Importing Neccessary library

In [2]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

Reading From the File

In [3]:
```
df = pd.read_csv('sales.csv')
df.head()
```

Out[3]:

	order_id	product	quantity	price	date	address	month
0	236670	Wired Headphones	2	11.99	08/31/19 22:21	359 Spruce St, Seattle, WA 98101	August
1	236671	Bose SoundSport Headphones	1	99.99	08/15/19 15:11	492 Ridge St, Dallas, TX 75001	August
2	236672	iPhone	1	700.0	08/06/19 14:40	149 7th St, Portland, OR 97035	August
3	236673	AA Batteries (4-pack)	2	3.84	08/29/19 20:59	631 2nd St, Los Angeles, CA 90001	August
4	236674	AA Batteries (4-pack)	2	3.84	08/15/19 19:53	736 14th St, New York City, NY 10001	August

checking the null values

In [4]:
```
df.isnull().sum()
```

Out[4]:
```
order_id    0
product     0
quantity    0
price       0
date        0
address     0
month       0
dtype: int64
```

describing the data

In [5]:
```
df.describe()
```

Out[5]:

	order_id	product	quantity	price	date	address	month
count	186305	186305	186305	186305	186305	186305	186305
unique	178438	20	10	24	142396	140788	12
top	Order ID	USB-C Charging Cable	1	11.95	Order Date	Purchase Address	December
freq	355	21903	168552	21903	355	355	25037

preprocessing the order_id

In [6]:
```
data = []
for i in df.values:
    if 'Order ID' not in i:
        data.append(i)                          # clearing the dataset and creating a new dataset

data = pd.DataFrame(data,columns = ['order_id','product','quantity','price','date','address','month'
data
```

Out[6]:

	order_id	product	quantity	price	date	address	month
0	236670	Wired Headphones	2	11.99	08/31/19 22:21	359 Spruce St, Seattle, WA 98101	August
1	236671	Bose SoundSport Headphones	1	99.99	08/15/19 15:11	492 Ridge St, Dallas, TX 75001	August
2	236672	iPhone	1	700.0	08/06/19 14:40	149 7th St, Portland, OR 97035	August
3	236673	AA Batteries (4-pack)	2	3.84	08/29/19 20:59	631 2nd St, Los Angeles, CA 90001	August
4	236674	AA Batteries (4-pack)	2	3.84	08/15/19 19:53	736 14th St, New York City, NY 10001	August
...	...	...	...	...	...	...	...
185945	162004	Apple Airpods Headphones	1	150	02/12/19 22:02	227 Church St, San Francisco, CA 94016	February
185946	162005	AAA Batteries (4-pack)	2	2.99	02/04/19 20:44	417 Jefferson St, Los Angeles, CA 90001	February
185947	162006	USB-C Charging Cable	1	11.95	02/24/19 06:31	498 8th St, Atlanta, GA 30301	February
185948	162007	USB-C Charging Cable	1	11.95	02/24/19 19:09	715 7th St, Dallas, TX 75001	February
185949	162008	27in FHD Monitor	1	149.99	02/26/19 17:15	677 West St, Los Angeles, CA 90001	February

185950 rows × 7 columns

preprocessing date

In [7]:
```
date  = []
time  = []

for i in data.values:
    date.append(i[4].split(' ')[0])           # getting the date
    time.append(i[4].split(' ')[1])           # getting the time

data['date'] = date
data['time'] = time

data.head()
```

Out[7]:

	order_id	product	quantity	price	date	address	month	time
0	236670	Wired Headphones	2	11.99	08/31/19	359 Spruce St, Seattle, WA 98101	August	22:21
1	236671	Bose SoundSport Headphones	1	99.99	08/15/19	492 Ridge St, Dallas, TX 75001	August	15:11
2	236672	iPhone	1	700.0	08/06/19	149 7th St, Portland, OR 97035	August	14:40
3	236673	AA Batteries (4-pack)	2	3.84	08/29/19	631 2nd St, Los Angeles, CA 90001	August	20:59
4	236674	AA Batteries (4-pack)	2	3.84	08/15/19	736 14th St, New York City, NY 10001	August	19:53

further preprocessing the date and time column

In [8]:
```
day   = []
month = []
year  = []

for i in data.values:
    month.append(int(i[4].split('/')[0]))                    # getting the month
    day.append(int(i[4].split('/')[1]))                      # gettting the day
    year.append(int('20'+i[4].split('/')[2]))                # getting the year



data['day']   = day
data['month_'] = month
data['year']  = year


data.head()
```

Out[8]:

	order_id	product	quantity	price	date	address	month	time	day	month_	year
0	236670	Wired Headphones	2	11.99	08/31/19	359 Spruce St, Seattle, WA 98101	August	22:21	31	8	2019
1	236671	Bose SoundSport Headphones	1	99.99	08/15/19	492 Ridge St, Dallas, TX 75001	August	15:11	15	8	2019
2	236672	iPhone	1	700.0	08/06/19	149 7th St, Portland, OR 97035	August	14:40	6	8	2019
3	236673	AA Batteries (4-pack)	2	3.84	08/29/19	631 2nd St, Los Angeles, CA 90001	August	20:59	29	8	2019
4	236674	AA Batteries (4-pack)	2	3.84	08/15/19	736 14th St, New York City, NY 10001	August	19:53	15	8	2019

further preprocessing time column and deleting the time column

In [9]:
```
hour = []
for i in data.values:
    hour.append(i[7].split(':')[0])              # getting the hour

data['hour'] = hour
data.head()
```

Out[9]:

	order_id	product	quantity	price	date	address	month	time	day	month_	year	hour
0	236670	Wired Headphones	2	11.99	08/31/19	359 Spruce St, Seattle, WA 98101	August	22:21	31	8	2019	22
1	236671	Bose SoundSport Headphones	1	99.99	08/15/19	492 Ridge St, Dallas, TX 75001	August	15:11	15	8	2019	15
2	236672	iPhone	1	700.0	08/06/19	149 7th St, Portland, OR 97035	August	14:40	6	8	2019	14
3	236673	AA Batteries (4-pack)	2	3.84	08/29/19	631 2nd St, Los Angeles, CA 90001	August	20:59	29	8	2019	20
4	236674	AA Batteries (4-pack)	2	3.84	08/15/19	736 14th St, New York City, NY 10001	August	19:53	15	8	2019	19

adding total amount column

In [10]:
```
tot_amt = []
for i in data.values:
    tot_amt.append(float(i[2])* float(i[3]))     # getting total amount

data['tot_amt'] = tot_amt
data.head()
```

Out[10]:

	order_id	product	quantity	price	date	address	month	time	day	month_	year	hour	tot_amt
0	236670	Wired Headphones	2	11.99	08/31/19	359 Spruce St, Seattle, WA 98101	August	22:21	31	8	2019	22	23.98
1	236671	Bose SoundSport Headphones	1	99.99	08/15/19	492 Ridge St, Dallas, TX 75001	August	15:11	15	8	2019	15	99.99
2	236672	iPhone	1	700.0	08/06/19	149 7th St, Portland, OR 97035	August	14:40	6	8	2019	14	700.00
3	236673	AA Batteries (4-pack)	2	3.84	08/29/19	631 2nd St, Los Angeles, CA 90001	August	20:59	29	8	2019	20	7.68
4	236674	AA Batteries (4-pack)	2	3.84	08/15/19	736 14th St, New York City, NY 10001	August	19:53	15	8	2019	19	7.68

preprocessing the address column

In [11]:
```
shop_no  = []
street    = []
city      = []
city_code = []
pincode   = []
for i in data.values:
    shop_no.append(i[5].split(',')[0].strip().split(' ')[0])
    street.append(i[5].split(',')[0].strip().split(' ')[1] + ' ' +i[5].split(',')[0].strip().split(
    city.append(i[5].split(',')[1].strip())
    city_code.append(i[5].split(',')[-1].strip().split(' ')[0])
    pincode.append(i[5].split(',')[-1].strip().split(' ')[-1])

data['shop_no']    = shop_no           # adding the shop number to the dataset
data['street']     = street            # adding the street address to the dataset
data['city']       = city              # adding the city to the dataset
data['city_code']  = city_code         # adding the city code address to the dataset
data['pincode']    = pincode           # adding the pincode address to the dataset

data.head()
```

Out[11]:

	order_id	product	quantity	price	date	address	month	time	day	month_	year	hour	tot_amt	shop_no	street	c
0	236670	Wired Headphones	2	11.99	08/31/19	359 Spruce St, Seattle, WA 98101	August	22:21	31	8	2019	22	23.98	359	Spruce St	Seat
1	236671	Bose SoundSport Headphones	1	99.99	08/15/19	492 Ridge St, Dallas, TX 75001	August	15:11	15	8	2019	15	99.99	492	Ridge St	Dall
2	236672	iPhone	1	700.0	08/06/19	149 7th St, Portland, OR 97035	August	14:40	6	8	2019	14	700.00	149	7th St	Portla

	order_id	product	quantity	price	date	address	month	time	day	month_	year	hour	tot_amt	shop_no	street	c
3	236673	AA Batteries (4-pack)	2	3.84	08/29/19	631 2nd St, Los Angeles, CA 90001	August	20:59	29	8	2019	20	7.68	631	2nd St	L Angel
						736 14th										

Removing the unneccesary column

In [12]:
```
del data['time']
del data['date']
```

In [13]:
```
data.head()
```

Out[13]:

	order_id	product	quantity	price	address	month	day	month_	year	hour	tot_amt	shop_no	street	city	city_code	p
0	236670	Wired Headphones	2	11.99	359 Spruce St, Seattle, WA 98101	August	31	8	2019	22	23.98	359	Spruce St	Seattle	WA	
1	236671	Bose SoundSport Headphones	1	99.99	492 Ridge St, Dallas, TX 75001	August	15	8	2019	15	99.99	492	Ridge St	Dallas	TX	
2	236672	iPhone	1	700.0	149 7th St, Portland, OR 97035	August	6	8	2019	14	700.00	149	7th St	Portland	OR	
3	236673	AA Batteries (4-pack)	2	3.84	631 2nd St, Los Angeles, CA 90001	August	29	8	2019	20	7.68	631	2nd St	Los Angeles	CA	
4	236674	AA Batteries (4-pack)	2	3.84	736 14th St, New York City, NY 10001	August	15	8	2019	19	7.68	736	14th St	New York City	NY	

pre-processing the hour column

In [14]:
```
am_pm = []
for h in data['hour']:
    if int(h) > 12:                    # check if pm present or not
        am_pm.append('P.M.')
    elif int(h) <= 12:
        am_pm.append('A.M.')          # check if am present or not
data['time_'] = am_pm
data.head()
```

Out[14]:

	order_id	product	quantity	price	address	month	day	month_	year	hour	tot_amt	shop_no	street	city	city_code	p
0	236670	Wired Headphones	2	11.99	359 Spruce St, Seattle, WA 98101	August	31	8	2019	22	23.98	359	Spruce St	Seattle	WA	
1	236671	Bose SoundSport Headphones	1	99.99	492 Ridge St, Dallas, TX 75001	August	15	8	2019	15	99.99	492	Ridge St	Dallas	TX	
2	236672	iPhone	1	700.0	149 7th St, Portland, OR 97035	August	6	8	2019	14	700.00	149	7th St	Portland	OR	
3	236673	AA Batteries (4-pack)	2	3.84	631 2nd St, Los Angeles, CA 90001	August	29	8	2019	20	7.68	631	2nd St	Los Angeles	CA	
4	236674	AA Batteries (4-pack)	2	3.84	736 14th St, New York City, NY 10001	August	15	8	2019	19	7.68	736	14th St	New York City	NY	

Classification of sales based on A.M./P.M.

In [15]:
```
data_am = data[data['time_'] == 'A.M.']              # selecting the data with am
data_pm = data[data['time_'] == 'P.M.']              # selecting the data with pm

data_pm.to_csv('PM.csv',index = False)               # saving the pm.csv file with pm data
data_am.to_csv('AM.csv',index = False)               # saving the am.csv file with am data
```

Classification based on months

In [16]:
```
monthly = []
for months in df['month'].unique():
    c          = 0
    amount     = 0
    tot_quant  = 0
    for j in data.values:
        if months in j:
            c += 1
            tot_quant += int(j[2])
            amount += j[10]
    monthly.append([months,c,tot_quant,round(amount,2)])

# saving the data
monthly = pd.DataFrame(monthly,columns = ['months','total_sales','total_quantity','total_amount'])
monthly.to_csv('monthy.csv',index = False)
```

In [17]:
```
data.head(1)
```

Out[17]:

	order_id	product	quantity	price	address	month	day	month_	year	hour	tot_amt	shop_no	street	city	city_code	pin
0	236670	Wired Headphones	2	11.99	359 Spruce St, Seattle, WA 98101	August	31	8	2019	22	23.98	359	Spruce St	Seattle	WA	9

In [18]:
```
data['address'].nunique()
```

Out[18]: 140787

In [ ]:
```
address = []
for addresses in data['address'].unique():          # searching in all the unique addresses
    c = 0
    for i in df.values:
        if addresses in i[4] :
            c += 1
    address.append([addresses,c])

#  creating the dataframe
address = pd.DataFrame(address,columns =['address','count'])
address = address.sort_values(by='count',ascending = False ).head()          # Sorting the values
```

Product sales

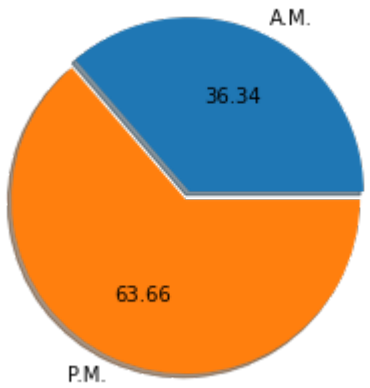
In [22]:
```
products_sales = []

for products in data['product'].unique():
    c         = 0
    tot       = 0
    price     = 0
    tot_quant = 0

    for j in data.values:
        if products in j:
            c += 1
            tot_quant += int(j[2])
            tot += j[10]
            price = j[3]
    products_sales.append([products,c,tot_quant,price,round(tot,2)])

product_sales = pd.DataFrame(products_sales,columns = ['product','total_prod_sold_to','total_quantit
product_sales.to_csv('product_sale.csv',index = False)
```

Data Visualization of am and pm data

In [19]:
```
time_data = data.groupby(data['time_']).sum()
```

```
/tmp/ipykernel_3744/3478460807.py:1: FutureWarning: The default value of numeric_only in DataFrame
GroupBy.sum is deprecated. In a future version, numeric_only will default to False. Either specify
numeric_only or select only columns which should be valid for the function.
  time_data = data.groupby(data['time_']).sum()
```

In [24]:
```
# comparison of sales or total amount collected in that particular time period
plt.pie(time_data['tot_amt'],labels =['A.M.','P.M.'],autopct = '%1.2f',explode = [0,0.05],shadow = T
plt.show()
```



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