Meet recording link –
https://drive.google.com/file/d/1yVGuwqfPIA1iTOgnZeY5SkoxzBKnhaeM/view

Github repo link –
https://github.com/vivek20dadhich/Assessment-1---MLT

Assessment - 1 Feature Engineering

link :- https://drive.google.com/file/d/1yVGuwqfPIA1iTOgnZeY5SkoxzBKnhaeM/view?usp=sharing (https://drive.google.com/file/d/1yVGuwqfPIA1iTOgnZeY5SkoxzBKnhaeM/view?usp=sharing)

Team - 8

20MAI0075 BINAL MANOJ BARIYA

20MAI0076 MERAJ AHMED

20MAI0077 VIVEK DADHICH

20MAI0079 KHEMRAJ GUPTA

20MAI0080 SARANYA ROY

20MAI0081 MESHANK ADHIA

20MAI0082 RISHABH SHARMA

20MAI0083 ASTHA TEMBHRE

In [11]:
```
import numpy as np
import pandas as pd
```

In [18]:
```
read = pd.read_csv("Real_state_data.csv")
```

In [19]:
```
1 read.head()
```

Out[19]:

	Rooms_in_BHK	Number_of_buildings	Super_build_up_area	location	price_in_cr	Emi_available	Emi_amount_in_lac_per_month	Fu
0	2	3.0	781	Bandra	5.75	Yes	3.36	Unfu
1	2	3.0	547	Kanjurmarg West	1.33	Yes	NaN	Unfu
2	1	3.0	510	Kalyan Complex	1.80	Yes	NaN	Fu
3	3	9.0	1280	Chandivali, Powai	2.75	Yes	1.61	Unfu
4	3	3.0	740	Powai vihar	NaN	No	0.35	Fu

5 rows × 22 columns

In [49]:
```
1 read.columns
```

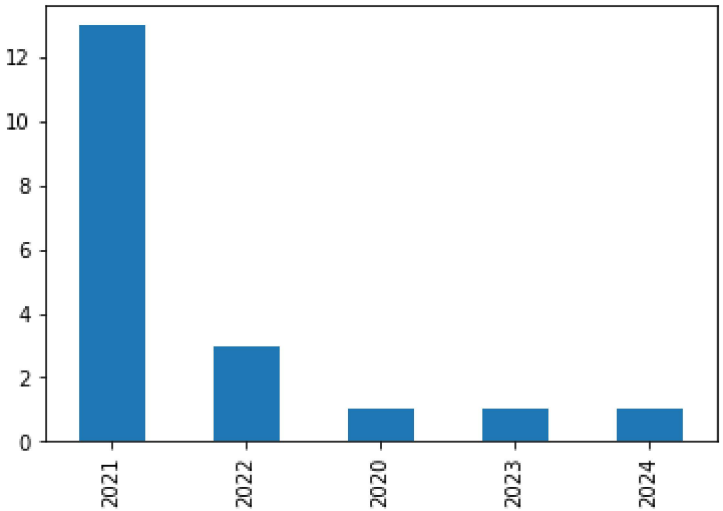
Out[49]:
```
Index(['Rooms_in_BHK', 'Number_of_buildings', 'Super_build_up_area',
       'location', 'price_in_cr', 'Emi_available',
       'Emi_amount_in_lac_per_month', 'Furnished', 'Householder',
       'Car_parking_space', 'Outskirts', 'Floor_number', 'Total_floors',
       'Water_availability_24X7', 'Number_of_bathrooms', 'Balconies',
       'Constructed_or_Under_construction', 'Possession', 'Power_back_up',
       'Pet_allowed', 'Facing', 'Purchased', 'New', 'parking_balcony'],
      dtype='object')
```

Feature- 1

In [50]:
```
# Count of Possession Year

read["Possession"].value_counts().plot.bar()
```

Out[50]: <AxesSubplot:>



Feature- 2

In [43]:
```
a= read.groupby(by="Constructed_or_Under_construction",).sum()
```

In [51]:
```
1 a
```

Out[51]:

Constructed_or_Under_construction	Rooms_in_BHK	Number_of_buildings	Super_build_up_area	price_in_cr	Emi_amount_in_lac_per_month
Constructed	36	22.0	19294	47.2	34.9200
Under Construction	8	24.0	3054	5.7	3.0042

Feature- 3

In [35]:
```
1 read['parking_balcony'] = ((read.Balconies >= 2) & (read.Car_parking_space == 'Yes'))
```

In [52]:
```
1 # Display percent of rows where parking_balcony == 1
2 #homes with more than two balcony and car parking space are more popular amoung investers
3 read[read['parking_balcony']==1].shape[0]/read.shape[0]
```

Out[52]: 0.2631578947368421

Feature- 4

In [27]:
```
1 # Are they New or not
2 # We have considered  Constructed_or_Under_construction which are in Under Construction and Where Possessio
3 read["New"]= ((read["Constructed_or_Under_construction"] == "Under Construction") & (read["Possession"] > 2
```

In [53]:
```
1 read.head()
```

Out[53]:

	Rooms_in_BHK	Number_of_buildings	Super_build_up_area	location	price_in_cr	Emi_available	Emi_amount_in_lac_per_month	Fu
0	2	3.0	781	Bandra	5.75	Yes	3.36	Unfu
1	2	3.0	547	Kanjurmarg West	1.33	Yes	NaN	Unfu
2	1	3.0	510	Kalyan Complex	1.80	Yes	NaN	Fu
3	3	9.0	1280	Chandivali, Powai	2.75	Yes	1.61	Unfu
4	3	3.0	740	Powai vihar	NaN	No	0.35	Fu

5 rows × 24 columns

Feature- 5

In [48]:
```
1 #display the count of Landlords who owns furnished house
2 count = read[(read['Householder'] == 'Ownership') & (read['Furnished'] == 'Furnished')].count()[0]
3 print("The count of Householder who  like Furnished house are :- ",count)
```

```
The count of Householder who  like Furnished house are :-  2
```

In [4]:
```
1 read['Possession']= pd.to_datetime(read['Possession'])
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
~\anaconda3\lib\site-packages\pandas\core\arrays\datetimes.py in objects_to_datetime64ns(data, dayfirst, yearf
irst, utc, errors, require_iso8601, allow_object)
   2084         try:
-> 2085             values, tz_parsed = conversion.datetime_to_datetime64(data)
   2086             # If tzaware, these values represent unix timestamps, so we

pandas\_libs\tslibs\conversion.pyx in pandas._libs.tslibs.conversion.datetime_to_datetime64()

TypeError: Unrecognized value type: <class 'str'>

During handling of the above exception, another exception occurred:

OutOfBoundsDatetime                       Traceback (most recent call last)
<ipython-input-4-e1d48295cba6> in <module>
----> 1 read['Possession']= pd.to_datetime(read['Possession'])

~\anaconda3\lib\site-packages\pandas\core\tools\datetimes.py in to_datetime(arg, errors, dayfirst, yearfirst,
 utc, format, exact, unit, infer_datetime_format, origin, cache)
    803             result = arg.map(cache_array)
    804         else:
--> 805             values = convert_listlike(arg._values, format)
    806             result = arg._constructor(values, index=arg.index, name=arg.name)
    807     elif isinstance(arg, (ABCDataFrame, abc.MutableMapping)):

~\anaconda3\lib\site-packages\pandas\core\tools\datetimes.py in _convert_listlike_datetimes(arg, format, name,
tz, unit, errors, infer_datetime_format, dayfirst, yearfirst, exact)
    463         assert format is None or infer_datetime_format
    464         utc = tz == "utc"
--> 465         result, tz_parsed = objects_to_datetime64ns(
    466             arg,
    467             dayfirst=dayfirst,

~\anaconda3\lib\site-packages\pandas\core\arrays\datetimes.py in objects_to_datetime64ns(data, dayfirst, yearf
irst, utc, errors, require_iso8601, allow_object)
   2088             return values.view("i8"), tz_parsed
   2089         except (ValueError, TypeError):
-> 2090             raise e
   2091
   2092     if tz_parsed is not None:
```

```
~\anaconda3\lib\site-packages\pandas\core\arrays\datetimes.py in objects_to_datetime64ns(data, dayfirst, yearf
irst, utc, errors, require_iso8601, allow_object)
   2073
   2074     try:
-> 2075         result, tz_parsed = tslib.array_to_datetime(
   2076             data,
   2077             errors=errors,

pandas\_libs\tslib.pyx in pandas._libs.tslib.array_to_datetime()

pandas\_libs\tslib.pyx in pandas._libs.tslib.array_to_datetime()

pandas\_libs\tslib.pyx in pandas._libs.tslib.array_to_datetime()

pandas\_libs\tslib.pyx in pandas._libs.tslib.array_to_datetime()

pandas\_libs\tslibs\conversion.pyx in pandas._libs.tslibs.conversion.convert_datetime_to_tsobject()

pandas\_libs\tslibs\np_datetime.pyx in pandas._libs.tslibs.np_datetime.check_dts_bounds()

OutOfBoundsDatetime: Out of bounds nanosecond timestamp: 1-06-23 00:00:00
```

In [30]:
```
1 read.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 19 entries, 0 to 18
Data columns (total 22 columns):
 #   Column                              Non-Null Count  Dtype  
---  ------                              --------------  -----  
 0   Rooms_in_BHK                        19 non-null     int64  
 1   Number_of_buildings                 12 non-null     float64
 2   Super_build_up_area                 19 non-null     int64  
 3   location                            19 non-null     object 
 4   price_in_cr                         12 non-null     float64
 5   Emi_available                       19 non-null     object 
 6   Emi_amount_in_lac_per_month         17 non-null     float64
 7   Furnished                           19 non-null     object 
 8   Householder                         19 non-null     object 
 9   Car_parking_space                   19 non-null     object 
 10  Outskirts                           19 non-null     object 
 11  Floor_number                        18 non-null     float64
 12  Total_floors                        19 non-null     int64  
 13  Water_availability_24X7             15 non-null     object 
 14  Number_of_bathrooms                 16 non-null     float64
 15  Balconies                           17 non-null     float64
 16  Constructed_or_Under_construction   19 non-null     object 
 17  Possession                          18 non-null     object 
 18  Power_back_up                       13 non-null     object 
 19  Pet_allowed                         19 non-null     object 
 20  Facing                              9 non-null      object 
 21  Purchased                           19 non-null     object 
dtypes: float64(6), int64(3), object(13)
memory usage: 3.4+ KB
```

In [3]:
```
1 read.head()
```

Out[3]:

	Rooms_in_BHK	Number_of_buildings	Super_build_up_area	location	price_in_cr	Emi_available	Emi_amount_in_lac_per_month	Fu
0	2	3.0	781	Bandra	5.75	Yes	3.36	Unfu
1	2	3.0	547	Kanjurmarg West	1.33	Yes	NaN	Unfu
2	1	3.0	510	Kalyan Complex	1.80	Yes	NaN	Fu
3	3	9.0	1280	Chandivali, Powai	2.75	Yes	1.61	Unfu
4	3	3.0	740	Powai vihar	NaN	No	0.35	Fu

5 rows × 22 columns

In [4]:
```
1 read.shape
```

Out[4]:
```
(19, 22)
```

In [5]:
```
1 read.isnull().sum()
```

Out[5]:
```
Rooms_in_BHK                          0
Number_of_buildings                   7
Super_build_up_area                   0
location                              0
price_in_cr                           7
Emi_available                         0
Emi_amount_in_lac_per_month           2
Furnished                             0
Householder                           0
Car_parking_space                     0
Outskirts                             0
Floor_number                          1
Total_floors                          0
Water_availability_24X7               4
Number_of_bathrooms                   3
Balconies                             2
Constructed_or_Under_construction     0
Possession                            1
Power_back_up                         6
Pet_allowed                           0
Facing                               10
Purchased                             0
dtype: int64
```

In [6]:
```
1 read.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 19 entries, 0 to 18
Data columns (total 22 columns):
 #   Column                              Non-Null Count  Dtype  
---  ------                              --------------  -----  
 0   Rooms_in_BHK                        19 non-null     int64  
 1   Number_of_buildings                 12 non-null     float64
 2   Super_build_up_area                 19 non-null     int64  
 3   location                            19 non-null     object 
 4   price_in_cr                         12 non-null     float64
 5   Emi_available                       19 non-null     object 
 6   Emi_amount_in_lac_per_month         17 non-null     float64
 7   Furnished                           19 non-null     object 
 8   Householder                         19 non-null     object 
 9   Car_parking_space                   19 non-null     object 
 10  Outskirts                           19 non-null     object 
 11  Floor_number                        18 non-null     float64
 12  Total_floors                        19 non-null     int64  
 13  Water_availability_24X7             15 non-null     object 
 14  Number_of_bathrooms                 16 non-null     float64
 15  Balconies                           17 non-null     float64
 16  Constructed_or_Under_construction   19 non-null     object 
 17  Possession                          18 non-null     object 
 18  Power_back_up                       13 non-null     object 
 19  Pet_allowed                         19 non-null     object 
 20  Facing                              9 non-null      object 
 21  Purchased                           19 non-null     object 
dtypes: float64(6), int64(3), object(13)
memory usage: 3.4+ KB
```

In [7]:
```
1 cat_columns = [c for c in read.columns if read[c].dtypes == "O"]
```

In [8]:
```
1 Num_columns = [c for c in read.columns if read[c].dtypes != "O"]
```

In [9]:
```
Num_columns
```

Out[9]:
```
['Rooms_in_BHK',
 'Number_of_buildings',
 'Super_build_up_area',
 'price_in_cr',
 'Emi_amount_in_lac_per_month',
 'Floor_number',
 'Total_floors',
 'Number_of_bathrooms',
 'Balconies']
```

In [10]:
```
cat_columns
```

Out[10]:
```
['location',
 'Emi_available',
 'Furnished',
 'Householder',
 'Car_parking_space',
 'Outskirts',
 'Water_availability_24X7',
 'Constructed_or_Under_construction',
 'Possession',
 'Power_back_up',
 'Pet_allowed',
 'Facing',
 'Purchased']
```

In [11]:
```
# read["Number_of_buildings"].fillna(read["Number_of_buildings"].mode())
# read["Number_of_buildings"].fillna(read["Number_of_buildings"],method="mode")
for i in Num_columns:
#     print(i)
#     print(read[i].mode())
    read[i].fillna(read[i].mode(), inplace=True)
```

In [27]:

```
# read.Super_build_up_area
# read["Number_of_buildings"].fillna(value=read[i].mode(),inplace=True)
for i in Num_columns:
#     print(i)
#     print(read[i].mode())
    value = read[i].mode()
    print(value)
#     read[i].replace("NaN",  value)
```

```
0    2
dtype: int64
0    3.0
dtype: float64
0      450
1      510
2      527
3      547
4      550
5      664
6      700
7      740
8      750
9      755
10     781
11     895
12    1250
13    1280
14    1450
15    2000
16    2450
17    2500
18    3549
dtype: int64
0    1.02
1    1.80
2    4.15
3    5.75
dtype: float64
0    0.42
dtype: float64
0    7.0
dtype: float64
```

```
0     3
1    12
2    15
3    17
4    24
dtype: int64
0    2.0
dtype: float64
0    0.0
dtype: float64
```

In [ ]:
```
1 from sklearn.calibration
```

In [20]:
```
1 read["Number_of_buildings"]
```

Out[20]:
```
0     3.0
1     3.0
2     3.0
3     9.0
4     3.0
5     7.0
6     NaN
7     2.0
8     5.0
9     1.0
10    4.0
11    NaN
12    NaN
13    NaN
14    1.0
15    NaN
16    NaN
17    5.0
18    NaN
Name: Number_of_buildings, dtype: float64
```

In [13]:
```
1 read.isnull().sum()
```

Out[13]:
```
Rooms_in_BHK                          0
Number_of_buildings                   7
Super_build_up_area                   0
location                              0
price_in_cr                           3
Emi_available                         0
Emi_amount_in_lac_per_month           2
Furnished                             0
Householder                           0
Car_parking_space                     0
Outskirts                             0
Floor_number                          0
Total_floors                          0
Water_availability_24X7               4
Number_of_bathrooms                   2
Balconies                             1
Constructed_or_Under_construction     0
Possession                            1
Power_back_up                         6
Pet_allowed                           0
Facing                               10
Purchased                             0
dtype: int64
```

In [14]:
```
1 # read["Number_of_buildings"].mode()
```

In [15]:
```
1 # read.Number_of_buildings
```

In [16]:
```
1 # for i in cat_columns:
2 #     print(i,":- ",read[i].unique,end=" ")
```

In [17]:
```
1 # from sklearn.preprocessing import LabelEncoder
2 # le = LabelEncoder()
3 # le.fit_transform()
```