

```
In [1]: import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import openpyxl
import warnings
warnings.filterwarnings('ignore')
```

```
In [2]: #Importing File
df = pd.read_excel('July Issues Cleaned.xlsx')
df.head()
```

Out[2]:

	Date	Issued To	Items	Quantity	Unit Price	Amount
0	2023-07-01	Dr	REMMY AKONYA	NaN	NaN	NaN
1	NaT	NaN	2K Silver Paint	1.0	90000.0	90000.0
2	2023-07-03	Dr	OXFAM	NaN	NaN	NaN
3	NaT	NaN	Engine Oil Delo Silver SAE40/ Diesel Engine Oil	11.0	12000.0	132000.0
4	NaT	NaN	Oil Filter 90915-30002-8T LC HZJ 78, 79,105	1.0	61200.0	61200.0

```
In [3]: df.shape #Shape of our data - Rows and Columns
```

Out[3]: (4030, 6)

Data Cleaning and Transformation

```
In [4]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4030 entries, 0 to 4029
Data columns (total 6 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   Date        748 non-null    datetime64[ns]
 1   Issued To  748 non-null    object  
 2   Items       4028 non-null   object  
 3   Quantity    2543 non-null   float64 
 4   Unit Price  2543 non-null   float64 
 5   Amount      2542 non-null   float64 
dtypes: datetime64[ns](1), float64(3), object(2)
memory usage: 189.0+ KB
```

```
In [5]: #Changing date column data type to datetime
df["Date"] = pd.to_datetime(df["Date"], format="%A, %d %B %Y")
df.head()
```

Out[5]:

	Date	Issued To	Items	Quantity	Unit Price	Amount
0	2023-07-01	Dr	REMMY AKONYA	NaN	NaN	NaN
1	NaT	NaN	2K Silver Paint	1.0	90000.0	90000.0
2	2023-07-03	Dr	OXFAM	NaN	NaN	NaN
3	NaT	NaN	Engine Oil Delo Silver SAE40/ Diesel Engine Oil	11.0	12000.0	132000.0
4	NaT	NaN	Oil Filter 90915-30002-8T LC HZJ 78, 79,105	1.0	61200.0	61200.0

```
In [6]: # Forward-fill missing dates
df["Date"].fillna(method="ffill", inplace=True)
df.head()
```

Out[6]:

	Date	Issued To	Items	Quantity	Unit Price	Amount
0	2023-07-01	Dr	REMMY AKONYA	NaN	NaN	NaN
1	2023-07-01	NaN	2K Silver Paint	1.0	90000.0	90000.0
2	2023-07-03	Dr	OXFAM	NaN	NaN	NaN
3	2023-07-03	NaN	Engine Oil Delo Silver SAE40/ Diesel Engine Oil	11.0	12000.0	132000.0
4	2023-07-03	NaN	Oil Filter 90915-30002-8T LC HZJ 78, 79,105	1.0	61200.0	61200.0

```
In [12]: # Replacing non-null values in "Issued To" column with the corresponding non-null v
df.loc[df["Issued To"].notnull(), "Issued To"] = df.loc[df["Issued To"].notnull(),
df.head()
```

Out[12]:

	Date	Issued To	Items	Quantity	Unit Price	Amount
0	2023-07-01	REMMY AKONYA	REMMY AKONYA	NaN	NaN	NaN
1	2023-07-01	NaN	2K Silver Paint	1.0	90000.0	90000.0
2	2023-07-03	OXFAM	OXFAM	NaN	NaN	NaN
3	2023-07-03	NaN	Engine Oil Delo Silver SAE40/ Diesel Engine Oil	11.0	12000.0	132000.0
4	2023-07-03	NaN	Oil Filter 90915-30002-8T LC HZJ 78, 79,105	1.0	61200.0	61200.0

In [13]:

```
# Forward-fill missing values in the Issued To Column
df["Issued To"].fillna(method="ffill", inplace=True)
```

In [14]:

```
df.head()
```

Out[14]:

	Date	Issued To	Items	Quantity	Unit Price	Amount
0	2023-07-01	REMMY AKONYA	REMMY AKONYA	NaN	NaN	NaN
1	2023-07-01	REMMY AKONYA	2K Silver Paint	1.0	90000.0	90000.0
2	2023-07-03	OXFAM	OXFAM	NaN	NaN	NaN
3	2023-07-03	OXFAM	Engine Oil Delo Silver SAE40/ Diesel Engine Oil	11.0	12000.0	132000.0
4	2023-07-03	OXFAM	Oil Filter 90915-30002-8T LC HZJ 78, 79,105	1.0	61200.0	61200.0

In [15]:

```
# Droping rows with NaN values
df.dropna(inplace=True)
```

In [16]:

```
df.head(30)
```

Out[16]:

	Date	Issued To	Items	Quantity	Unit Price	Amount
1	2023-07-01	REMMY AKONYA	2K Silver Paint	1.0	90000.0	90000.0
3	2023-07-03	OXFAM	Engine Oil Delo Silver SAE40/ Diesel Engine Oil	11.0	12000.0	132000.0
4	2023-07-03	OXFAM	Oil Filter 90915-30002-8T LC HZJ 78, 79,105	1.0	61200.0	61200.0
5	2023-07-03	OXFAM	Diesel Filter 23390-51070 - L/C Hzj 76,79,VDJ200R	1.0	106800.0	106800.0
6	2023-07-03	OXFAM	Tie Rod End 45044-69135 L/C Hzj78	2.0	145000.0	290000.0
7	2023-07-03	OXFAM	Spring Bushes90385-18022 L/c Hzj 78	4.0	10500.0	42000.0
8	2023-07-03	OXFAM	Spring Bushes 90385-18021 Lc 178,79,12,105	8.0	10500.0	84000.0
11	2023-07-03	REAP	Engine Oil Delo Silver SAE40/ Diesel Engine Oil	10.0	12000.0	120000.0
12	2023-07-03	REAP	Oil Filter 15208-43G0A NissanH/B	2.0	33850.0	67700.0
15	2023-07-03	Jassy Kasami	Diesel Filter 23390-51070 - L/C Hzj 76,79,VDJ200R	1.0	106800.0	106800.0
18	2023-07-03	JUDICIARY	Brake Pads Frt 04465-60320 Prado/ KD2482	1.0	415140.0	415140.0
21	2023-07-03	JB UNITED CIVIL ENGINEERING	Rubbing Compound	0.5	10000.0	5000.0
22	2023-07-03	JB UNITED CIVIL ENGINEERING	Sand Paper P2000	2.0	3000.0	6000.0
25	2023-07-03	AIR FORCE	Gas Wire	8.0	3500.0	28000.0
28	2023-07-03	Min of Defence(M.O.D)	Brake Pad FRT 04465-60280 L/c VDJ 200R/KD2387	1.0	497000.0	497000.0
29	2023-07-03	Min of Defence(M.O.D)	Rear Brake Pads 04466-60160 LC VDJ 200R/KD2388	1.0	298000.0	298000.0
30	2023-07-03	Min of Defence(M.O.D)	Grill Light Red and Blue	1.0	150000.0	150000.0
31	2023-07-03	Min of Defence(M.O.D)	Remote Key Battery 89745- 52020 L/c Vdj 200R	1.0	25050.0	25050.0
32	2023-07-03	Min of Defence(M.O.D)	Aradite	1.0	12000.0	12000.0

	Date	Issued To	Items	Quantity	Unit Price	Amount
33	2023-07-03	Min of Defence(M.O.D)	Insulating Tape	1.0	5000.0	5000.0
34	2023-07-03	Min of Defence(M.O.D)	Supper Glue	1.0	2000.0	2000.0
37	2023-07-03	AIR FORCE	G.T SARVERO TYRES 265/65R17	4.0	582500.0	2330000.0
38	2023-07-03	AIR FORCE	Brake Pads Frt 04465-60320 Prado/ KD2482	1.0	415140.0	415140.0
39	2023-07-03	AIR FORCE	Brake Sheos 04495-0K160 Hilex Rev	1.0	200000.0	200000.0
42	2023-07-03	Wamuco Motors (U) LTD	A/c Filter 87139-30040/8713906050/87139-YZZ26	1.0	144853.0	144853.0
45	2023-07-03	Wamuco Motors (U) LTD	Wheel Nut Sport-Prado	1.0	25000.0	25000.0
48	2023-07-03	MEERA INVESTMENT	Filler Paste P-38-4 Kgs	1.0	16500.0	16500.0
49	2023-07-03	MEERA INVESTMENT	Sand Paper P 60 -All	2.0	3000.0	6000.0
50	2023-07-03	MEERA INVESTMENT	Supper Glue	2.0	2000.0	4000.0
51	2023-07-03	MEERA INVESTMENT	SILCON TUBE	1.0	16500.0	16500.0

Exploratory Data Analysis

In [17]: `df.shape`

Out[17]: (2542, 6)

In [18]: `df.info()`

```
<class 'pandas.core.frame.DataFrame'>
Index: 2542 entries, 1 to 4026
Data columns (total 6 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   Date        2542 non-null    datetime64[ns]
 1   Issued To  2542 non-null    object  
 2   Items       2542 non-null    object  
 3   Quantity    2542 non-null    float64 
 4   Unit Price  2542 non-null    float64 
 5   Amount      2542 non-null    float64 
dtypes: datetime64[ns](1), float64(3), object(2)
memory usage: 139.0+ KB
```

Client exploration

In [19]: `df['Issued To'].nunique()`

Out[19]: 192

We have 192 different clients from the month of July

Top Loyal clients

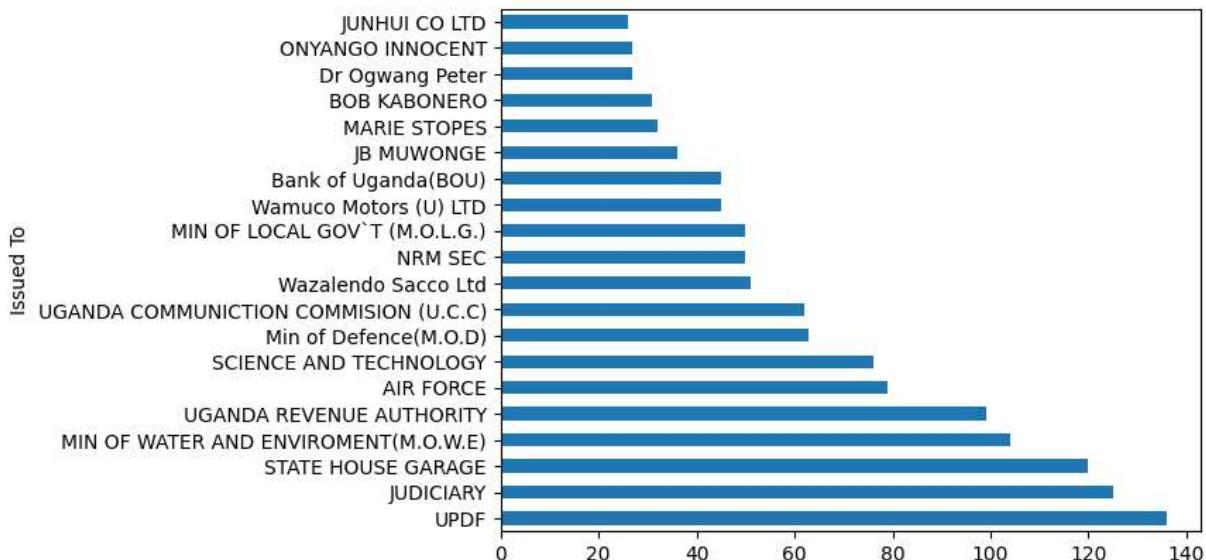
In [20]: `top20 = df['Issued To'].value_counts().head(20)`
`top20`

Issued To	count
UPDF	136
JUDICIARY	125
STATE HOUSE GARAGE	120
MIN OF WATER AND ENVIROMENT(M.O.W.E)	104
UGANDA REVENUE AUTHORITY	99
AIR FORCE	79
SCIENCE AND TECHNOLOGY	76
Min of Defence(M.O.D)	63
UGANDA COMMUNICTION COMMISION (U.C.C)	62
Wazalendo Sacco Ltd	51
NRM SEC	50
MIN OF LOCAL GOV`T (M.O.L.G.)	50
Wamuco Motors (U) LTD	45
Bank of Uganda(BOU)	45
JB MUWONGE	36
MARIE STOPES	32
BOB KABONERO	31
Dr Ogwang Peter	27
ONYANGO INNOCENT	27
JUNHUI CO LTD	26

Name: count, dtype: int64

In [21]: `top20.plot(kind = 'barh')`

Out[21]: <Axes: ylabel='Issued To'>



```
In [22]: last20 = df['Issued To'].value_counts().tail(20)
last20
```

```
Out[22]: Issued To
RICHARD KABONERO           1
SHEEBA KYOBUTUNGII          1
TYRE EXPRESS (U) LTD         1
SUZAN KAMPI                 1
MALE MICHAEL                1
AGE SAFARIS                  1
UNCST                         1
MUZUNI                         1
Dr NANDAULA MUTEMA           1
Mayunge Sugar Ltd             1
JORDAN M                      1
S.S.T                          1
ROBERT KAWANSI                1
Katale Augustine               1
UAP INSURANCE /RICHARD KAREGYESA 1
TUMUSIIME GEOFREY              1
DAVID / CO MARA MUSINGU        1
H.K SPARE PARTS                1
LWANGA RODNEY                 1
JOSEPH/ INTERNATION JUSTICE MISSION 1
Name: count, dtype: int64
```

Items Exploration

```
In [23]: df.head(1)
```

```
Out[23]:      Date    Issued To     Items  Quantity  Unit Price   Amount
1  2023-07-01  REMMY AKONYA  2K Silver Paint      1.0  90000.0  90000.0
```

```
In [24]: df['Items'].nunique()
```

Out[24]: 502

The store has 502 unique items

Fast Moving items

```
In [27]: fast_moving_items = df['Items'].value_counts().head(100)  
fast_moving_items
```

Out[27]: Items

Engine Oil Delo Silver SAE40/ Diesel Engine Oil	140
Thinner Standard	83
Strainers	77
Oil Filter 90915-YZZD2 - HILUX 90915-20003	68
Sand Paper P 60 -All	65
Black Duco	62
Masking Tape	61
Slow Thinner 601	52
Hardener Thinner 651 - All	50
Thinner Clear	49
Rubbing Compound	48
Sand Paper P2000	45
SILCON TUBE	45
Filler Paste P-38-4 Kgs	45
Supper Glue	45
A/c Filter 87139-30040/8713906050/87139-YZZ26	44
Degreaser 605	37
Tack Lag	37
Brake Pads Frt 04465-60320 Prado/ KD2482	35
Primer Thinner 631 - All	32
Putty 400 - All	31
Diesel Filter 23390-51070 - L/C Hzj 76,79,VDJ200R	30
Sand Paper 320	29
Oil Filter 04152-38020,YZZA4 L/C VDJ200R	28
Brake Fluid	26
Aradite	25
Hydraulic Oil -Texamatic 1888	24
2K Silver Paint	22
Radiator Coolant	21
Diesel Filter 23390-64480 1kz,51,31,1kd,2kd	19
GASKET MAKER GREY	19
Air Cleaner 17801-51020 LC VDJ 200R	19
Insulating Tape	18
Brake Pads Rear 04466-60140 , Kd2281,D-2090-MK	18
Rear Brake Pads 04466-60160 LC VDJ 200R/KD2388	16
Indicator Bulb Capless OLT10- A11158 12V 5W	16
Brake Pads 04465-0K240 Hilux/KD2389	15
Bulb Single Filment Ols255m120R/1156-ALL	15
Ignite Battery 75AH MF N-70ZL	15
G.T SARVERO TYRES 265/65R17	12
Welding Rodes G12	12
Oil Filter 90915-30002-8T LC HZJ 78, 79,105	12
Headlamp Bulb H11 12v	11
Brake Sheos 04495-0K160 Hilex Rev	11
Grill Light Red and Blue	11
Silver 2k-180	11
Gas Wire	10
Brake Pad FRT 04465-60280 L/c VDJ 200R/KD2387	10
Brake Light Bulb Rounddouble-1157	10
Brake Shoes 04495-0K120 Hilux Vigo	10

Name: count, dtype: int64

Amount Generated by each item

```
In [29]: # Calculating the amount generated by each item by multiplication
df["Total Amount"] = df["Quantity"] * df["Unit Price"]

# Top 50 items based on the total amount
top_50_items = df.groupby("Items")["Total Amount"].sum().nlargest(50)
print(top_50_items)
```

Items

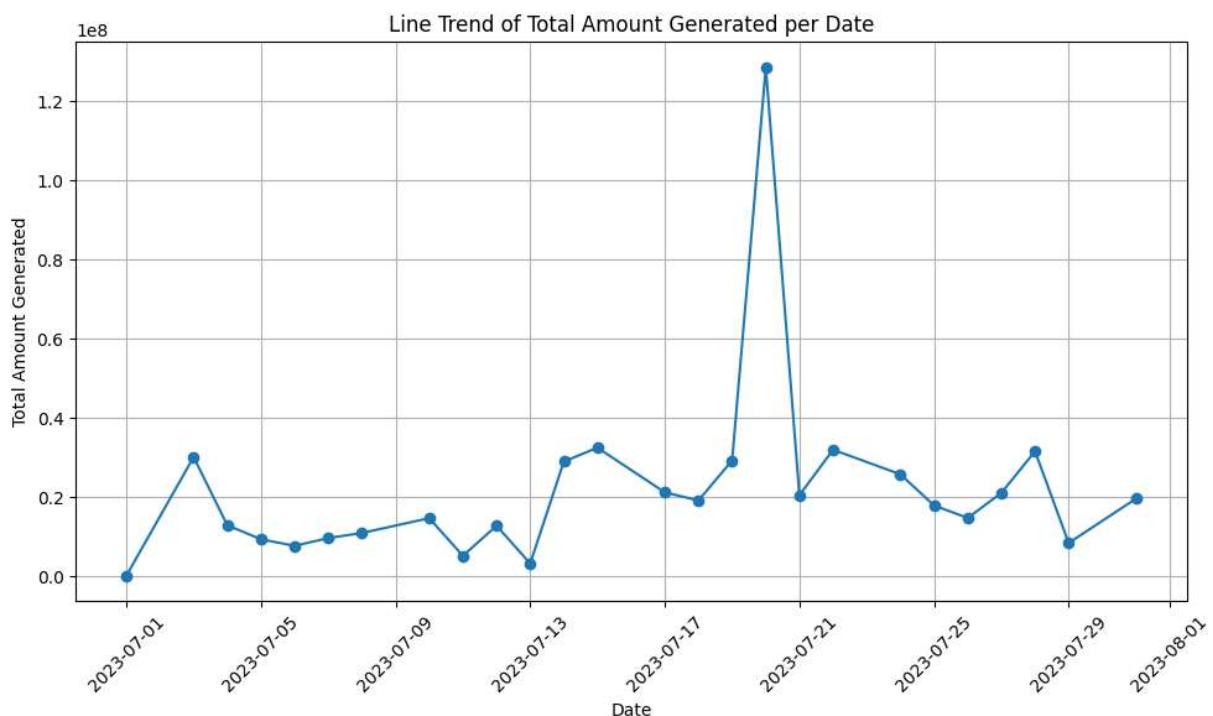
G.T SARVERO TYRES 265/65R17	75725000.00
Yokohama 265/65 R17 PRADO LJ 120	30800000.00
GT SAVERO TYRES 265/70R16	26400000.00
Milk	16300800.00
Engine Oil Delo Silver SAE40/ Diesel Engine Oil	14321000.00
Brake Pads Frt 04465-60320 Prado/ KD2482	11691960.00
Steering Rack 44200-60130 L/c Vdj200r	11310000.00
BRAKE BOOSTER ASSY 47050-60170	9607000.00
FALKEN TYRES 315/80R22.5 SUPER TF RUCK	7696000.00
Dunlop Tyres 285/50R20	6800000.00
Yokohama Tyre 285/70R17	5982472.00
Clutch Plate 31250-60382, 60383PRADO KDJ 150R	5480000.00
Thinner Clear	5420000.00
Bf Goodrich 265/75R16 ALL	5405815.00
Bfgoodrich Tyres 285/55R20 L/cv8	5400000.00
Pressure Plate 31210-60350 PRADO KDJ 150	5250000.00
BF Goodrich All Terrain 235/85R16 L/C	5214400.00
A/c Filter 87139-30040/8713906050/87139-YZZ26	5212854.00
Turbo Charger 17201-30161 Prado 150r	5116240.55
Siren Speaker-K/810014	5000000.00
Ignite Battery 75AH MF N-70ZL	4691000.00
Brake Pads Rear 04466-60140 , Kd2281,D-2090-MK	4671600.00
Brake Booster 47050-60201 Prado 150	4600000.00
SIREN CONTROL RADIO 868A169	4500000.00
FALKEN TYRES 315/80R22.5 18PLY SUPER	4360000.00
Rear Brake Pads 04466-60160 LC VDJ 200R/KD2388	4246000.00
STEERING PUMP ASSY 44310-60552	3976438.68
Brake Pad FRT 04465-60280 L/c VDJ 200R/KD2387	3668000.00
Slow Thinner 601	3590000.00
Brake Pads 04465-0K240 Hilux/KD2389	3525000.00
Brake Sheos 04495-0K160 Hilex Rev	3211000.00
Brake Shoes 04495-0K120 Hilux Vigo	3180200.00
Steering Rack 4410A604 Sportello	3155600.00
Yokohama Tyre 265/60 R18	3135000.00
Shock Absorber FR.48510-69365	3060000.00
Air Cleaner 17801-54170 HILUX LN 106	3000000.00
Yohohama 265/60R18 Hilux	2880000.00
Diesel Filter 23390-51070 - L/C Hzj 76,79,VDJ200R	2723400.00
Frt Shockabsorber 48510-80873 Prado 150r	2706000.00
Lower Suspension Bush Arm 48655-0k040	2656000.00
Filler Paste P-38-4 Kgs	2640000.00
Rack End 45503-09321lan,Kun25/SR-3880	2604500.00
GT Radial 245/70R16	2600000.00
GT SAVERO 265/75 R16	2600000.00
Primer Thinner 631 - All	2560000.00
Hardener Thinner 651 - All	2400000.00
Front Shockabsorber 48510-09J20	2376012.00
Brake Pad 1723538 Ford T6	2280000.00
Oil Filter 90915-YZZD2 - HILUX 90915-20003	2241100.00
Lower Suspension Plate Bush 48655-60050 Prado Kdj15	2043200.00

Name: Total Amount, dtype: float64

Trend Analysis

```
In [30]: # Calculate the sum of total amount generated per date
date_total = df.groupby("Date")["Total Amount"].sum()

# Plot the Line trend
plt.figure(figsize=(10, 6))
plt.plot(date_total.index, date_total.values, marker='o')
plt.title("Line Trend of Total Amount Generated per Date")
plt.xlabel("Date")
plt.ylabel("Total Amount Generated")
plt.xticks(rotation=45)
plt.grid(True)
plt.tight_layout()
plt.show()
```



Exporting File to Excel

```
In [32]: df.to_excel('July Issues 2023 Cleaned.xlsx', index = False)
```