In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
```

In [5]:
```
df=pd.read_csv('Amazon Sale Report.csv',encoding= 'unicode_escape')
```

In [6]:
```
df.shape
```

Out[6]:(128976, 21)

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

Out[4]:

	index	Order ID	Date	Status	Fulfilment	Sales Channel	ship-service-level	Category	Size	Courier Status	...	currency	Amount	ship-city	ship-state
0	0	405-8078784-5731545	04-30-22	Cancelled	Merchant	Amazon.in	Standard	T-shirt	S	On the Way	...	INR	647.62	MUMBAI	MAHARASHTRA
1	1	171-9198151-1101146	04-30-22	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	Shirt	3XL	Shipped	...	INR	406.00	BENGALURU	KARNATAKA
2	2	404-0687676-7273146	04-30-22	Shipped	Amazon	Amazon.in	Expedited	Shirt	XL	Shipped	...	INR	329.00	NAVI MUMBAI	MAHARASHTRA
3	3	403-9615377-8133951	04-30-22	Cancelled	Merchant	Amazon.in	Standard	Blazzer	L	On the Way	...	INR	753.33	PUDUCHERRY	PUDUCHERRY
4	4	407-1069790-7240320	04-30-22	Shipped	Amazon	Amazon.in	Expedited	Trousers	3XL	Shipped	...	INR	574.00	CHENNAI	TAMIL NADU

5 rows × 21 columns

In [7]:
```
df.tail()
```

Out[7]:

	index	Order ID	Date	Status	Fulfilment	Sales Channel	ship-service-level	Category	Size	Courier Status	...	currency	Amount	ship-city	ship-st
128971	128970	406-6001380-7673107	05-31-22	Shipped	Amazon	Amazon.in	Expedited	Shirt	XL	Shipped	...	INR	517.0	HYDERABAD	TELANGA
128972	128971	402-9551604-7544318	05-31-22	Shipped	Amazon	Amazon.in	Expedited	T-shirt	M	Shipped	...	INR	999.0	GURUGRAM	HARYA
128973	128972	407-9547469-3152358	05-31-22	Shipped	Amazon	Amazon.in	Expedited	Blazzer	XXL	Shipped	...	INR	690.0	HYDERABAD	TELANGA
128974	128973	402-6184140-0545956	05-31-22	Shipped	Amazon	Amazon.in	Expedited	T-shirt	XS	Shipped	...	INR	1199.0	Halol	Guja
128975	128974	408-7436540-8728312	05-31-22	Shipped	Amazon	Amazon.in	Expedited	T-shirt	S	Shipped	...	INR	696.0	Raipur	CHHATTISGA

5 rows × 21 columns

In [8]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 128976 entries, 0 to 128975
Data columns (total 21 columns):
 #   Column              Non-Null Count   Dtype  
---  ------              --------------   -----  
 0   index               128976 non-null  int64  
 1   Order ID            128976 non-null  object 
 2   Date                128976 non-null  object 
 3   Status              128976 non-null  object 
 4   Fulfilment          128976 non-null  object 
 5   Sales Channel       128976 non-null  object 
 6   ship-service-level  128976 non-null  object 
 7   Category            128976 non-null  object 
 8   Size                128976 non-null  object 
 9   Courier Status      128976 non-null  object 
 10  Qty                 128976 non-null  int64  
 11  currency            121176 non-null  object 
 12  Amount              121176 non-null  float64
 13  ship-city           128941 non-null  object 
 14  ship-state          128941 non-null  object 
 15  ship-postal-code    128941 non-null  float64
 16  ship-country        128941 non-null  object 
 17  B2B                 128976 non-null  bool   
 18  fulfilled-by        39263 non-null   object 
 19  New                 0 non-null       float64
 20  PendingS            0 non-null       float64
dtypes: bool(1), float64(4), int64(2), object(14)
memory usage: 19.8+ MB
```

```
In [9]: df.drop(['New','PendingS'], axis=1, inplace=True)
```

```
In [10]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 128976 entries, 0 to 128975
Data columns (total 19 columns):
 #   Column              Non-Null Count   Dtype  
---  ------              --------------   -----  
 0   index               128976 non-null  int64  
 1   Order ID            128976 non-null  object 
 2   Date                128976 non-null  object 
 3   Status              128976 non-null  object 
 4   Fulfilment          128976 non-null  object 
 5   Sales Channel       128976 non-null  object 
 6   ship-service-level  128976 non-null  object 
 7   Category            128976 non-null  object 
 8   Size                128976 non-null  object 
 9   Courier Status      128976 non-null  object 
 10  Qty                 128976 non-null  int64  
 11  currency            121176 non-null  object 
 12  Amount              121176 non-null  float64
 13  ship-city           128941 non-null  object 
 14  ship-state          128941 non-null  object 
 15  ship-postal-code    128941 non-null  float64
 16  ship-country        128941 non-null  object 
 17  B2B                 128976 non-null  bool   
 18  fulfilled-by        39263 non-null   object 
dtypes: bool(1), float64(2), int64(2), object(14)
memory usage: 17.8+ MB
```

```
In [11]: pd.isnull(df)
```

Out[11]:

	index	Order ID	Date	Status	Fulfilment	Sales Channel	ship-service-level	Category	Size	Courier Status	Qty	currency	Amount	ship-city	ship-state	ship-postal-code	ship-country
0	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
128971	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
128972	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
128973	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
128974	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
128975	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False

128976 rows × 19 columns

In [12]:
```
pd.isnull(df).sum()
```

Out[12]:
```
index                  0
Order ID               0
Date                   0
Status                 0
Fulfilment             0
Sales Channel          0
ship-service-level     0
Category               0
Size                   0
Courier Status         0
Qty                    0
currency            7800
Amount              7800
ship-city             35
ship-state            35
ship-postal-code      35
ship-country          35
B2B                    0
fulfilled-by       89713
dtype: int64
```

In [13]:
```
df.shape
```

Out[13]:
```
(128976, 19)
```

In [14]:
```
df.dropna(inplace=True)
```

In [15]:
```
df.shape
```

Out[15]:
```
(37514, 19)
```

In [16]:
```
df.columns
```

Out[16]:
```
Index(['index', 'Order ID', 'Date', 'Status', 'Fulfilment', 'Sales Channel',
       'ship-service-level', 'Category', 'Size', 'Courier Status', 'Qty',
       'currency', 'Amount', 'ship-city', 'ship-state', 'ship-postal-code',
       'ship-country', 'B2B', 'fulfilled-by'],
      dtype='object')
```

In [17]:
```
df['ship-postal-code']=df['ship-postal-code'].astype('int')
```

In [18]:
```
df['ship-postal-code'].dtype
```

Out[18]:
```
dtype('int32')
```

In [19]:
```
df['Date']=pd.to_datetime (df['Date'])
```

In [20]:
```
df.columns
```

Out[20]:
```
Index(['index', 'Order ID', 'Date', 'Status', 'Fulfilment', 'Sales Channel',
       'ship-service-level', 'Category', 'Size', 'Courier Status', 'Qty',
       'currency', 'Amount', 'ship-city', 'ship-state', 'ship-postal-code',
       'ship-country', 'B2B', 'fulfilled-by'],
      dtype='object')
```

In [21]:
```
df.rename(columns={'Qty':'Quantity'})
```

```
Out[21]:
        index Order ID            Date       Status                         Fulfilment Sales Channel ship-service-level Category Size Courier Status Quantity currency Amount ship-city
0       0      405-8078784-5731545 2022-04-30 Cancelled                      Merchant   Amazon.in     Standard           T-shirt  S    On the Way     0        INR      647.62 MUMBAI          M
1       1      171-9198151-1101146 2022-04-30 Shipped - Delivered to Buyer   Merchant   Amazon.in     Standard           Shirt    3XL  Shipped        1        INR      406.00 BENGALURU
3       3      403-9615377-8133951 2022-04-30 Cancelled                      Merchant   Amazon.in     Standard           Blazzer  L    On the Way     0        INR      753.33 PUDUCHERRY      P
7       7      406-7807733-3785945 2022-04-30 Shipped - Delivered to Buyer   Merchant   Amazon.in     Standard           Shirt    S    Shipped        1        INR      399.00 HYDERABAD
12      12     405-5513694-8146768 2022-04-30 Shipped - Delivered to Buyer   Merchant   Amazon.in     Standard           Shirt    XS   Shipped        1        INR      399.00 Amravati.       M
...     ...    ...                 ...        ...                            ...        ...           ...                ...      ...  ...            ...      ...      ...    ...
128875  128874 405-4724097-1016369 2022-06-01 Shipped - Delivered to Buyer   Merchant   Amazon.in     Standard           T-shirt  S    Shipped        1        INR      854.00 ALLUR
128876  128875 403-9524128-9243508 2022-06-01 Cancelled                      Merchant   Amazon.in     Standard           Blazzer  XL   On the Way     0        INR      734.29 Barabanki
128888  128887 405-6493630-8542756 2022-05-31 Shipped - Delivered to Buyer   Merchant   Amazon.in     Standard           Trousers M    Shipped        1        INR      518.00 NOIDA
128891  128890 407-0116398-1810752 2022-05-31 Cancelled                      Merchant   Amazon.in     Standard           Wallet   Free On the Way     0        INR      398.10 MADURAI
128892  128891 403-0317423-9322704 2022-05-31 Shipped - Delivered to Buyer   Merchant   Amazon.in     Standard           Blazzer  M    Shipped        1        INR      721.00 UTTAR BAGDOGRA  V

37514 rows × 19 columns
```

```
In [22]: df.describe()
```

```
Out[22]:
              index          Qty       Amount  ship-postal-code
count  37514.000000 37514.000000 37514.000000      37514.000000
mean   60953.809858     0.867383   646.553960     463291.552754
std    36844.853039     0.354160   279.952414     194550.425637
min        0.000000     0.000000     0.000000     110001.000000
25%    27235.250000     1.000000   458.000000     370465.000000
50%    63470.500000     1.000000   629.000000     500019.000000
75%    91790.750000     1.000000   771.000000     600042.000000
max   128891.000000     5.000000  5495.000000     989898.000000
```

```
In [23]: df.describe(include='object')
```

```
Out[23]:
                   Order ID                        Status Fulfilment Sales Channel ship-service-level Category  Size Courier Status currency  ship-city  ship-state ship-country fulfilled-by
count                 37514                         37514      37514         37514              37514    37514 37514          37514    37514      37514       37514        37514        37514
unique                34664                            11          1             1                  1        8    11              3        1       4698          58            1            1
top     171-5057375-2831560  Shipped - Delivered to Buyer   Merchant     Amazon.in           Standard  T-shirt     M        Shipped      INR  BENGALURU MAHARASHTRA           IN    Easy Ship
freq                     12                         28741      37514         37514              37514    14062  6806          31859    37514       2839        6236        37514        37514
```

```
In [24]: df[['Qty','Amount']].describe()
```

Out[24]:
```
                Qty         Amount
count  37514.000000   37514.000000
mean       0.867383     646.553960
std        0.354160     279.952414
min        0.000000       0.000000
25%        1.000000     458.000000
50%        1.000000     629.000000
75%        1.000000     771.000000
max        5.000000    5495.000000
```

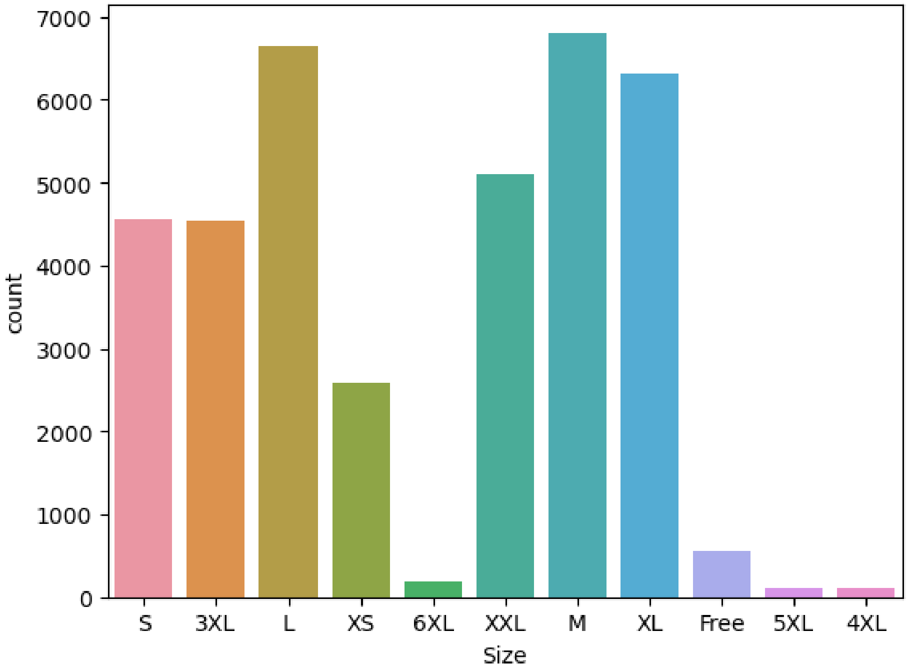
Exploratory Data Analysis

In [25]:
```
df.columns
```

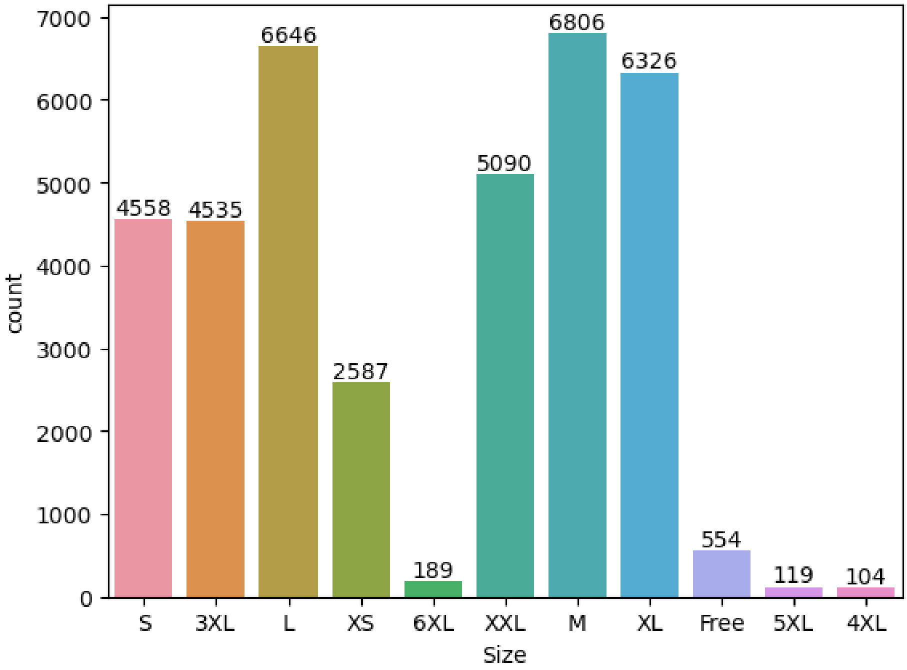
Out[25]:
```
Index(['index', 'Order ID', 'Date', 'Status', 'Fulfilment', 'Sales Channel',
       'ship-service-level', 'Category', 'Size', 'Courier Status', 'Qty',
       'currency', 'Amount', 'ship-city', 'ship-state', 'ship-postal-code',
       'ship-country', 'B2B', 'fulfilled-by'],
      dtype='object')
```

size

In [26]:
```
ax=sns.countplot(x='Size' ,data=df)
```



In [27]:
```
ax=sns.countplot(x='Size' ,data=df)

for bars in ax.containers:
    ax.bar_label(bars)
```



Note: From above Graph you can see that most of the people buys M-Size

Group By

The groupby() function in pandas is used to group data based on one or more columns in a DataFrame

In [28]:

```
df.groupby(['Size'], as_index=False)['Qty'].sum().sort_values(by='Qty',ascending=False)
```

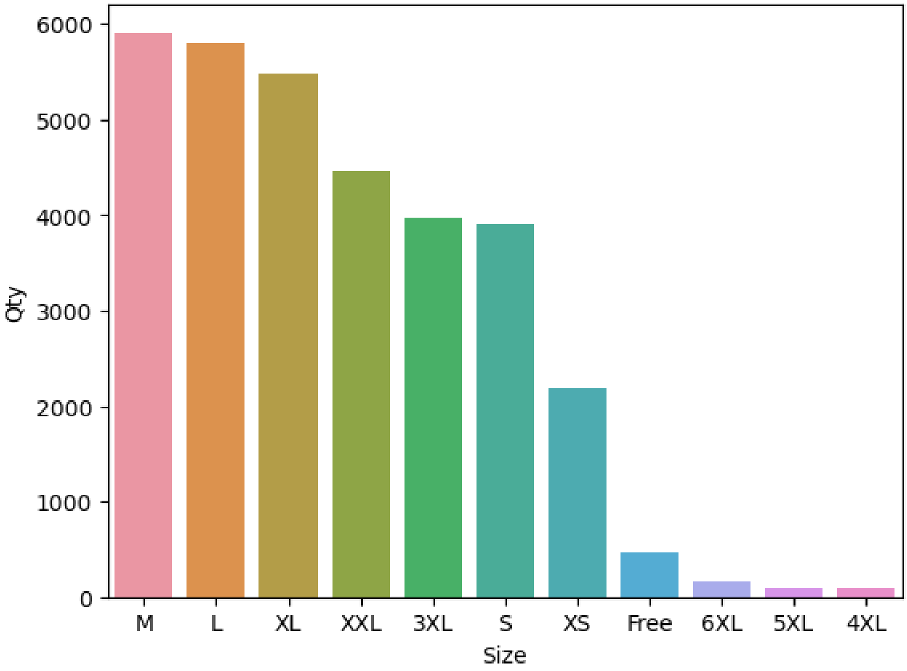
Out[28]:

```
     Size   Qty
 6      M  5905
 5      L  5795
 8     XL  5481
10    XXL  4465
 0    3XL  3972
 7      S  3896
 9     XS  2191
 4   Free   467
 3    6XL   170
 2    5XL   104
 1    4XL    93
```

In [29]:

```
S_Qty=df.groupby(['Size'], as_index=False)['Qty'].sum().sort_values(by='Qty',ascending=False)

sns.barplot(x='Size',y='Qty', data=S_Qty)
```

```
Out[29]:<Axes: xlabel='Size', ylabel='Qty'>
```

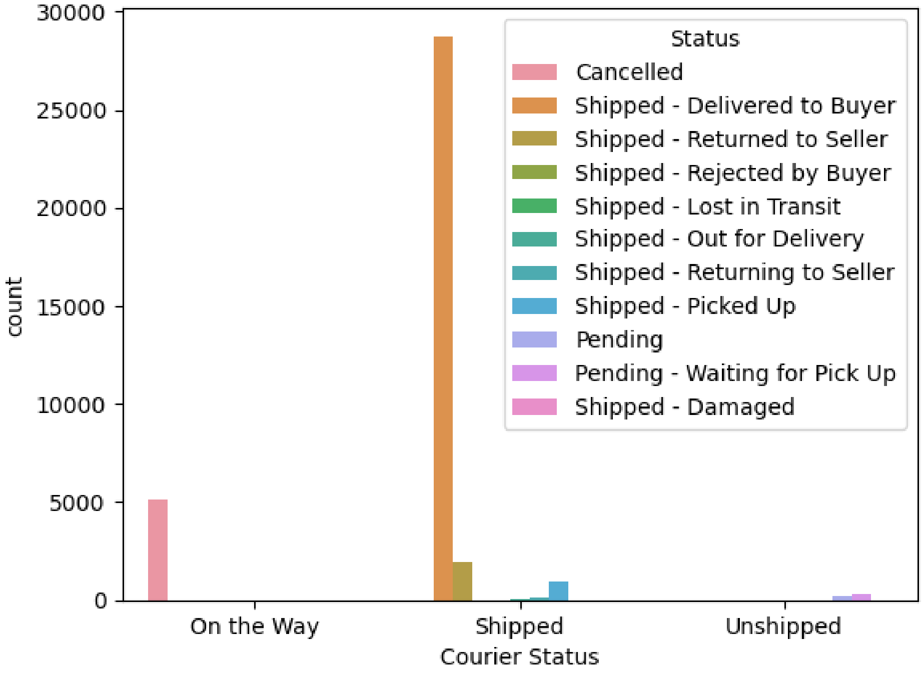


Note: From above Graph you can see that most of the Qty buys M-Size in the sales

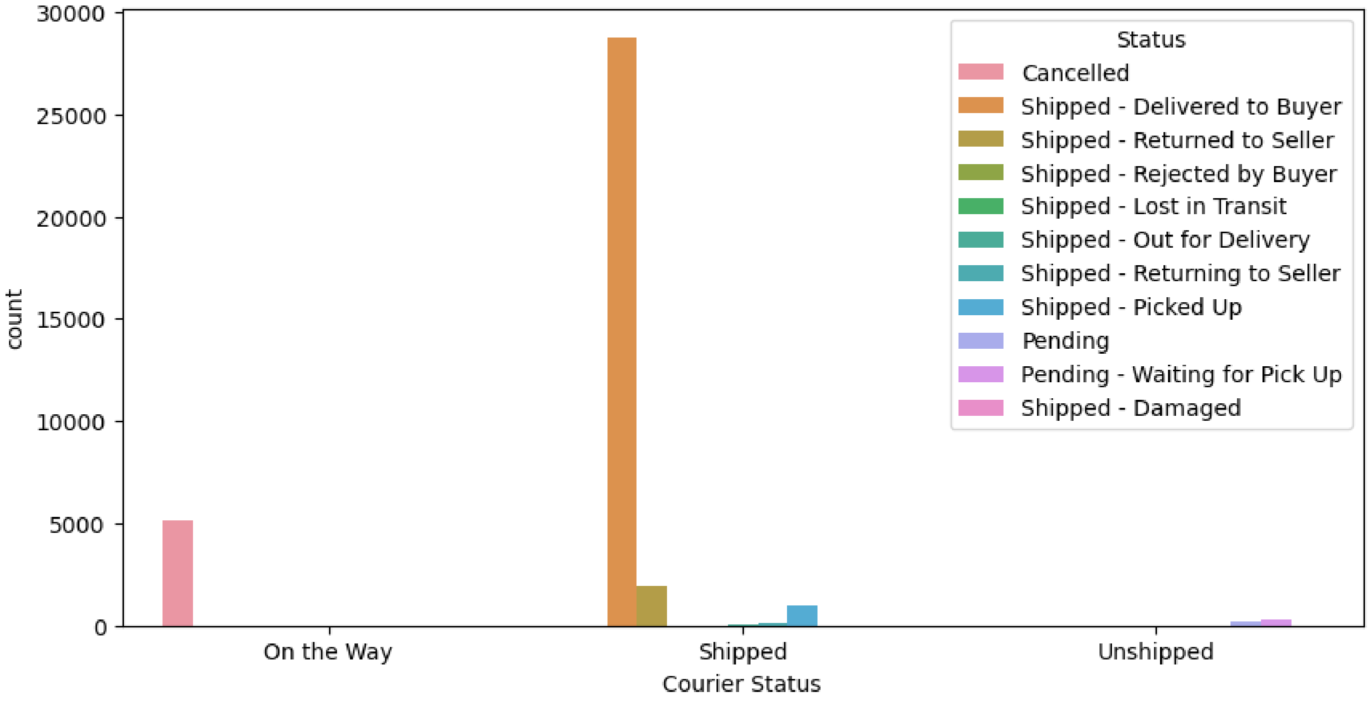
Courier Status

In [30]:
```
sns.countplot(data=df, x='Courier Status',hue= 'Status')
```

```
Out[30]:<Axes: xlabel='Courier Status', ylabel='count'>
```



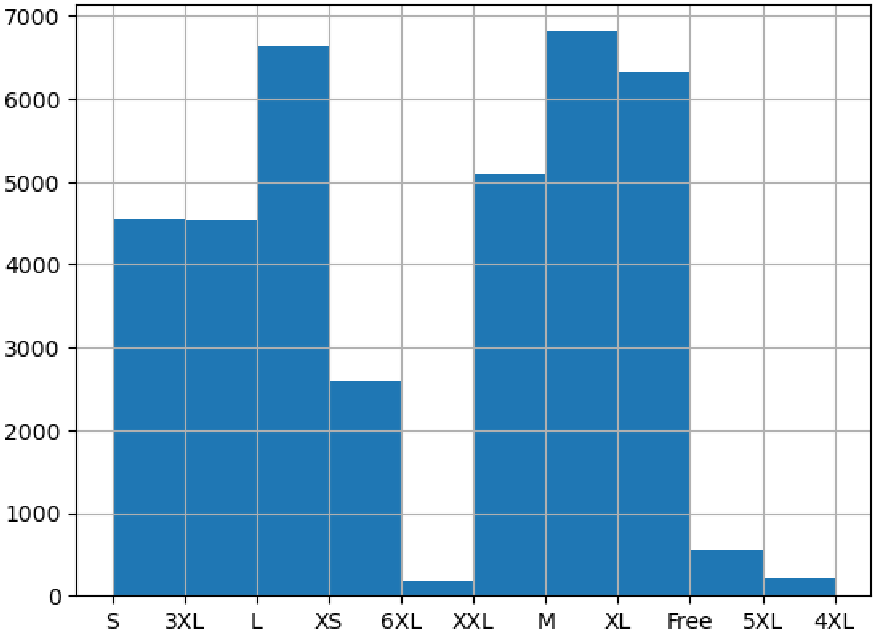
In [31]:
```
plt.figure(figsize=(10,5))

ax=sns.countplot(data=df, x='Courier Status',hue= 'Status')

plt.show()
```



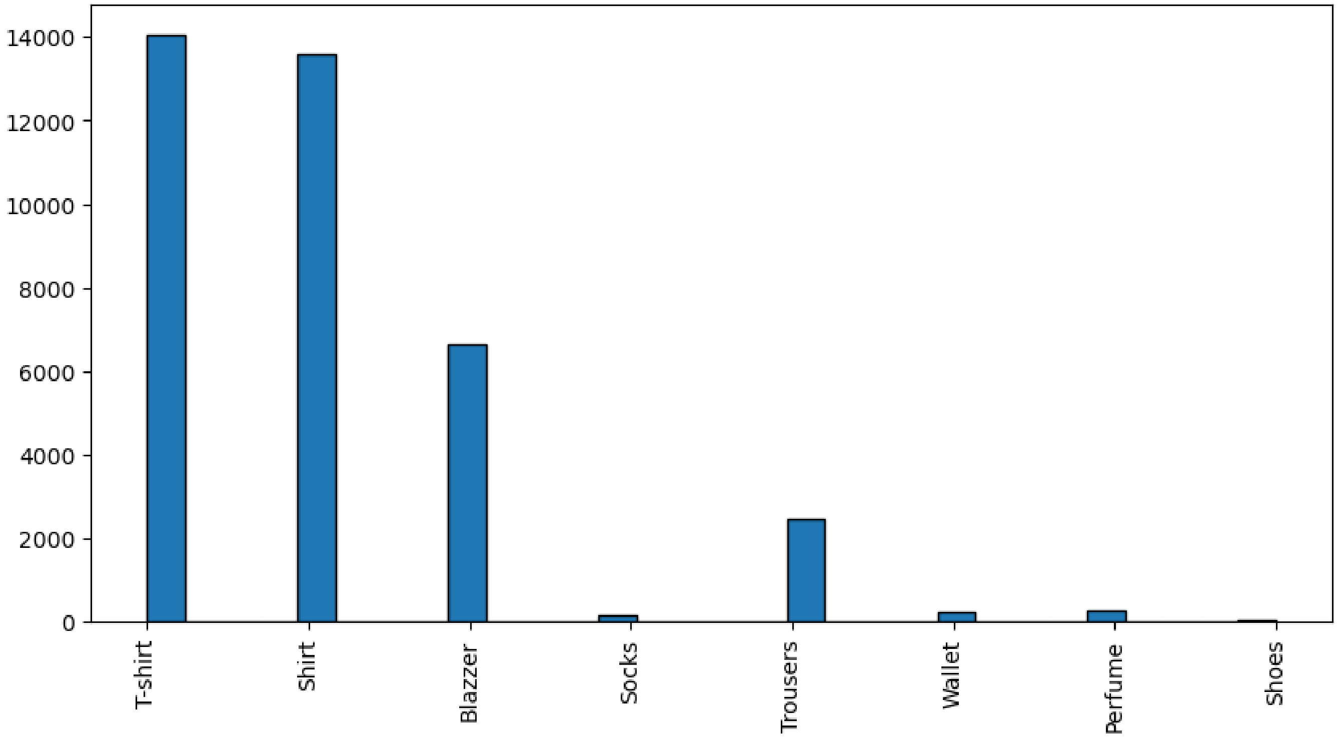
Note: From above Graph the majority of the orders are shipped through the courier.

In [32]:
```
df['Size'].hist()
```

Out[32]:<Axes: >

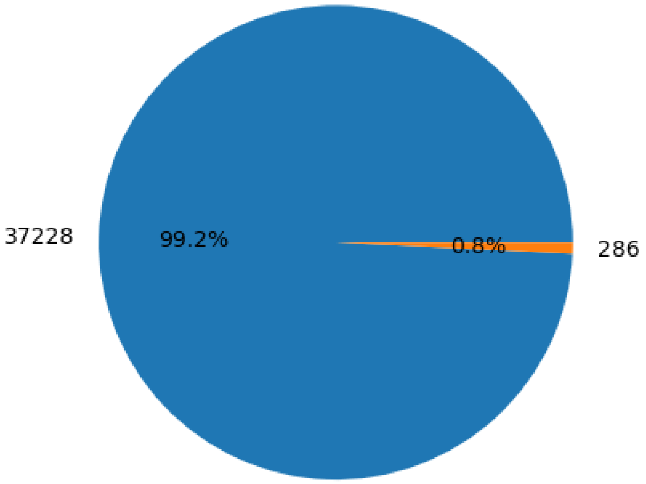


In [33]:
```
df['Category'] = df['Category'].astype(str)
column_data = df['Category']
plt.figure(figsize=(10, 5))
plt.hist(column_data, bins=30, edgecolor='Black')
plt.xticks(rotation=90)
plt.show()
```

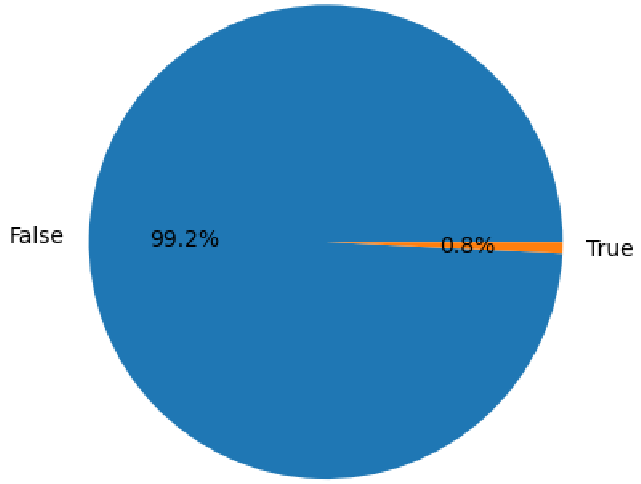


Note: From above Graph you can see that most of the buyers are T-shirt

In [34]:
```
# Checking B2B Data  by using pie chart
B2B_Check = df['B2B'].value_counts()

#  Plot the pie chart
plt.pie(B2B_Check, labels=B2B_Check, autopct='%1.1f%%')
#plt.axis('equal')
plt.show()
```

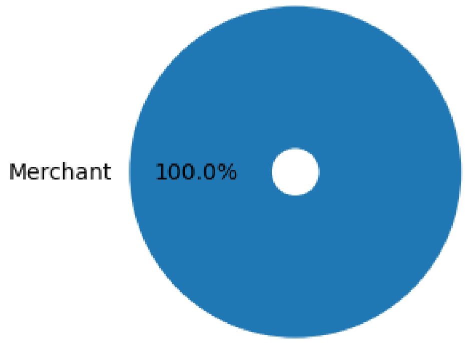


In [35]:
```
# Checking B2B Data  by using pie chart
B2B_Check = df['B2B'].value_counts()

#  Plot the pie chart
plt.pie(B2B_Check, labels=B2B_Check.index, autopct='%1.1f%%')
#plt.axis('equal')
plt.show()
```



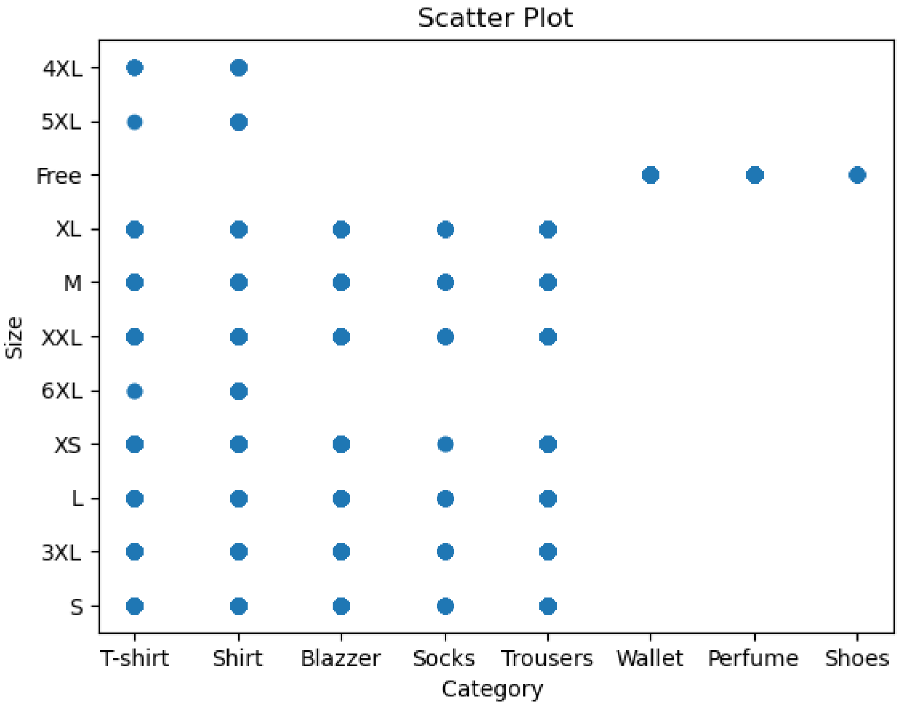
Note : From above chart we can see that maximum i.e. 99.3% of buyers are retailers and 0.7% are B2B buyers

In [36]:
```
#  Prepare data for pie chart
a1 = df['Fulfilment'].value_counts()

# Step 4: Plot the pie chart
fig, ax = plt.subplots()

ax.pie(a1, labels=a1.index, autopct='%1.1f%%', radius=0.7, wedgeprops=dict(width=0.6))
ax.set(aspect="equal")

plt.show()
```



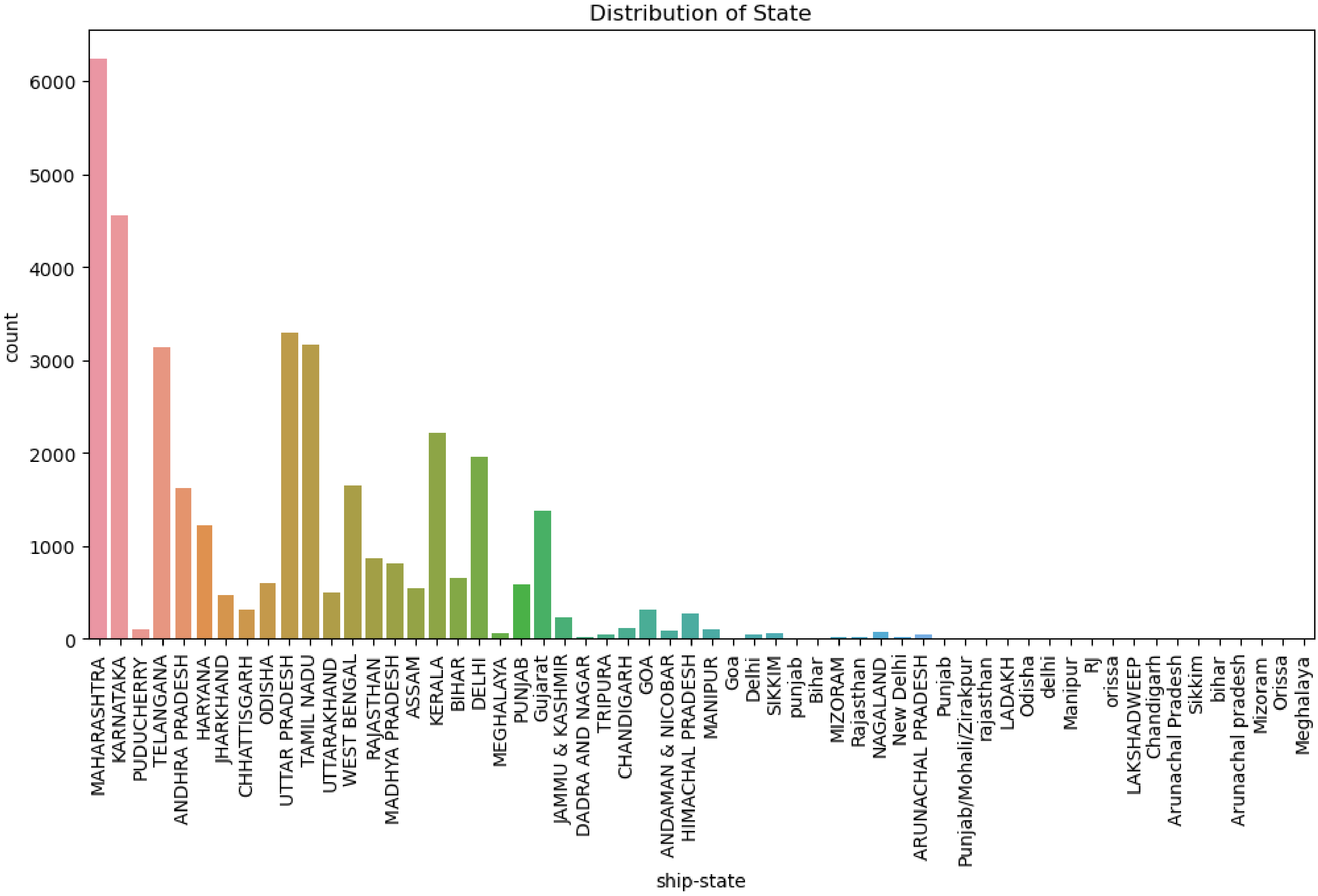
Note: From above chart you can see that most of the Fulfilment are amazon

In [37]:
```
# Prepare data for scatter plot
x_data = df['Category']
y_data = df['Size']

# Plot the scatter plot
plt.scatter(x_data, y_data)
plt.xlabel('Category ')
plt.ylabel('Size')
plt.title('Scatter Plot')
plt.show()
```



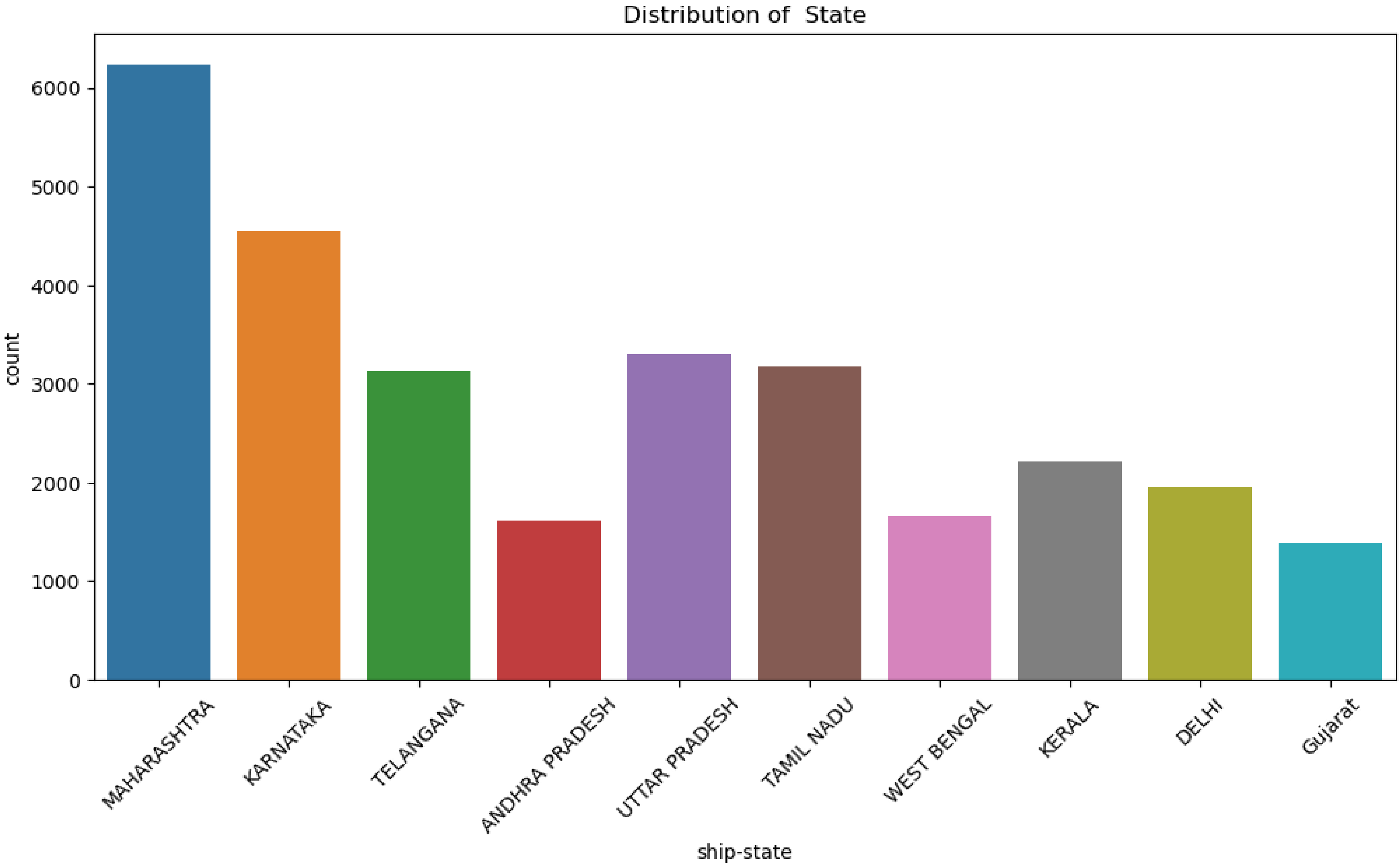
In [38]:

```
# Plot count of cities by state
plt.figure(figsize=(12, 6))
sns.countplot(data=df, x='ship-state')
plt.xlabel('ship-state')
plt.ylabel('count')
plt.title('Distribution of State')
plt.xticks(rotation=90)
plt.show()
```



In [39]:

```
# top_10_States
top_10_state = df['ship-state'].value_counts().head(10)
# Plot count of cities by state
plt.figure(figsize=(12, 6))
sns.countplot(data=df[df['ship-state'].isin(top_10_state.index)], x='ship-state')
plt.xlabel('ship-state')
plt.ylabel('count')
plt.title('Distribution of  State')
plt.xticks(rotation=45)
plt.show()
```



Note: From above Graph you can see that most of the buyers are Maharashtra state

Conclusion

The data analysis reveals that the business has a significant customer base in Maharashtra state, mainly serves retailers, fulfills orders through Amazon, experiences high demand for T-shirts, and sees M-Size as the preferred choice among buyers.

In [ ]:

In [ ]: