In [1]:
```
# importing libraries

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

In [2]:
```
# importing dataset
df=pd.read_csv('Amazon Sale Report.csv',encoding= 'unicode_escape')
```

In [3]:
```
# gathering data information
df.shape
```

Out[3]:
```
(128976, 21)
```

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

Out[4]:

	index	Order ID	Date	Status	Fulfilment	Sales Channel	ship-service-level	Category	Size	Courier Status	.
0	0	405-8078784-5731545	04-30-22	Cancelled	Merchant	Amazon.in	Standard	T-shirt	S	On the Way	.
1	1	171-9198151-1101146	04-30-22	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	Shirt	3XL	Shipped	.
2	2	404-0687676-7273146	04-30-22	Shipped	Amazon	Amazon.in	Expedited	Shirt	XL	Shipped	.
3	3	403-9615377-8133951	04-30-22	Cancelled	Merchant	Amazon.in	Standard	Blazzer	L	On the Way	.
4	4	407-1069790-7240320	04-30-22	Shipped	Amazon	Amazon.in	Expedited	Trousers	3XL	Shipped	.

5 rows × 21 columns

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

Out[5]:

	index	Order ID	Date	Status	Fulfilment	Sales Channel	ship-service-level	Category	Size	Cou Sta
128971	128970	406-6001380-7673107	05-31-22	Shipped	Amazon	Amazon.in	Expedited	Shirt	XL	Ship
128972	128971	402-9551604-7544318	05-31-22	Shipped	Amazon	Amazon.in	Expedited	T-shirt	M	Ship
128973	128972	407-9547469-3152358	05-31-22	Shipped	Amazon	Amazon.in	Expedited	Blazzer	XXL	Ship
128974	128973	402-6184140-0545956	05-31-22	Shipped	Amazon	Amazon.in	Expedited	T-shirt	XS	Ship
128975	128974	408-7436540-8728312	05-31-22	Shipped	Amazon	Amazon.in	Expedited	T-shirt	S	Ship

5 rows × 21 columns

In [6]:
```
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 [7]:
```
#drop unrelated/blank columns
df.drop(['New','PendingS'], axis=1, inplace=True)
```

In [8]:
```
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 [9]:
```
# data cleaning and manipulation
pd.isnull(df)
# checking null value
```

Out[9]:

	index	Order ID	Date	Status	Fulfilment	Sales Channel	ship-service-level	Category	Size	Courier Status	C
0	False	False	False	False	False	False	False	False	False	False	Fa
1	False	False	False	False	False	False	False	False	False	False	Fa
2	False	False	False	False	False	False	False	False	False	False	Fa
3	False	False	False	False	False	False	False	False	False	False	Fa
4	False	False	False	False	False	False	False	False	False	False	Fa
...	...	...	...	...	...	...	...	...	...	...	
128971	False	False	False	False	False	False	False	False	False	False	Fa
128972	False	False	False	False	False	False	False	False	False	False	Fa
128973	False	False	False	False	False	False	False	False	False	False	Fa
128974	False	False	False	False	False	False	False	False	False	False	Fa
128975	False	False	False	False	False	False	False	False	False	False	Fa

128976 rows × 19 columns

In [10]:
```
pd.isnull(df).sum()
# sum will give total values of null values
```

Out[10]:
```
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 [11]:
```
df.shape
```

Out[11]:
```
(128976, 19)
```

In [12]:
```
#drop null values
df.dropna(inplace=True)
```

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

Out[13]:
```
(37514, 19)
```

In [14]:
```
df.columns
```

Out[14]:
```
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 [15]:
```
# change data type
df['ship-postal-code']=df['ship-postal-code'].astype('int')
```

In [16]:
```
#checking whether the  data type change or not
df['ship-postal-code'].dtype
```

Out[16]:
```
dtype('int32')
```

In [17]:
```
df['Date']=pd.to_datetime (df['Date'])
```

In [18]:
```
df.columns
```

Out[18]:
```
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 [19]:
```
#rename Columns
df.rename(columns={'Qty':'Quantity'})
```

Out[19]:

	index	Order ID	Date	Status	Fulfilment	Sales Channel	ship-service-level	Category	Size	Cc S
0	0	405-8078784-5731545	2022-04-30	Cancelled	Merchant	Amazon.in	Standard	T-shirt	S	C
1	1	171-9198151-1101146	2022-04-30	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	Shirt	3XL	Sh
3	3	403-9615377-8133951	2022-04-30	Cancelled	Merchant	Amazon.in	Standard	Blazzer	L	C
7	7	406-7807733-3785945	2022-04-30	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	Shirt	S	Sh
12	12	405-5513694-8146768	2022-04-30	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	Shirt	XS	Sh
...	...	...	...	...	...	...	...	...	...	
128875	128874	405-4724097-1016369	2022-06-01	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	T-shirt	S	Sh
128876	128875	403-9524128-9243508	2022-06-01	Cancelled	Merchant	Amazon.in	Standard	Blazzer	XL	C
128888	128887	405-6493630-8542756	2022-05-31	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	Trousers	M	Sh
128891	128890	407-0116398-1810752	2022-05-31	Cancelled	Merchant	Amazon.in	Standard	Wallet	Free	C
128892	128891	403-0317423-9322704	2022-05-31	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	Blazzer	M	Sh

37514 rows × 19 columns

In [20]:
```
#describe() method return description of the data in the DataFrame(i.e count,r
df.describe()
```

Out[20]:

	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 [21]:
```
df.describe(include='object')
```

Out[21]:

	Order ID	Status	Fulfilment	Sales Channel	ship-service-level	Category	Size	Courier Status	currency
count	37514	37514	37514	37514	37514	37514	37514	37514	37514
unique	34664	11	1	1	1	8	11	3	1
top	171-5057375-2831560	Shipped - Delivered to Buyer	Merchant	Amazon.in	Standard	T-shirt	M	Shipped	INR
freq	12	28741	37514	37514	37514	14062	6806	31859	37514

In [22]:
```
#use describe() for specific columns
df[['Qty','Amount']].describe()
```

Out[22]:

	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

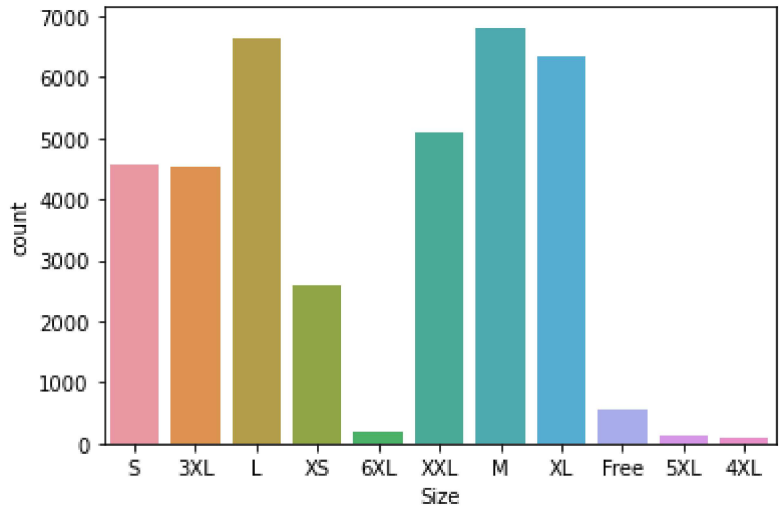
Exploratory Data Analysis

In [23]:
```
df.columns
```

Out[23]:
```
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 [24]:
```
ax=sns.countplot(x='Size' ,data=df)
```



In [35]:
```
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

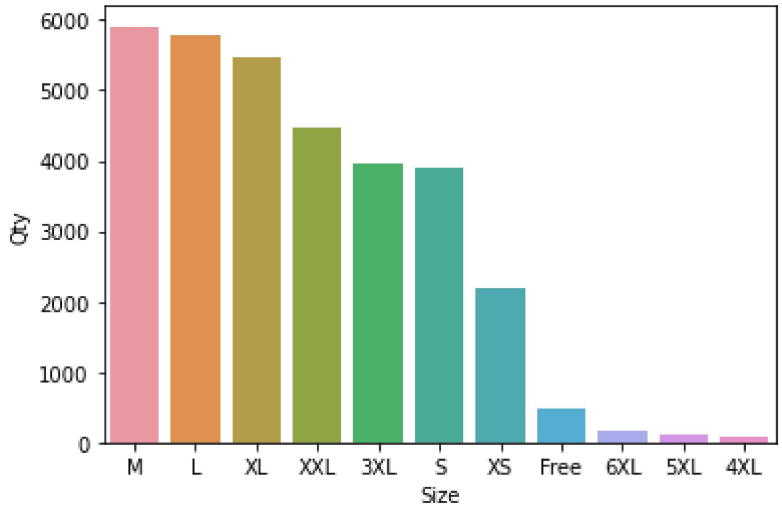
In [25]:
```
df.groupby(['Size'], as_index=False)['Qty'].sum().sort_values(by='Qty',ascend
```

Out[25]:

	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 [26]:
```
S_Qty=df.groupby(['Size'], as_index=False)['Qty'].sum().sort_values(by='Qty',a

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

Out[26]:
```
<AxesSubplot:xlabel='Size', ylabel='Qty'>
```

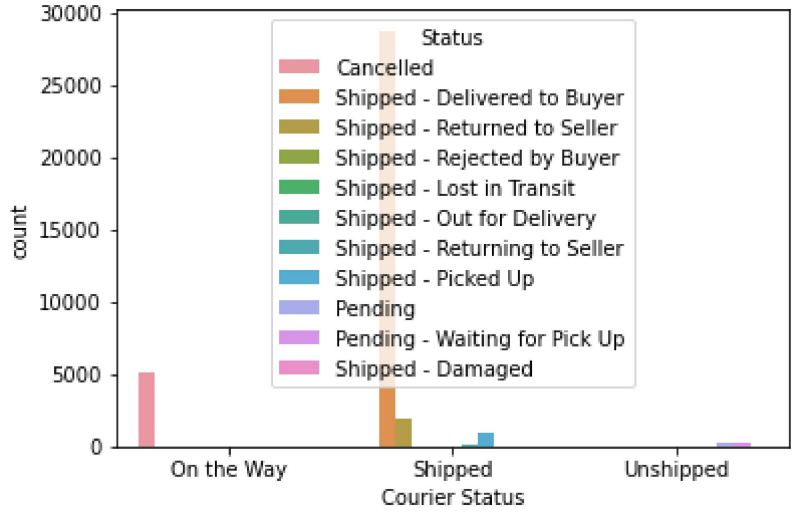


Note: From above Graph you can see that most of the Qty buys M-Size in the sales

Courier Status

In [27]:
```
sns.countplot(data=df, x='Courier Status',hue= 'Status')
```

Out[27]:
```
<AxesSubplot:xlabel='Courier Status', ylabel='count'>
```

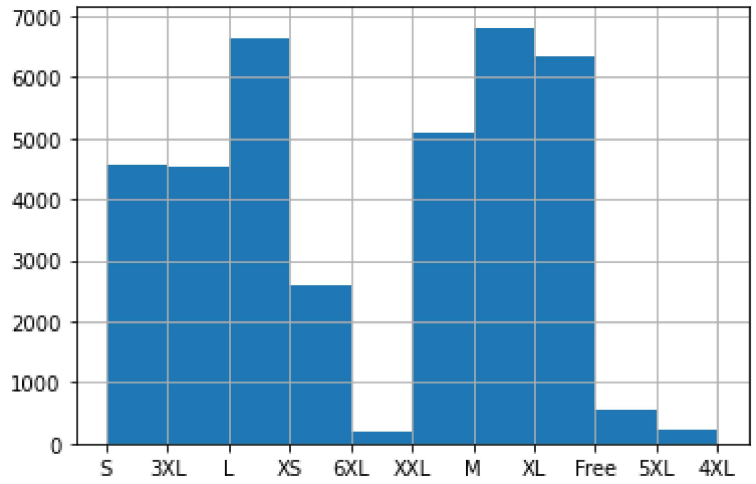


In [28]:
```
plt.figure(figsize=(10,5))

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

plt.show()
```

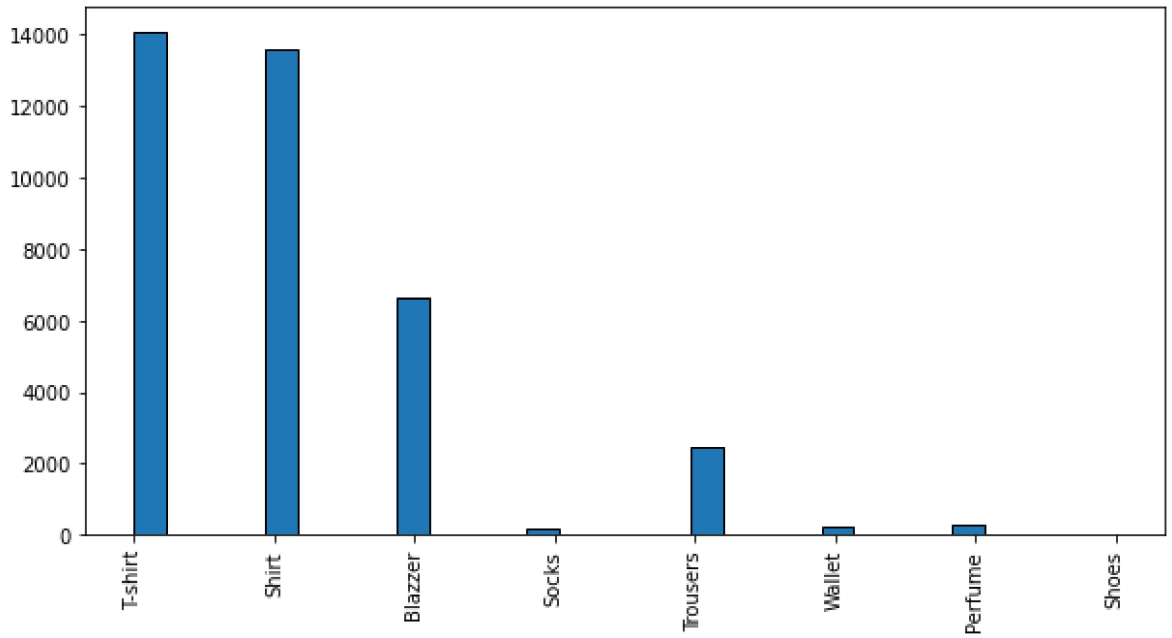
Note: From above Graph the majority of the orders are shipped through the courier.

In [29]:
```
#histogram
df['Size'].hist()
```

Out[29]: <AxesSubplot:>

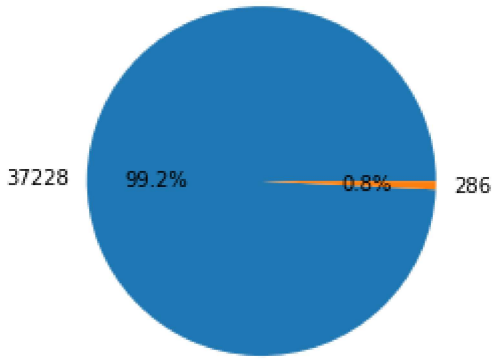


In [30]:
```
df['Category'] = df['Category'].astype(str)
column_data = df['Category']
plt.figure(figsize=(10, 5))
plt.hist(column_data, bins=30, edgecolor='Black')
plt.xticks(rotation=90)
plt.show()
```

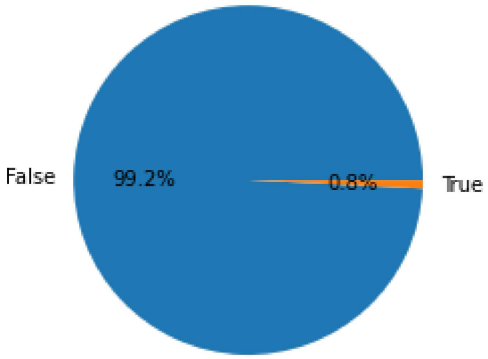


Note: From above Graph you can see that most of the buyers are T-shirt

In [31]:
```
# 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()
```

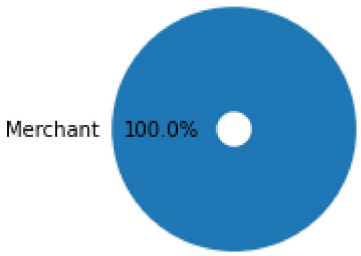


In [32]:
```
# Checking B2B Data  by using pie chart
B2B_Check = df['B2B'].value_counts()

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



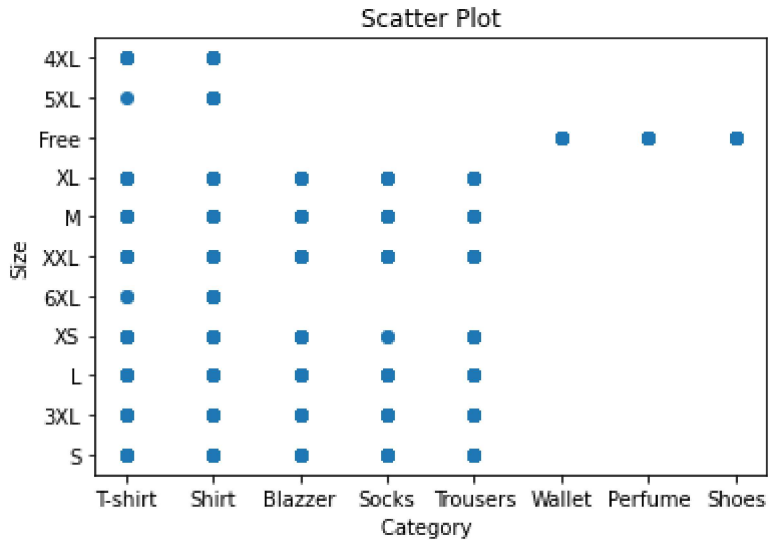
Note : From above chart we can see that maximum i.e. 99.3% of buyers are retailers and 0.7% are B2B buyers

In [33]:
```
#  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(wi
ax.set(aspect="equal")

plt.show()
```



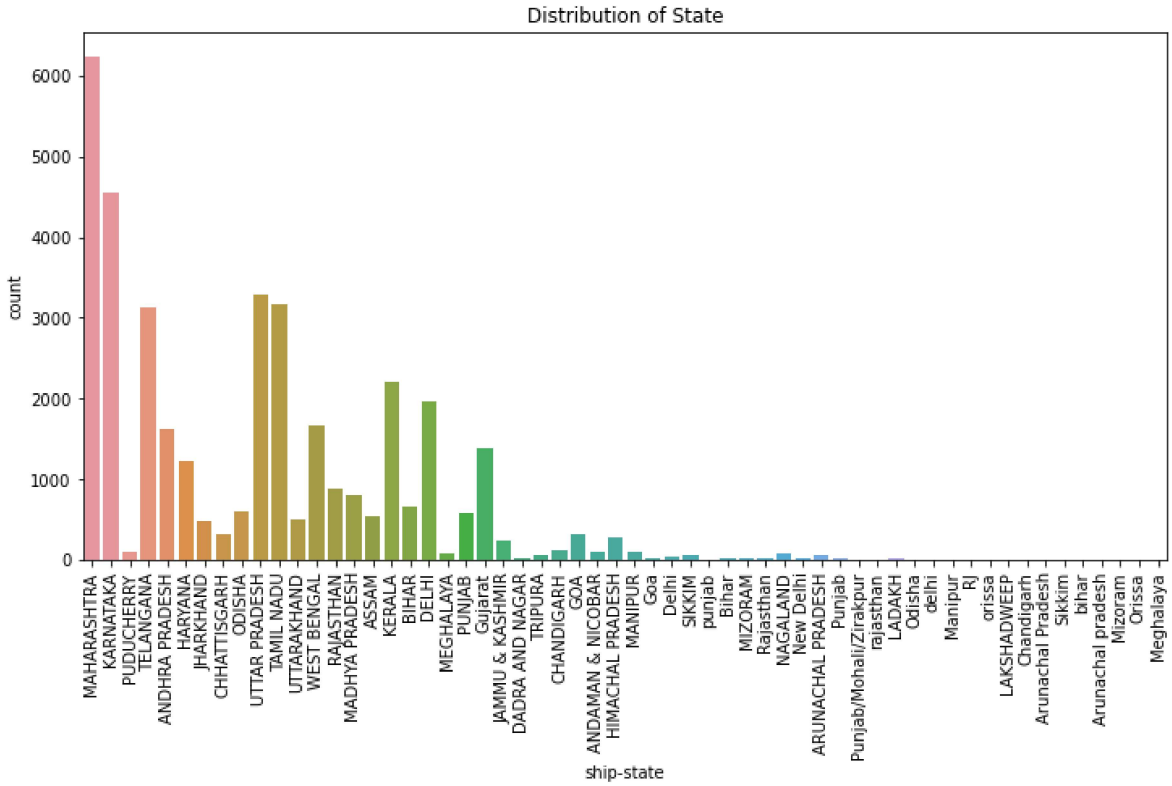
Note: From above chart you can see that most of the Fulfilment are amazon

In [34]:
```
# 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()
```

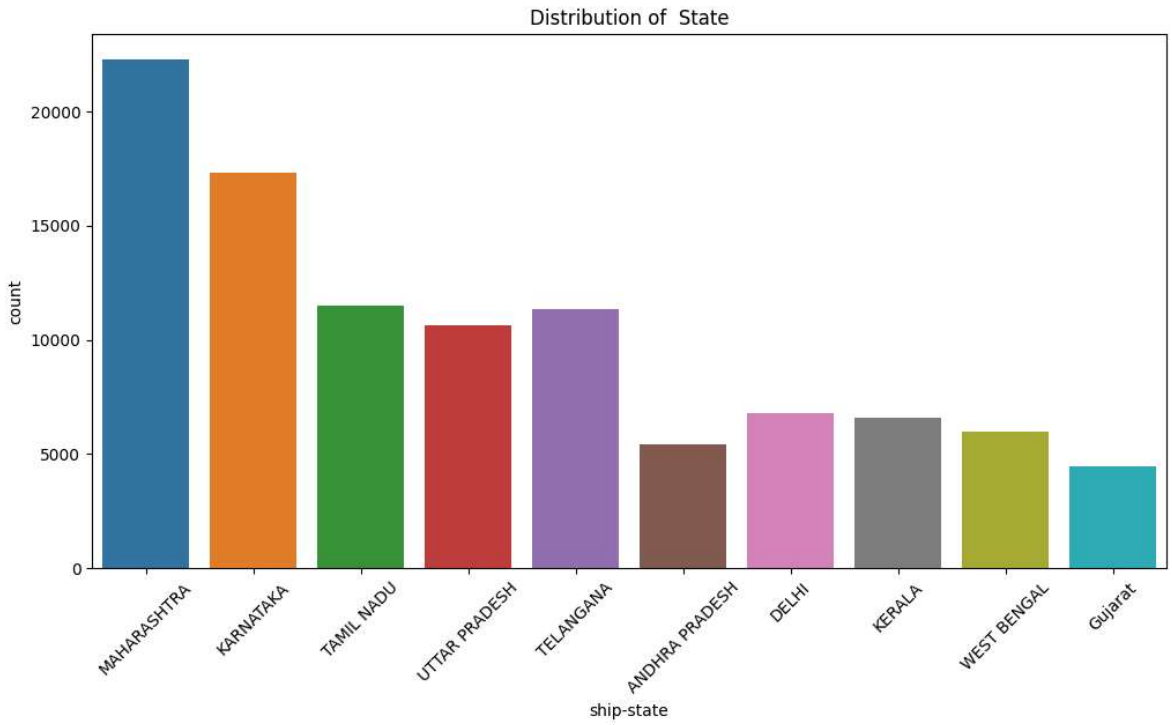


In [35]:

```
# 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 [87]:
```
# 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-stat
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.