In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import datetime
```

In [3]:

```
jan= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\jan-tripdat
a.csv")
feb= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\feb-tripdat
a.csv")
march= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\march-trip
data.csv")
april= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\april-trip
data.csv")
may= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\may-tripdat
a.csv")
june= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\june-tripda
ta.csv")
july= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\july-tripda
ta.csv")
aug= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\august-tripd
ata.csv")
sep= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\sept-tripdat
a.csv")
octo= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\oct-tripdat
a.csv")
nov= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\nov-tripdat
a.csv")
dec= pd.read_csv(r"C:\Users\Atharva\google data analytics capstone project\dec-tripdat
a.csv")
```

In [5]:

```
#now lets merge all the dataframes into one
data_frames = [jan, feb, march,april,may,june,july,aug,sep,octo,nov,dec]
data_df = pd.concat(data_frames)
```

In [6]:

```
data_df.head()
```

Out[6]:

	ride_id	rideable_type	started_at	ended_at	start_station_name	start_station_
0	E19E6F1B8D4C42ED	electric_bike	2021-01-23 16:14:19	2021-01-23 16:24:44	California Ave & Cortez St	176
1	DC88F20C2C55F27F	electric_bike	2021-01-27 18:43:08	2021-01-27 18:47:12	California Ave & Cortez St	176
2	EC45C94683FE3F27	electric_bike	2021-01-21 22:35:54	2021-01-21 22:37:14	California Ave & Cortez St	176
3	4FA453A75AE377DB	electric_bike	2021-01-07 13:31:13	2021-01-07 13:42:55	California Ave & Cortez St	176
4	BE5E8EB4E7263A0B	electric_bike	2021-01-23 02:24:02	2021-01-23 02:24:45	California Ave & Cortez St	176

In [7]:

```
data_df.dtypes
```

Out[7]:

```
ride_id               object
rideable_type         object
started_at            object
ended_at              object
start_station_name    object
start_station_id      object
end_station_name      object
end_station_id        object
start_lat            float64
start_lng            float64
end_lat              float64
end_lng              float64
member_casual         object
dtype: object
```

In [8]:

```
data_df["started_at"] = pd.to_datetime(data_df["started_at"])
data_df["ended_at"] = pd.to_datetime(data_df["ended_at"])
```

In [9]:

```
data_df.dtypes
```

Out[9]:

```
ride_id                       object
rideable_type                 object
started_at            datetime64[ns]
ended_at              datetime64[ns]
start_station_name            object
start_station_id              object
end_station_name              object
end_station_id                object
start_lat                    float64
start_lng                    float64
end_lat                      float64
end_lng                      float64
member_casual                 object
dtype: object
```

In [10]:

```
# calculating the ride length
data_df["ride_length"]= data_df["ended_at"] - data_df["started_at"]
data_df["ride_length"] # viewing the newly added column
```

Out[10]:

```
0         00:10:25
1         00:04:04
2         00:01:20
3         00:11:42
4         00:00:43
             ...
247535    00:19:13
247536    00:07:01
247537    00:08:17
247538    00:14:13
247539    00:03:37
Name: ride_length, Length: 5595063, dtype: timedelta64[ns]
```

We can extract start date and start time from the same column. as we would like to know which days are having what number of trips per user type.

we would split the single column into two by using str.split function the function takes the character that you want to find and split e.g. it will be a space between the date and time in the field, n=1 means consider the first space found. For all this we first need to convert the format of the column to string inorder for the str.split function to work.

In [11]:

```
data_df[['start_date','start_time']] = data_df['started_at'].astype(str).str.split(' ',
n=1,expand=True)
# n =1 split at the first space
```

In [12]:

```
data_df.head()
```

Out[12]:

	ride_id	rideable_type	started_at	ended_at	start_station_name	start_station_
0	E19E6F1B8D4C42ED	electric_bike	2021-01-23 16:14:19	2021-01-23 16:24:44	California Ave & Cortez St	176
1	DC88F20C2C55F27F	electric_bike	2021-01-27 18:43:08	2021-01-27 18:47:12	California Ave & Cortez St	176
2	EC45C94683FE3F27	electric_bike	2021-01-21 22:35:54	2021-01-21 22:37:14	California Ave & Cortez St	176
3	4FA453A75AE377DB	electric_bike	2021-01-07 13:31:13	2021-01-07 13:42:55	California Ave & Cortez St	176
4	BE5E8EB4E7263A0B	electric_bike	2021-01-23 02:24:02	2021-01-23 02:24:45	California Ave & Cortez St	176

In [15]:

```
data_df["start_time"] = pd.to_datetime(data_df["start_time"])
data_df["start_date"] = pd.to_datetime(data_df["start_date"])
```

In [16]:

```
data_df["week day"]=data_df["start_date"].apply(lambda x:x.weekday())
# takes a column and applies weekday function on it through lamba which is an anonymous function
data_df["week day"].unique() # show only unique values
```

Out[16]:

```
array([5, 2, 3, 0, 6, 4, 1], dtype=int64)
```

In [17]:

```
day_dict={0:"Sunday", 1:"Monday",2:"Tuesday",3:"Wednesday",4:"Thursday",5:"Friday",6:"saturday"}
```

In [18]:

```
data_df["weekday_name"]= data_df['week day'].apply(lambda y:day_dict[y])
```

In [19]:

```
data_df['year'] = pd.DatetimeIndex(data_df['start_date']).year
data_df['month']= pd.DatetimeIndex(data_df['start_date']).month
data_df.head()
```

Out[19]:

	ride_id	rideable_type	started_at	ended_at	start_station_name	start_station_
0	E19E6F1B8D4C42ED	electric_bike	2021-01-23 16:14:19	2021-01-23 16:24:44	California Ave & Cortez St	176
1	DC88F20C2C55F27F	electric_bike	2021-01-27 18:43:08	2021-01-27 18:47:12	California Ave & Cortez St	176
2	EC45C94683FE3F27	electric_bike	2021-01-21 22:35:54	2021-01-21 22:37:14	California Ave & Cortez St	176
3	4FA453A75AE377DB	electric_bike	2021-01-07 13:31:13	2021-01-07 13:42:55	California Ave & Cortez St	176
4	BE5E8EB4E7263A0B	electric_bike	2021-01-23 02:24:02	2021-01-23 02:24:45	California Ave & Cortez St	176

In [20]:

```
#sort the dataFrame by start date in ascending order
data_df.sort_values(by=['start_date'],inplace= True, ascending=True )
```

In [21]:

```
data_df.isnull().sum()
```

Out[21]:

```
ride_id                  0
rideable_type            0
started_at               0
ended_at                 0
start_station_name    690809
start_station_id      690806
end_station_name      739170
end_station_id        739170
start_lat                0
start_lng                0
end_lat                4771
end_lng                4771
member_casual            0
ride_length              0
start_date               0
start_time               0
week day                 0
weekday_name             0
year                     0
month                    0
dtype: int64
```

In [22]:

```
data_df.duplicated().any()
```

Out[22]:

```
False
```

lets find out the mean ride length of both groups of users such as member and casual

In [23]:

```
data_member = data_df[data_df["member_casual"]=="member"]
data_member_ride_len_mean = data_member["ride_length"].mean()
data_member_ride_len_mean
```

Out[23]:

```
Timedelta('0 days 00:13:37.970452')
```

In [24]:

```
data_casual = data_df[data_df["member_casual"]=="casual"]
data_casual_ride_len_mean = data_casual["ride_length"].mean()
data_casual_ride_len_mean
```

Out[24]:

```
Timedelta('0 days 00:32:00.056830')
```

In [25]:

```
data_member_ride_len_max = data_member["ride_length"].max()
data_member_ride_len_max
```

Out[25]:

```
Timedelta('1 days 01:59:56')
```

In [26]:

```
data_casual_ride_len_max = data_casual["ride_length"].max()
data_casual_ride_len_max
```

Out[26]:

```
Timedelta('38 days 20:24:09')
```

In [27]:

```
# calculate the mode of week day for mememberr which means to see what day do they usual
ly ride on
data_member_ride_day_mode = data_member["week day"].mode()
data_member_ride_day_mode
# 2 is Tuesday
```

Out[27]:

```
0    2
dtype: int64
```

In [28]:

```
data_member_ride_day_mode = data_casual["week day"].mode()
data_member_ride_day_mode
# 5 is friday
```

Out[28]:

```
0    5
dtype: int64
```

In [29]:

```
mem_rides_pday= data_df[data_df["member_casual"]=="member"].groupby('week day')['ride_i
d'].count()
mem_rides_pday
```

Out[29]:

```
week day
0    416212
1    465513
2    477192
3    451524
4    446428
5    433047
6    376142
Name: ride_id, dtype: int64
```

In [30]:

```
cas_rides_pday = data_df[data_df["member_casual"]=="casual"].groupby('week day')['ride_
id'].count()
cas_rides_pday
```

Out[30]:

```
week day
0    286376
1    274392
2    278950
3    286064
4    364080
5    558000
6    481143
Name: ride_id, dtype: int64
```

In [32]:

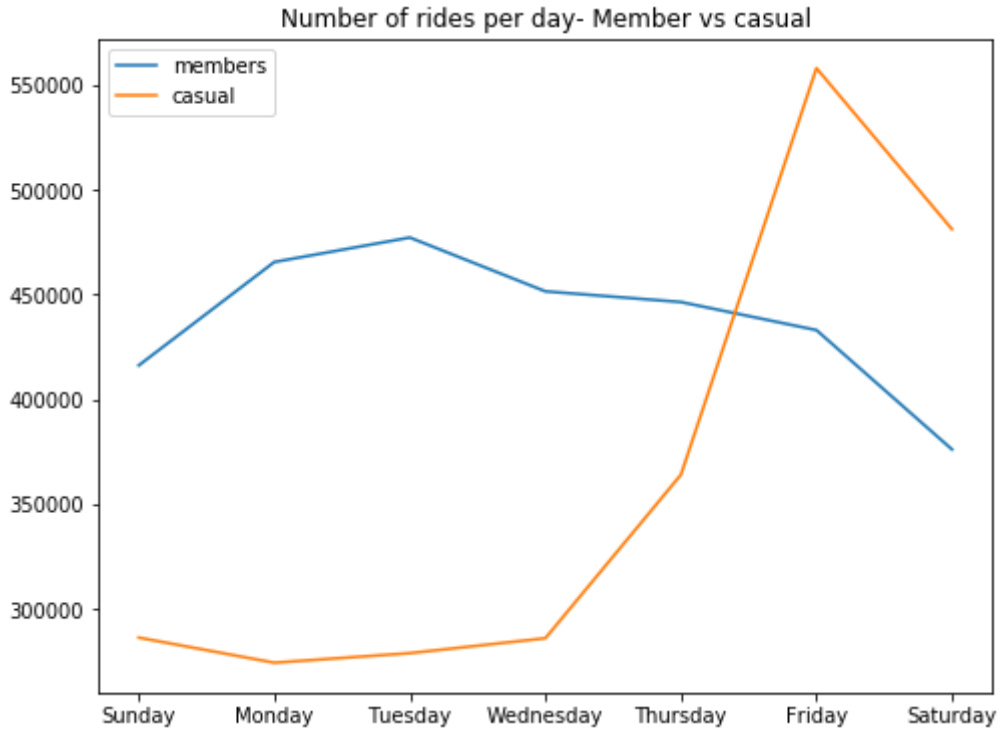
```
data_df.head()
```

Out[32]:

	ride_id	rideable_type	started_at	ended_at	start_station_name	start_sta
65943	BC3CB970F08D36B6	electric_bike	2021-01-01 15:35:15	2021-01-01 15:44:46	Kingsbury St & Kinzie St	KA1503
14763	5E125D8F1F7B1813	classic_bike	2021-01-01 14:26:46	2021-01-01 14:32:16	Columbus Dr & Randolph St	
58467	15ACCC355D076101	classic_bike	2021-01-01 20:02:09	2021-01-01 20:39:53	Fairbanks Ct & Grand Ave	TA1305
12687	90EBA06FDFD44CFE	classic_bike	2021-01-01 13:12:14	2021-01-01 13:17:09	Federal St & Polk St	
22135	CBF551444E1D77B8	classic_bike	2021-01-01 16:47:56	2021-01-01 16:52:02	Paulina St & Howard St	

In [36]:

```
plt.figure(figsize=(8,6))
plt.plot(mem_rides_pday) # gets average ride length in minutes
plt.plot(cas_rides_pday)
plt.title("Number of rides per day- Member vs casual")
plt.legend(["members","casual"])
labels=["Sunday","Monday","Tuesday","Wednesday","Thursday","Friday","Saturday"]
plt.xticks(mem_rides_pday.index,labels)
plt.show()
```



It confirms from the above plot what we already found out that the member users tend to use rides on the week days where as the casual members are riding more on the weekends.

In [38]:

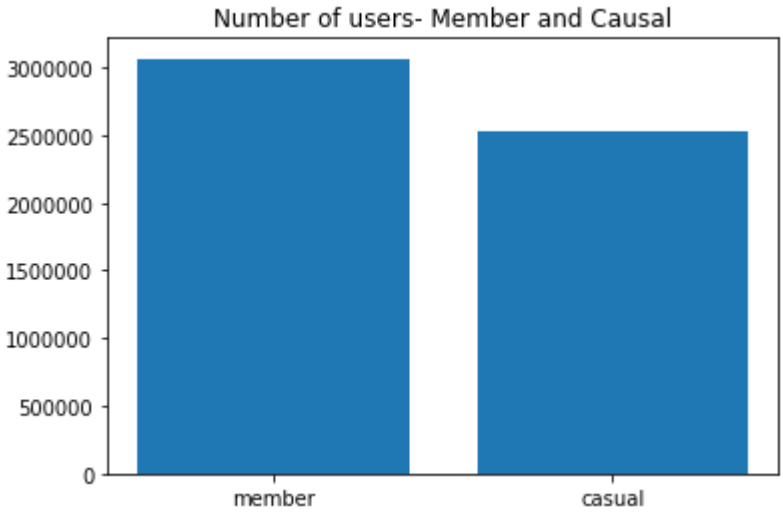
```
member_type =data_df["member_casual"].value_counts()
member_type
```

Out[38]:

```
member    3066058
casual    2529005
Name: member_casual, dtype: int64
```

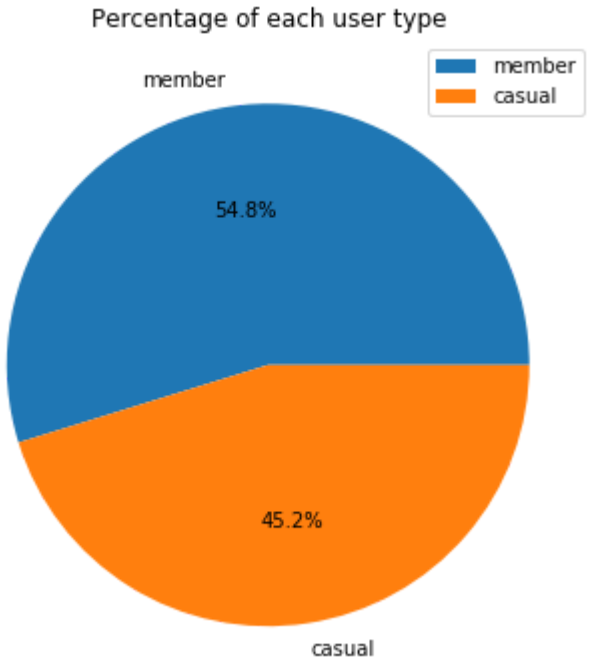
In [39]:

```
plt.title("Number of users- Member and Causal")
plt.bar(member_type.index, member_type.values)
plt.ticklabel_format(style='plain', axis='y')
```



In [40]:

```
# pie chart  to see the percentage
plt.figure(figsize=(8,6))
plt.pie(member_type.values, labels =member_type.index,autopct='%1.1f%%')
plt.title("Percentage of each user type")
plt.legend(member_type.index)
plt.show()
```



In [41]:

```
#To check monthly trends in the users
monthly_users = data_df.groupby("month") ['member_casual'].value_counts()
monthly_users
```

Out[41]:

```
month  member_casual
1      member            78717
       casual            18117
2      member            39491
       casual            10131
3      member           144463
       casual            84033
4      member           200629
       casual           136601
5      member           274717
       casual           256916
6      casual           370681
       member           358914
7      casual           442056
       member           380354
8      casual           412671
       member           391681
9      member           392257
       casual           363890
10     member           373984
       casual           257242
11     member           253049
       casual           106929
12     member           177802
       casual            69738
Name: member_casual, dtype: int64
```

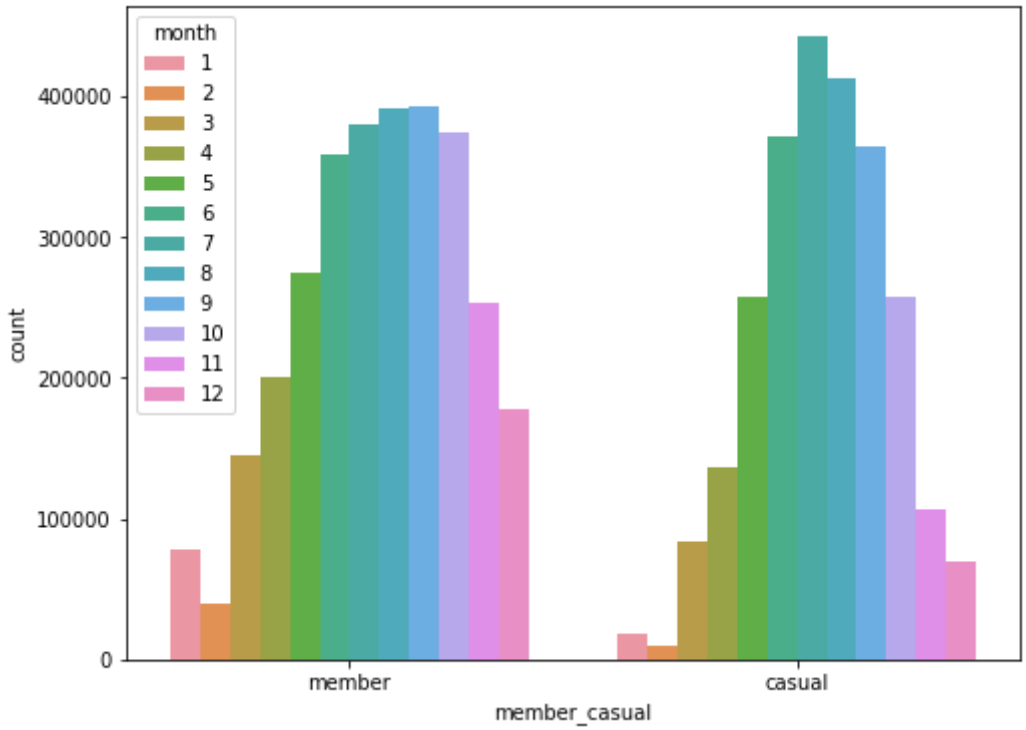
In [43]:

```
plt.figure(figsize=(8,6))

sns.countplot(x="member_casual",hue="month", data=data_df)
```

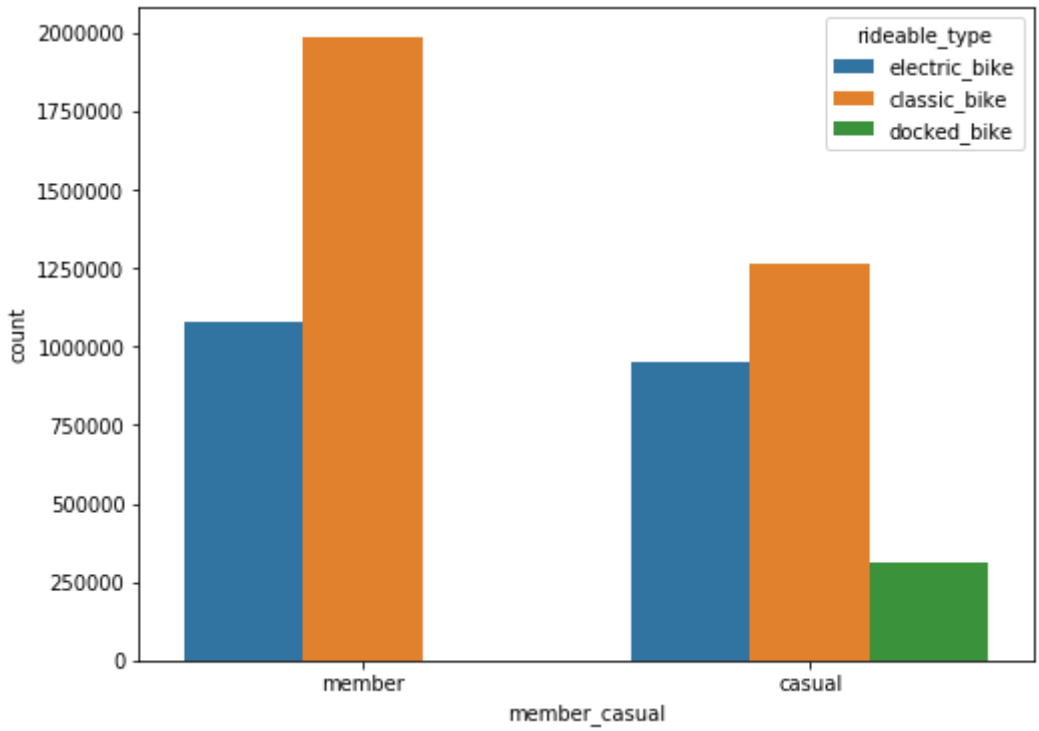
Out[43]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x24605db3248>
```



In [44]:

```
plt.figure(figsize=(8,6))
sns.countplot(x="member_casual", hue="rideable_type", data=data_df)
plt.ticklabel_format(style='plain', axis='y') # for removing #scientific notation
```



In [ ]:

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