df['Location/ Suburb'].str.contains('Lakeside Estate'), 'Main Location'] = 'East Legon'
df.loc[df['Location/ Suburb'].str.contains('Dzowulo'), 'Main Location'] = 'Dzorwulu'
df.loc[df['Location/ Suburb'].str.contains('Sointex'), 'Main Location'] = 'Spintex'
df.loc[df['Location/ Suburb'].str.contains('Spintex Manet'), 'Main Location'] = 'Spintex'
df.loc[df['Location/ Suburb'].str.contains('Bawaleshi'), 'Main Location'] = 'East Legon'
df.loc[df['Location/ Suburb'].str.contains('Westlands'), 'Main Location'] = 'Haatso'
df.loc[df['Location/ Suburb'].str.contains('West Legon'), 'Main Location'] = 'Haatso'
df.loc[df['Location/ Suburb'].str.contains('Shaishie'), 'Main Location'] = 'East Legon'
df.loc[df['Location/ Suburb'].str.contains('Shiashie'), 'Main Location'] = 'East Legon'
df.loc[df['Location/ Suburb'].str.contains('Achimota'), 'Main Location'] = 'Achimota'
```

```
df.loc[df['Location/ Suburb'].str.contains('Oyarifa'), 'Main Location'] = 'Oyarifa'
df.loc[df['Location/ Suburb'].str.contains('Adenta'), 'Main Location'] = 'Adenta'
df.loc[df['Location/ Suburb'].str.contains('Dansoman'), 'Main Location'] = 'Dansoman'
df.loc[df['Location/ Suburb'].str.contains('Dubai'), 'Main Location'] = ''
df.loc[df['Location/ Suburb'].str.contains('North Dzorwulu'), 'Main Location'] = 'Dzorwulu'
df.loc[df['Location/ Suburb'].str.contains('Borteyman'), 'Main Location'] = 'Teshie'

df.loc[df['Location/ Suburb'].str.contains('Lake side') | df['Location/ Suburb'].str.c
```

```
In [ ]: #print(f"\nTotal Unique value count in Location Column are as follow:\n {df['Location']
df.head(60)
```

Out[]:

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|----|----------|--------------------|--------------------------|------------|---------------------|
| 0 | 1 | apartment | Adjiringanor | 96497 | East Legon |
| 1 | 1 | | 1 1 48 m | 1 1 1 48 m | |
| 2 | 1 | apartment | Airport Residential Area | 1045000 | Airport Residential |
| 3 | 1 | apartment | Airport Residential Area | 2322000 | Airport Residential |
| 4 | 3 | apartment | Airport Residential Area | 4755000 | Airport Residential |
| 5 | 1 | apartment | Airport Residential Area | 2015000 | Airport Residential |
| 6 | 1 | apartment | Airport Residential Area | 960000 | Airport Residential |
| 7 | 1 | apartment | Airport Residential Area | 1380000 | Airport Residential |
| 8 | 3 | apartment | Airport Residential Area | 4765000 | Airport Residential |
| 9 | 3 | penthouseapartment | Airport Residential Area | 6850000 | Airport Residential |
| 10 | 3 | apartment | Airport Residential Area | 3845000 | Airport Residential |
| 11 | 1 | apartment | Airport Residential | 1509337 | Airport Residential |
| 12 | 3 | apartment | Sakumono | 1419084 | Sakumono |
| 13 | 1 | apartment | Cantonments | 1889000 | Cantonments |
| 14 | 2 | apartment | Cantonments | 2870000 | Cantonments |
| 15 | 1 | furnish apartment | Osu | 1135267 | Osu |
| 16 | 1 | apartment | Airport Residential Area | 935000 | Airport Residential |
| 17 | 3 | apartment | Airport Residential Area | 4790000 | Airport Residential |
| 18 | 1 | apartment | Airport Residential Area | 1566101 | Airport Residential |
| 19 | 1 | apartment | Airport Residential Area | 2215000 | Airport Residential |
| 20 | 1 | furnish apartment | Ridge Osu | 1112562 | Osu |
| 21 | 1 | apartment | Oyarifa | 576000 | Oyarifa |
| 22 | 3 | apartment | Cantonments | 4541068 | Cantonments |
| 23 | 2 | apartment | Airport Residential | 2115002 | Airport Residential |
| 24 | 1 | furnish apartment | Tse Addo | 1040000 | Tse Addo |

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|----|----------|--------------------|--------------------------|------------------------------|---------------------|
| 25 | 1 | furnish apartment | East Legon | 1316910 | East Legon |
| 26 | 1 | apartment | Airport Residential Area | 1955000 | Airport Residential |
| 27 | 1 | apartment | Borteyman, Accra | 260000 | Teshie |
| 28 | 3 | furnish apartment | Achimota | 3405801 | Achimota |
| 29 | 3 | apartment | Airport Residential Area | 8050000 | Airport Residential |
| 30 | 2 | apartment | Labone | 2667500 | Labone |
| 31 | 3 | penthouseapartment | Labone | 4345000 | Labone |
| 32 | 3 | furnish apartment | Airport Residential Area | 4541068 | Airport Residential |
| 33 | 2 | apartment | Airport Residential | 2405600 | Airport Residential |
| 34 | 1 | apartment | Osu | 1702901 | Osu |
| 35 | 1 | apartment | Airport Residential Area | 953057 | Airport Residential |
| 36 | 1 | apartment | Cantonments | 1759664 | Cantonments |
| 37 | 1 | apartment | Cantonments | 2043481 | Cantonments |
| 38 | 3 | apartment | Airport Residential Area | 5108702 | Airport Residential |
| 39 | 2 | apartment | Cantoments | 3292274 | Cantonments |
| 40 | 2 | apartment | Adenta | 681160 | Adenta |
| 41 | 1 | furnish apartment | Shaishie | 1135267 | East Legon |
| 42 | 3 | apartment | Spintex | 2645000 | |
| 43 | 3 | apartment | Airport City | 6300000 | Airport Residential |
| 44 | 3 | furnish apartment | Dansoman | 8000000 | Dansoman |
| 45 | 2 | apartment | North Dzorwulu | 3360000 | Dzorwulu |
| 46 | 1 | apartment | Dubai | 885508 | |
| 47 | 2 | apartment | Airport Residential Area | 2595000 | Airport Residential |
| 48 | 3 | apartment | Airport Residential | 2240000 | Airport Residential |
| 49 | 3 | apartment | Cantonments | [Price disclosed on request] | Cantonments |
| 50 | 3 | apartment | Airport Residential Area | [Price disclosed on request] | Airport Residential |
| 51 | 1 | apartment | Osu | 1850485 | Osu |

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|----|----------|-------------------|---------------------------------------|---------|---------------------|
| 52 | 2 | apartment | Tse Addo | 2043481 | Tse Addo |
| 53 | 5 | apartment | East Legon | 5676335 | East Legon |
| 54 | 1 | apartment | Labone | 1512500 | Labone |
| 55 | 2 | furnish apartment | East Legon | 2100244 | East Legon |
| 56 | 3 | apartment | East Legon | 2951694 | East Legon |
| 57 | 3 | apartment | Airport Area | 6960000 | Airport Residential |
| 58 | 2 | furnish apartment | East Legon | 16800 | East Legon |
| 59 | 3 | apartment | Kass Towers Airport Residential (USD | 5960152 | Airport Residential |

```
In [ ]: df['Location/ Suburb'] = df['Location/ Suburb'].str.replace('1 1 48 m', 'NaN')
```

```
In [ ]: # PRICE COLUMN CLEANING PROCESS
df['Price'].nunique()
```

```
Out[ ]: 864
```

```
In [ ]: df['Price'] = df['Price'].str.replace('1 1 1 48 m', 'NaN')
```

```
In [ ]: df['Price'] = df['Price'].str.replace('NaN', "")
df['Price'] = df['Price'].str.replace('[Price disclosed on request]', "")
```

```
In [ ]: for x in df.index:
        if df.loc[x, 'Price'] == "":
            df.drop(x, inplace=True)
df
```

Out[]:

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|------|----------|-------------------|--------------------------|---------|---------------------|
| 0 | 1 | apartment | Adjiringanor | 96497 | East Legon |
| 2 | 1 | apartment | Airport Residential Area | 1045000 | Airport Residential |
| 3 | 1 | apartment | Airport Residential Area | 2322000 | Airport Residential |
| 4 | 3 | apartment | Airport Residential Area | 4755000 | Airport Residential |
| 5 | 1 | apartment | Airport Residential Area | 2015000 | Airport Residential |
| ... | ... | ... | ... | ... | ... |
| 1592 | 3 | apartment | Cantonments | 5108702 | Cantonments |
| 1593 | 4 | apartment | East Legon | 5108702 | East Legon |
| 1594 | 4 | apartment | West Legon | 3973435 | Haatso |
| 1595 | 4 | apartment | Lakeside Estate | 1400000 | East Legon Hills |
| 1596 | 1 | furnish apartment | Shiashie | 845000 | East Legon |

1578 rows × 5 columns

In []:

```
for x in df.index:
    if df.loc[x, 'Bedrooms'] == "":
        df.drop(x, inplace=True)
df
```

Out[]:

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|------|----------|-------------------|--------------------------|---------|---------------------|
| 0 | 1 | apartment | Adjiringanor | 96497 | East Legon |
| 2 | 1 | apartment | Airport Residential Area | 1045000 | Airport Residential |
| 3 | 1 | apartment | Airport Residential Area | 2322000 | Airport Residential |
| 4 | 3 | apartment | Airport Residential Area | 4755000 | Airport Residential |
| 5 | 1 | apartment | Airport Residential Area | 2015000 | Airport Residential |
| ... | ... | ... | ... | ... | ... |
| 1592 | 3 | apartment | Cantonments | 5108702 | Cantonments |
| 1593 | 4 | apartment | East Legon | 5108702 | East Legon |
| 1594 | 4 | apartment | West Legon | 3973435 | Haatso |
| 1595 | 4 | apartment | Lakeside Estate | 1400000 | East Legon Hills |
| 1596 | 1 | furnish apartment | Shiashie | 845000 | East Legon |

1546 rows × 5 columns

In []:

df

Out[]:

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|------|----------|-------------------|--------------------------|---------|---------------------|
| 0 | 1 | apartment | Adjiringanor | 96497 | East Legon |
| 2 | 1 | apartment | Airport Residential Area | 1045000 | Airport Residential |
| 3 | 1 | apartment | Airport Residential Area | 2322000 | Airport Residential |
| 4 | 3 | apartment | Airport Residential Area | 4755000 | Airport Residential |
| 5 | 1 | apartment | Airport Residential Area | 2015000 | Airport Residential |
| ... | ... | ... | ... | ... | ... |
| 1592 | 3 | apartment | Cantonments | 5108702 | Cantonments |
| 1593 | 4 | apartment | East Legon | 5108702 | East Legon |
| 1594 | 4 | apartment | West Legon | 3973435 | Haatso |
| 1595 | 4 | apartment | Lakeside Estate | 1400000 | East Legon Hills |
| 1596 | 1 | furnish apartment | Shiashie | 845000 | East Legon |

1546 rows × 5 columns

In []: `df['Price'] = pd.to_numeric(df['Price'], errors='coerce', downcast='integer')`In []: `df = df.reset_index(drop=True)`
df

Out[]:

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|------|----------|-------------------|--------------------------|---------|---------------------|
| 0 | 1 | apartment | Adjiringanor | 96497 | East Legon |
| 1 | 1 | apartment | Airport Residential Area | 1045000 | Airport Residential |
| 2 | 1 | apartment | Airport Residential Area | 2322000 | Airport Residential |
| 3 | 3 | apartment | Airport Residential Area | 4755000 | Airport Residential |
| 4 | 1 | apartment | Airport Residential Area | 2015000 | Airport Residential |
| ... | ... | ... | ... | ... | ... |
| 1541 | 3 | apartment | Cantonments | 5108702 | Cantonments |
| 1542 | 4 | apartment | East Legon | 5108702 | East Legon |
| 1543 | 4 | apartment | West Legon | 3973435 | Haatso |
| 1544 | 4 | apartment | Lakeside Estate | 1400000 | East Legon Hills |
| 1545 | 1 | furnish apartment | Shiashie | 845000 | East Legon |

1546 rows × 5 columns

In []: `df['Price'].describe()`

```
Out[ ]: count    1.546000e+03
mean      4.760119e+06
std       2.788969e+07
min       1.700000e+03
25%       1.421813e+06
50%       2.340000e+06
75%       3.956722e+06
max       9.999800e+08
Name: Price, dtype: float64
```

```
In [ ]: IQR = df['Price'].quantile(0.75) - df['Price'].quantile(0.25)
print("The inter quantile range for the price column is", IQR)
```

The inter quantile range for the price column is 2534908.5

```
In [ ]: low_outlier = df['Price'].quantile(0.25) - 1.5 * IQR
print("The low outlier for price is", low_outlier)
```

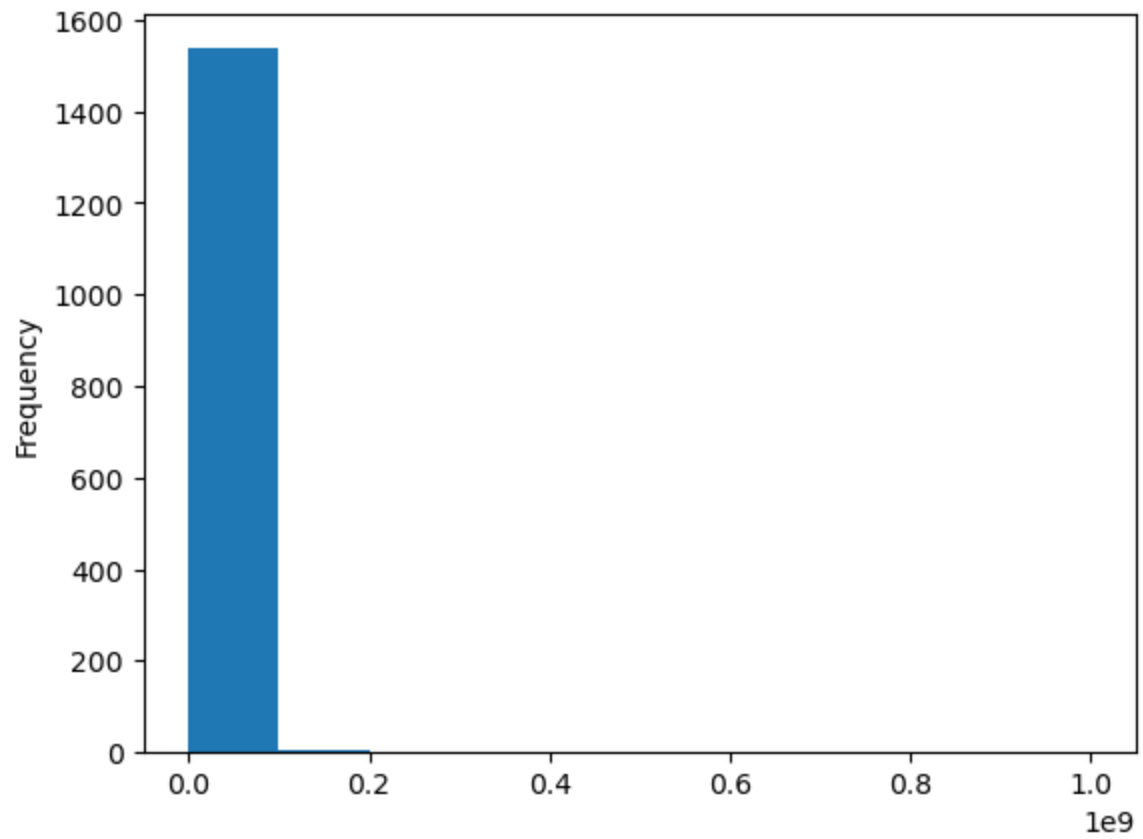
The low outlier for price is -2380549.75

```
In [ ]: high_outlier = df['Price'].quantile(0.75) + 1.5 * IQR
print("The high outlier for the price column is", high_outlier)
```

The high outlier for the price column is 7759084.25

```
In [ ]: if df['Price'].empty:
        print("empty.")
    else:
        if df['Price'].nunique() > 10:
            df['Price'].plot(kind='hist')
            print("THIS IS A HISTOGRAM")
        else:
            df['Price'].value_counts().sort_index().plot(kind='bar')
            print("THIS IS A BAR GRAPH")
```

THIS IS A HISTOGRAM



```
In [ ]: df.head(60)
```

Out[]:

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|----|----------|--------------------|--------------------------|---------|---------------------|
| 0 | 1 | apartment | Adjiringanor | 96497 | East Legon |
| 1 | 1 | apartment | Airport Residential Area | 1045000 | Airport Residential |
| 2 | 1 | apartment | Airport Residential Area | 2322000 | Airport Residential |
| 3 | 3 | apartment | Airport Residential Area | 4755000 | Airport Residential |
| 4 | 1 | apartment | Airport Residential Area | 2015000 | Airport Residential |
| 5 | 1 | apartment | Airport Residential Area | 960000 | Airport Residential |
| 6 | 1 | apartment | Airport Residential Area | 1380000 | Airport Residential |
| 7 | 3 | apartment | Airport Residential Area | 4765000 | Airport Residential |
| 8 | 3 | penthouseapartment | Airport Residential Area | 6850000 | Airport Residential |
| 9 | 3 | apartment | Airport Residential Area | 3845000 | Airport Residential |
| 10 | 1 | apartment | Airport Residential | 1509337 | Airport Residential |
| 11 | 3 | apartment | Sakumono | 1419084 | Sakumono |
| 12 | 1 | apartment | Cantonments | 1889000 | Cantonments |
| 13 | 2 | apartment | Cantonments | 2870000 | Cantonments |
| 14 | 1 | furnish apartment | Osu | 1135267 | Osu |
| 15 | 1 | apartment | Airport Residential Area | 935000 | Airport Residential |
| 16 | 3 | apartment | Airport Residential Area | 4790000 | Airport Residential |
| 17 | 1 | apartment | Airport Residential Area | 1566101 | Airport Residential |
| 18 | 1 | apartment | Airport Residential Area | 2215000 | Airport Residential |
| 19 | 1 | furnish apartment | Ridge Osu | 1112562 | Osu |
| 20 | 1 | apartment | Oyarifa | 576000 | Oyarifa |
| 21 | 3 | apartment | Cantonments | 4541068 | Cantonments |
| 22 | 2 | apartment | Airport Residential | 2115002 | Airport Residential |
| 23 | 1 | furnish apartment | Tse Addo | 1040000 | Tse Addo |
| 24 | 1 | furnish apartment | East Legon | 1316910 | East Legon |
| 25 | 1 | apartment | Airport Residential Area | 1955000 | Airport Residential |
| 26 | 1 | apartment | Borteyman, Accra | 260000 | Teshie |
| 27 | 3 | furnish apartment | Achimota | 3405801 | Achimota |
| 28 | 3 | apartment | Airport Residential Area | 8050000 | Airport Residential |
| 29 | 2 | apartment | Labone | 2667500 | Labone |
| 30 | 3 | penthouseapartment | Labone | 4345000 | Labone |
| 31 | 3 | furnish apartment | Airport Residential Area | 4541068 | Airport Residential |
| 32 | 2 | apartment | Airport Residential | 2405600 | Airport Residential |
| 33 | 1 | apartment | Osu | 1702901 | Osu |

| | Bedrooms | House Type | Location/ Suburb | Price | Main Location |
|----|----------|--------------------|---------------------------------------|---------|---------------------|
| 34 | 1 | apartment | Airport Residential Area | 953057 | Airport Residential |
| 35 | 1 | apartment | Cantonments | 1759664 | Cantonments |
| 36 | 1 | apartment | Cantonments | 2043481 | Cantonments |
| 37 | 3 | apartment | Airport Residential Area | 5108702 | Airport Residential |
| 38 | 2 | apartment | Cantonments | 3292274 | Cantonments |
| 39 | 2 | apartment | Adenta | 681160 | Adenta |
| 40 | 1 | furnish apartment | Shaishie | 1135267 | East Legon |
| 41 | 3 | apartment | Spintex | 2645000 | |
| 42 | 3 | apartment | Airport City | 6300000 | Airport Residential |
| 43 | 3 | furnish apartment | Dansoman | 8000000 | Dansoman |
| 44 | 2 | apartment | North Dzorwulu | 3360000 | Dzorwulu |
| 45 | 1 | apartment | Dubai | 885508 | |
| 46 | 2 | apartment | Airport Residential Area | 2595000 | Airport Residential |
| 47 | 3 | apartment | Airport Residential | 2240000 | Airport Residential |
| 48 | 1 | apartment | Osu | 1850485 | Osu |
| 49 | 2 | apartment | Tse Addo | 2043481 | Tse Addo |
| 50 | 5 | apartment | East Legon | 5676335 | East Legon |
| 51 | 1 | apartment | Labone | 1512500 | Labone |
| 52 | 2 | furnish apartment | East Legon | 2100244 | East Legon |
| 53 | 3 | apartment | East Legon | 2951694 | East Legon |
| 54 | 3 | apartment | Airport Area | 6960000 | Airport Residential |
| 55 | 2 | furnish apartment | East Legon | 16800 | East Legon |
| 56 | 3 | apartment | Kass Towers Airport Residential (USD | 5960152 | Airport Residential |
| 57 | 2 | apartment | West hills | 1152000 | |
| 58 | 2 | apartment | Sakumono | 1021740 | Sakumono |
| 59 | 4 | penthouseapartment | Sakumono | 3632854 | Sakumono |

In []: