In [1]:

```
import numpy as np
import pandas  as pd
import matplotlib.pyplot as plt
from scipy.stats import norm
from scipy.stats import binom
import math
import seaborn as sns
```

In [2]:

```
data=pd.read_csv(r"C:/Users/shiva/OneDrive/Desktop/walmart_data.csv")
```

In [3]:

```
data
```

Out[3]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_Category	Purch
0	1000001	P00069042	F	0-17	10	A	2	0	3	8
1	1000001	P00248942	F	0-17	10	A	2	0	1	15
2	1000001	P00087842	F	0-17	10	A	2	0	12	1
3	1000001	P00085442	F	0-17	10	A	2	0	12	1
4	1000002	P00285442	M	55+	16	C	4+	0	8	7
...	...	...	...	...	...	...	...	...	...	
550063	1006033	P00372445	M	51-55	13	B	1	1	20	
550064	1006035	P00375436	F	26-35	1	C	3	0	20	
550065	1006036	P00375436	F	26-35	15	B	4+	1	20	
550066	1006038	P00375436	F	55+	1	C	2	0	20	
550067	1006039	P00371644	F	46-50	0	B	4+	1	20	

550068 rows × 10 columns

In [4]:

```
data.shape
```

Out[4]:

```
(550068, 10)
```

In [5]:

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 550068 entries, 0 to 550067
Data columns (total 10 columns):
 #   Column                      Non-Null Count   Dtype 
---  ------                      --------------   ----- 
 0   User_ID                     550068 non-null  int64 
 1   Product_ID                  550068 non-null  object
 2   Gender                      550068 non-null  object
 3   Age                         550068 non-null  object
 4   Occupation                  550068 non-null  int64 
 5   City_Category               550068 non-null  object
 6   Stay_In_Current_City_Years  550068 non-null  object
 7   Marital_Status              550068 non-null  int64 
 8   Product_Category            550068 non-null  int64 
 9   Purchase                    550068 non-null  int64 
dtypes: int64(5), object(5)
memory usage: 42.0+ MB
```

In [6]:

```
cols = ['Occupation', 'Marital_Status', 'Product_Category']
data[cols] = data[cols].astype('object')
```

In [7]:

```
data.head(20)
```

Out[7]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_Category	Purchase
0	1000001	P00069042	F	0-17	10	A	2	0	3	8370
1	1000001	P00248942	F	0-17	10	A	2	0	1	15200
2	1000001	P00087842	F	0-17	10	A	2	0	12	1422
3	1000001	P00085442	F	0-17	10	A	2	0	12	1057
4	1000002	P00285442	M	55+	16	C	4+	0	8	7969
5	1000003	P00193542	M	26-35	15	A	3	0	1	15227
6	1000004	P00184942	M	46-50	7	B	2	1	1	19215
7	1000004	P00346142	M	46-50	7	B	2	1	1	15854
8	1000004	P0097242	M	46-50	7	B	2	1	1	15686
9	1000005	P00274942	M	26-35	20	A	1	1	8	7871
10	1000005	P00251242	M	26-35	20	A	1	1	5	5254
11	1000005	P00014542	M	26-35	20	A	1	1	8	3957
12	1000005	P00031342	M	26-35	20	A	1	1	8	6073
13	1000005	P00145042	M	26-35	20	A	1	1	1	15665
14	1000006	P00231342	F	51-55	9	A	1	0	5	5378
15	1000006	P00190242	F	51-55	9	A	1	0	4	2079
16	1000006	P0096642	F	51-55	9	A	1	0	2	13055
17	1000006	P00058442	F	51-55	9	A	1	0	5	8851
18	1000007	P00036842	M	36-45	1	B	1	1	1	11788
19	1000008	P00249542	M	26-35	12	C	4+	1	1	19614

Outlier Detection

In [8]:

```
data.describe()
```

Out[8]:

	User_ID	Purchase
count	5.500680e+05	550068.000000
mean	1.003029e+06	9263.968713
std	1.727592e+03	5023.065394
min	1.000001e+06	12.000000
25%	1.001516e+06	5823.000000
50%	1.003077e+06	8047.000000
75%	1.004478e+06	12054.000000
max	1.006040e+06	23961.000000

In [9]:

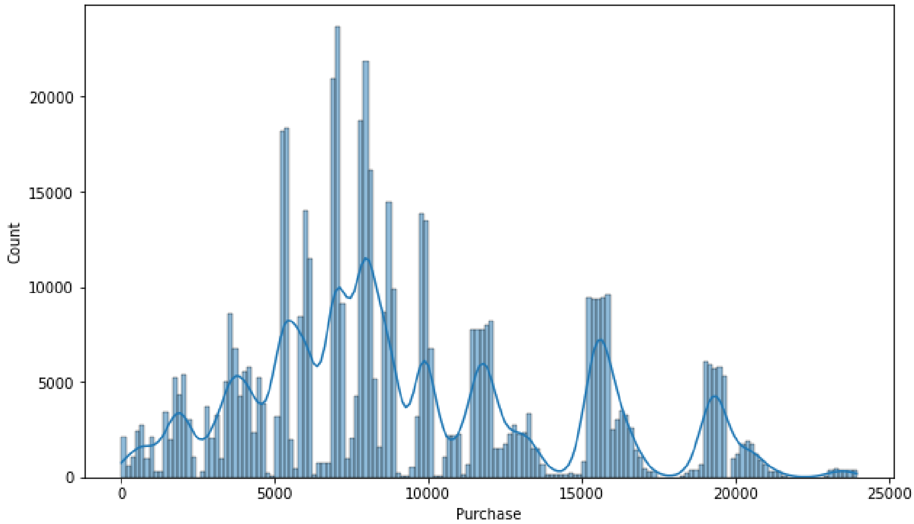
```
data.isnull().sum()
```

Out[9]:

```
User_ID                       0
Product_ID                    0
Gender                        0
Age                           0
Occupation                    0
City_Category                 0
Stay_In_Current_City_Years    0
Marital_Status                0
Product_Category              0
Purchase                      0
dtype: int64
```

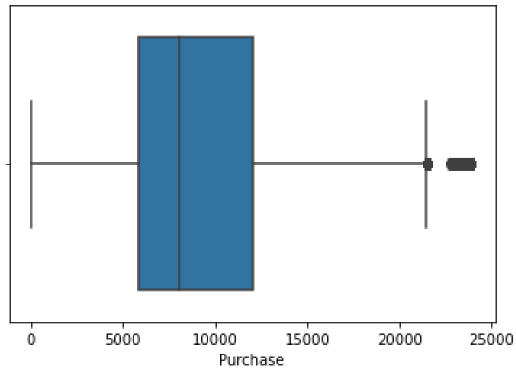
In [10]:

```
plt.figure(figsize=(10, 6))
sns.histplot(data=data, x='Purchase', kde=True)
plt.show()
```



In [11]:

```
sns.boxplot(data=data, x='Purchase', orient='h')
plt.show()
```



Observations

1. There are outliers in Purchase .

Univariate Analysis

In [12]:

```
data["Stay_In_Current_City_Years"].value_counts()
```

Out[12]:

```
1     193821
2     101838
3      95285
4+     84726
0      74398
Name: Stay_In_Current_City_Years, dtype: int64
```

In [13]:

```
data["Product_Category"].value_counts()
```

Out[13]:

```
5     150933
1     140378
8     113925
11     24287
2      23864
6      20466
3      20213
4      11753
16      9828
15      6290
13      5549
10      5125
12      3947
7       3721
18      3125
20      2550
19      1603
14      1523
17       578
9        410
Name: Product_Category, dtype: int64
```

In [14]:

```
data["City_Category"].value_counts()
```

Out[14]:

```
B    231173
C    171175
A    147720
Name: City_Category, dtype: int64
```

In [15]:

```
data.groupby("Gender")["User_ID"].nunique()
```

Out[15]:

```
Gender
F    1666
M    4225
Name: User_ID, dtype: int64
```

In [16]:

```
data["Age"].value_counts()
```

Out[16]:

```
26-35    219587
36-45    110013
18-25     99660
46-50     45701
51-55     38501
55+       21504
0-17      15102
Name: Age, dtype: int64
```

In [17]:

```
data["Marital_Status"]=data["Marital_Status"].replace([0,1],["Single","Married"])
```

In [18]:

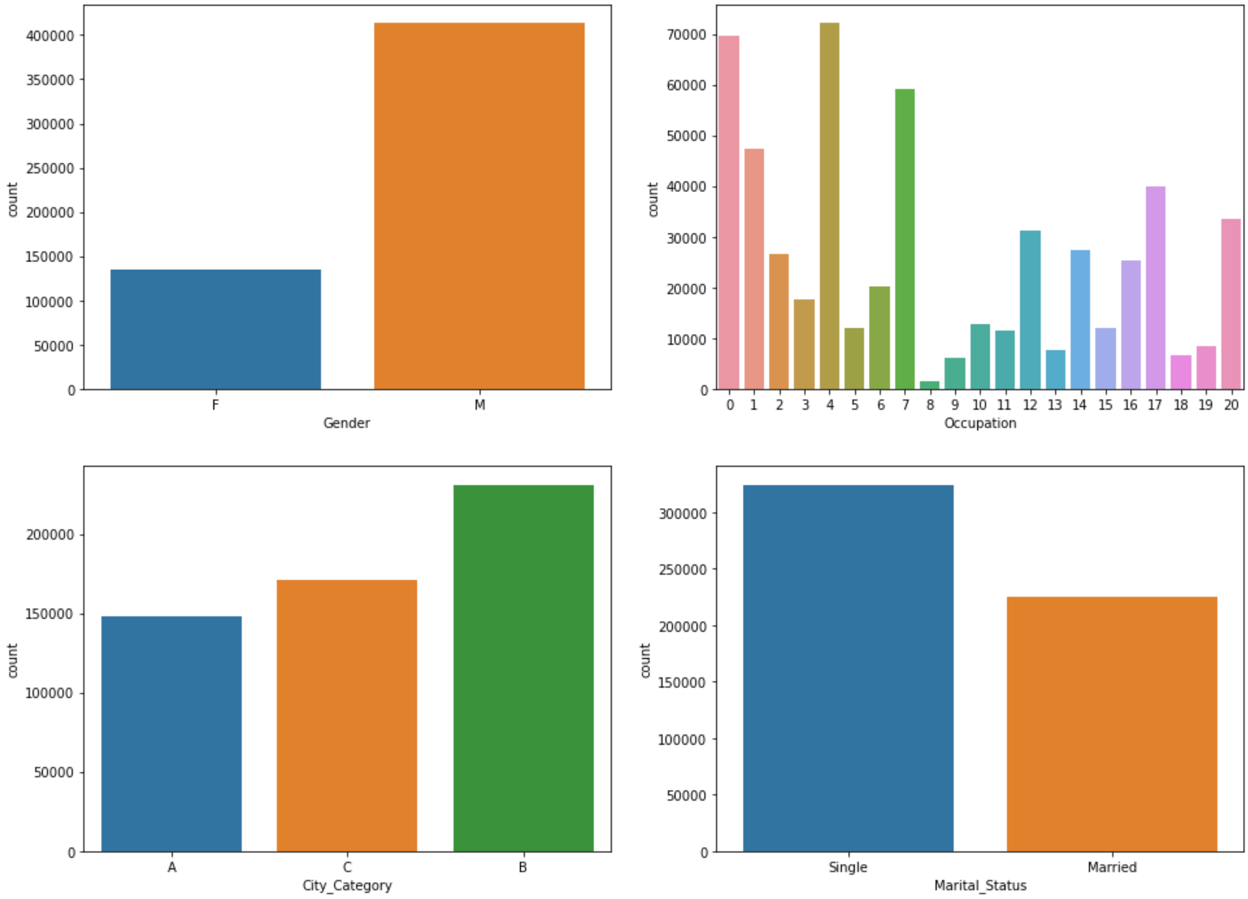
```
data["Marital_Status"].value_counts()
```

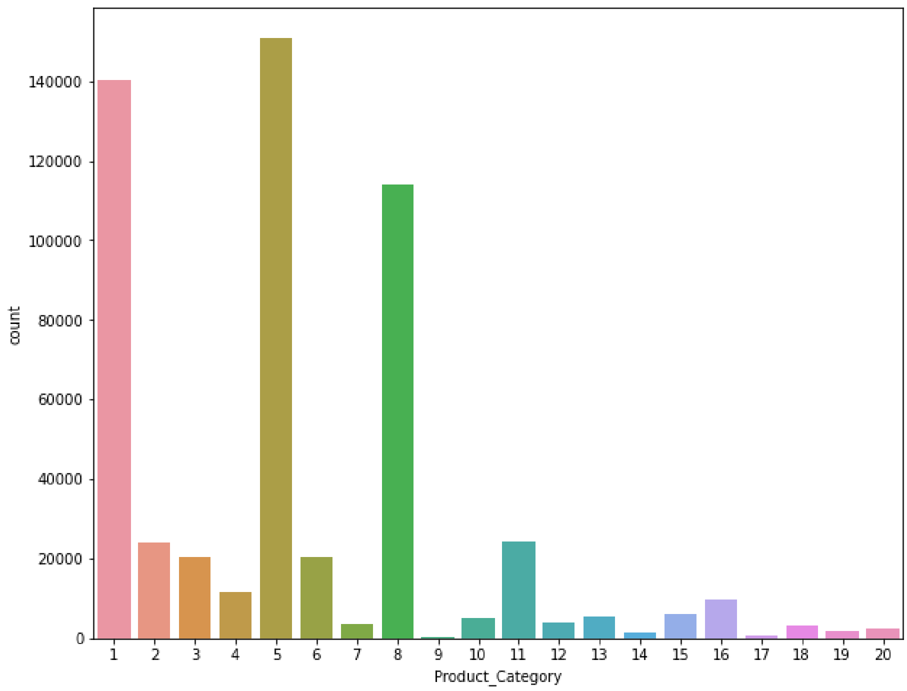
Out[18]:

```
Single     324731
Married    225337
Name: Marital_Status, dtype: int64
```

In [19]:

```
categorical_cols = ['Gender', 'Occupation','City_Category','Marital_Status','Product_Category']

fig, axs = plt.subplots(nrows=2, ncols=2, figsize=(16, 12))
sns.countplot(data=data, x='Gender', ax=axs[0,0])
sns.countplot(data=data, x='Occupation', ax=axs[0,1])
sns.countplot(data=data, x='City_Category', ax=axs[1,0])
sns.countplot(data=data, x='Marital_Status', ax=axs[1,1])
plt.show()

plt.figure(figsize=(10, 8))
sns.countplot(data=data, x='Product_Category')
plt.show()
```

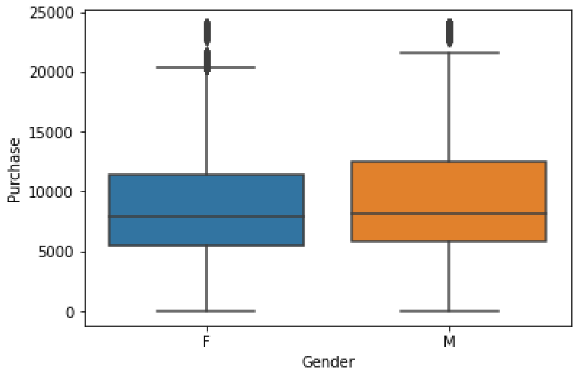




Bi-Variate Analysis

In [20]:

```
sns.boxplot(x="Gender",y="Purchase",data=data)
plt.show()
```

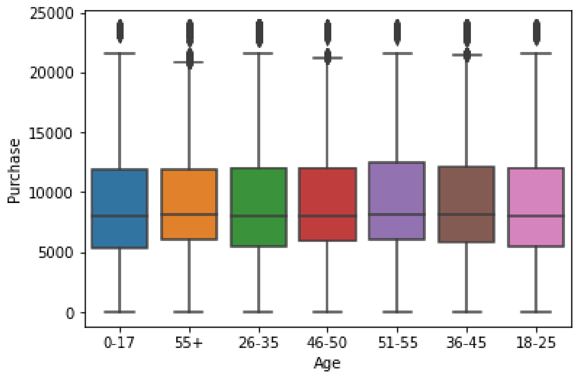


In [21]:

```
sns.boxplot(x="Age",y="Purchase",data=data)
```

Out[21]:

<AxesSubplot:xlabel='Age', ylabel='Purchase'>

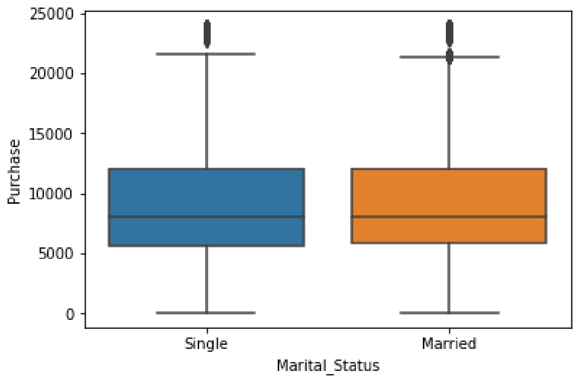


In [22]:

```
sns.boxplot(x="Marital_Status",y="Purchase",data=data)
```

Out[22]:

<AxesSubplot:xlabel='Marital_Status', ylabel='Purchase'>

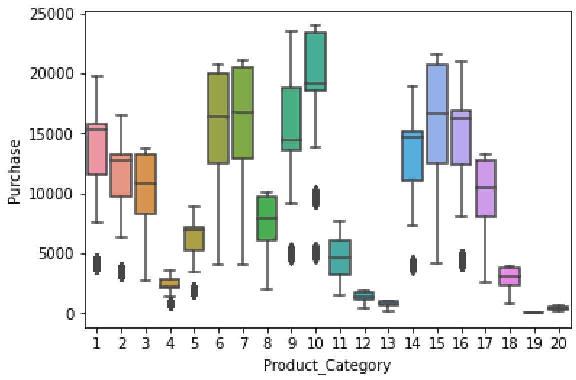


In [23]:

```
sns.boxplot(x="Product_Category",y="Purchase",data=data)
```

Out[23]:

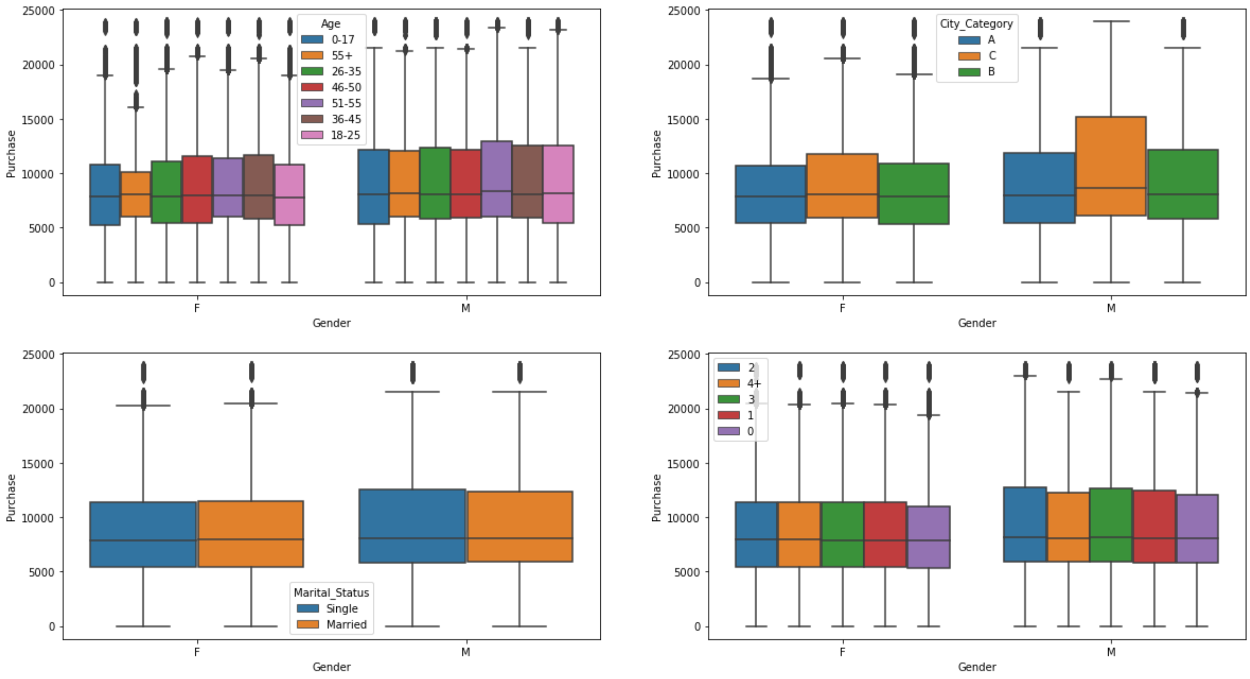
```
<AxesSubplot:xlabel='Product_Category', ylabel='Purchase'>
```



Multivariate Analysis

In [24]:

```
fig, axs = plt.subplots(nrows=2, ncols=2, figsize=(20, 6))
fig.subplots_adjust(top=1.5)
sns.boxplot(data=data, y="Purchase", x='Gender', hue='Age', ax=axs[0,0])
sns.boxplot(data=data, y='Purchase', x='Gender', hue='City_Category', ax=axs[0,1])
sns.boxplot(data=data, y='Purchase', x='Gender', hue='Marital_Status', ax=axs[1,0])
sns.boxplot(data=data, y='Purchase', x='Gender', hue='Stay_In_Current_City_Years', ax=axs[1,1])
axs[1,1].legend(loc='upper left')

plt.show()
```



In [25]:

```
s=300
iterations=1000
```

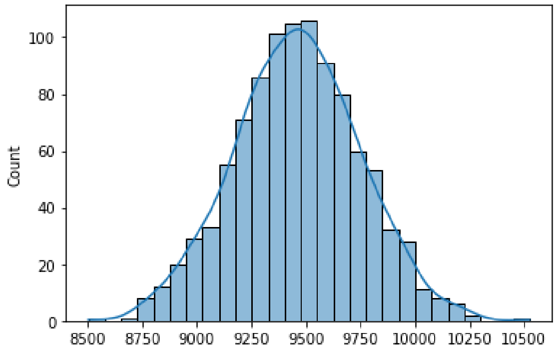
Gender vs Purchase

In [26]:

```
male_sample_mean=[data[data["Gender"]=="M"].sample(s)["Purchase"].mean() for i in range(iterations)]
```

In [27]:

```
sns.histplot(x=male_sample_mean,kde=True)
plt.show()
```



In [28]:

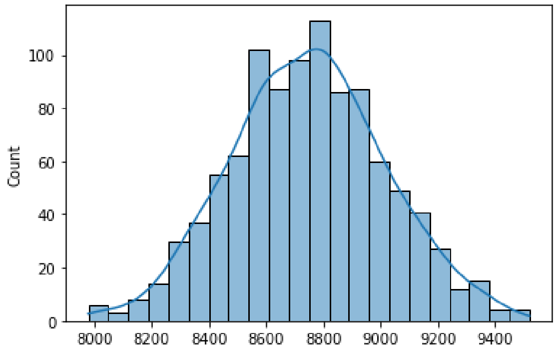
```
m_mean=np.mean(male_sample_mean)
```

In [29]:

```
female_sample_mean=[data[data["Gender"]=="F"].sample(s)["Purchase"].mean() for i in range(iterations)]
```

In [30]:

```
sns.histplot(x=female_sample_mean,kde=True)
plt.show()
```



In [31]:

```
f_mean=np.mean(female_sample_mean)
```

Confidence Interval

99% Confidence Interval

In [32]:

```
male_lower_interval_limit=m_mean-2.58*(np.std(male_sample_mean))
male_upper_interval_limit=m_mean+2.58*(np.std(female_sample_mean))
(male_lower_interval_limit,male_upper_interval_limit)
```

Out[32]:

```
(8717.631500467638, 10153.256346662705)
```

In [33]:

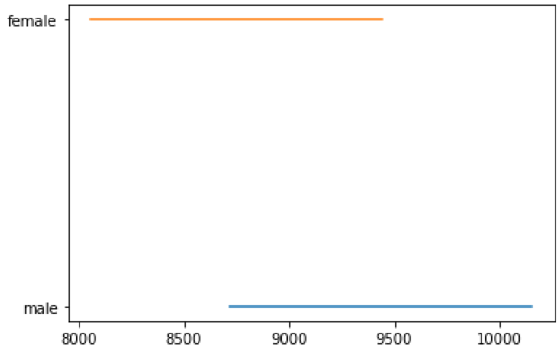
```
female_lower_interval_limit=f_mean-2.58*(np.std(female_sample_mean))
female_upper_interval_limit=f_mean+2.58*(np.std(female_sample_mean))
(female_lower_interval_limit,female_upper_interval_limit)
```

Out[33]:

```
(8054.327933337297, 9439.925173329371)
```

In [34]:

```
plt.plot((male_lower_interval_limit, male_upper_interval_limit), [0, 0])

plt.plot((female_lower_interval_limit, female_upper_interval_limit), [1, 1])
for i in range(2):
    plt.annotate([male_lower_interval_limit,male_upper_interval_limit],xy=[1,2])

plt.yticks(range(2), ["male", "female"])

plt.show()
```



95% Confidence Interval

In [35]:

```
male_lower_interval_limit=m_mean-1.96*(np.std(male_sample_mean))
```

In [36]:

```
male_upper_interval_limit=m_mean+1.96*(np.std(female_sample_mean))
```

In [37]:

```
E PURCHASE CONFIDENCE INTERVAL FOR POPULATION MEAN:- {:.2f} ,{:.2f} ".format(male_lower_interval_limit,male_upper_interval_limi
```

```
MALE PURCHASE CONFIDENCE INTERVAL FOR POPULATION MEAN:- 8896.14 ,9986.77
```

In [38]:

```
female_lower_interval_limit=f_mean-1.96*(np.std(female_sample_mean))
```

In [39]:

```
female_upper_interval_limit=f_mean+1.96*(np.std(female_sample_mean))
```

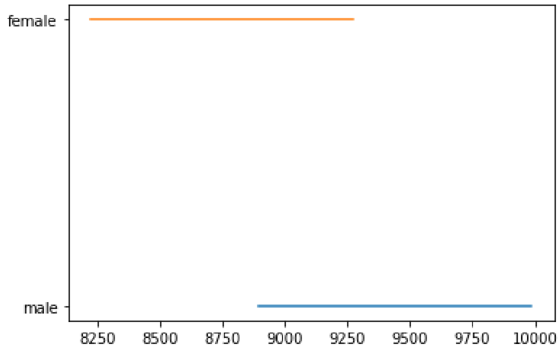
In [40]:

```
JRCHASE CONFIDENCE INTERVAL FOR POPULATION MEAN:- {:.2f} ,{:.2f} ".format(female_lower_interval_limit,female_upper_interval_limi
```

```
FEMALE PURCHASE CONFIDENCE INTERVAL FOR POPULATION MEAN:- 8220.81 ,9273.44
```

In [41]:

```
plt.plot((male_lower_interval_limit, male_upper_interval_limit), [0, 0])

plt.plot((female_lower_interval_limit, female_upper_interval_limit), [1, 1])

plt.yticks(range(2), ["male", "female"])

plt.show()
```



90% Confidence Interval

In [42]:

```
_interval_limit=m_mean-1.64*(np.std(male_sample_mean))
_interval_limit=m_mean+1.64*(np.std(female_sample_mean))
E PURCHASE CONFIDENCE INTERVAL FOR POPULATION MEAN:- {:.2f} ,{:.2f} ".format(male_lower_interval_limit,male_upper_interval_limi
```

```
MALE PURCHASE CONFIDENCE INTERVAL FOR POPULATION MEAN:- 8988.27 ,9900.84
```

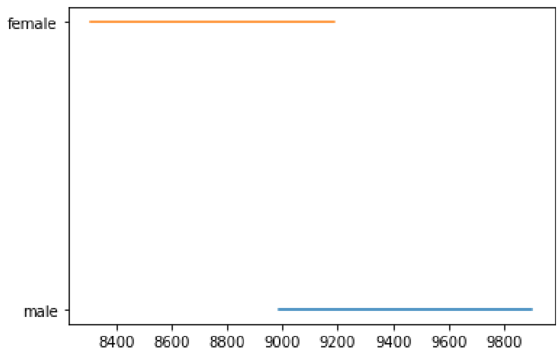
In [43]:

```
female_lower_interval_limit=f_mean-1.64*(np.std(female_sample_mean))
female_upper_interval_limit=f_mean+1.64*(np.std(female_sample_mean))
print("FEMALE PURCHASE CONFIDENCE INTERVAL FOR POPULATION MEAN:- {:.2f} ,{:.2f} ".format(female_lower_interval_limit,female_up
```

```
FEMALE PURCHASE CONFIDENCE INTERVAL FOR POPULATION MEAN:- 8306.74 ,9187.51
```

In [44]:

```
plt.plot((male_lower_interval_limit, male_upper_interval_limit), [0, 0])

plt.plot((female_lower_interval_limit, female_upper_interval_limit), [1, 1])

plt.yticks(range(2), ["male", "female"])

plt.show()
```



Marital_Status vs Purchase

In [45]:

```
data.groupby("Marital_Status")["Purchase"].describe()
```

Out[45]:

	count	mean	std	min	25%	50%	75%	max
Marital_Status								
Married	225337.0	9261.174574	5016.897378	12.0	5843.0	8051.0	12042.0	23961.0
Single	324731.0	9265.907619	5027.347859	12.0	5605.0	8044.0	12061.0	23961.0

In [46]:

```
Married_sample_mean_dist=[data[data["Marital_Status"]=="Married"].sample(s)["Purchase"].mean() for i in range(iterations)]
```

In [47]:

```
Single_sample_mean_dist=[data[data["Marital_Status"]=="Single"].sample(s)["Purchase"].mean() for i in range(iterations)]
```

In [48]:

```
Married_mean_of_sample_mean=np.mean(Married_sample_mean_dist)
```

In [49]:

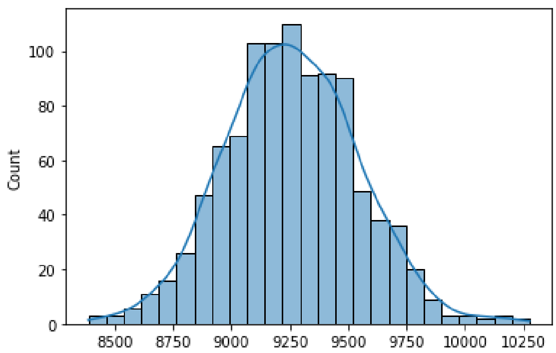
```
Single_mean_of_sample_mean=np.mean(Single_sample_mean_dist)
```

In [50]:

```
sns.histplot(x=Married_sample_mean_dist,kde=True)
```

Out[50]:

<AxesSubplot:ylabel='Count'>

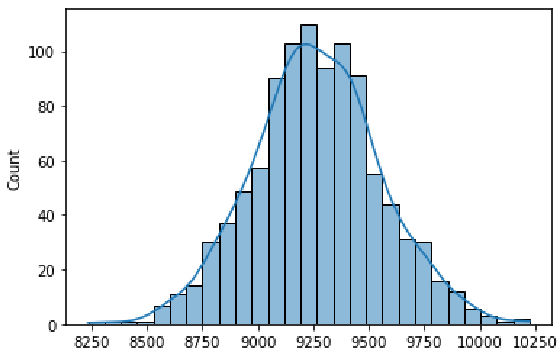


In [51]:

```
sns.histplot(x=Single_sample_mean_dist,kde=True)
```

Out[51]:

<AxesSubplot:ylabel='Count'>



Confidence Interval

99% Confidence Interval

In [52]:

```
lower_interval_limit_Single=Single_mean_of_sample_mean-2.58*(np.std(Single_sample_mean_dist))
upper_interval_limit_Single=Single_mean_of_sample_mean+2.58*(np.std(Single_sample_mean_dist))
(lower_interval_limit_Single,upper_interval_limit_Single)
```

Out[52]:

```
(8521.121021197492, 10005.498118802507)
```

In [53]:

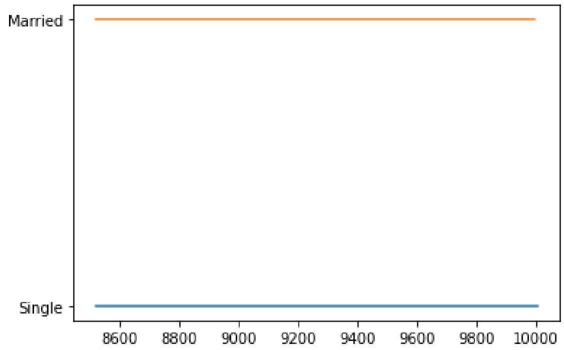
```
lower_interval_limit_Married=Married_mean_of_sample_mean-2.58*(np.std(Married_sample_mean_dist))
upper_interval_limit_Married=Married_mean_of_sample_mean+2.58*(np.std(Married_sample_mean_dist))
(lower_interval_limit_Married,upper_interval_limit_Married)
```

Out[53]:

```
(8522.718295658055, 9993.636511008615)
```

In [54]:

```
plt.plot((lower_interval_limit_Single, upper_interval_limit_Single), [0, 0])

plt.plot((lower_interval_limit_Married, upper_interval_limit_Married), [1, 1])

plt.yticks(range(2), ["Single", "Married"])

plt.show()
```



95% Confidence Interval

In [55]:

```
lower_interval_limit_Single=Single_mean_of_sample_mean-1.96*(np.std(Single_sample_mean_dist))
upper_interval_limit_Single=Single_mean_of_sample_mean+1.96*(np.std(Single_sample_mean_dist))
(lower_interval_limit_Single,upper_interval_limit_Single)
```

Out[55]:

```
(8699.47640889422, 9827.14273110578)
```

In [56]:

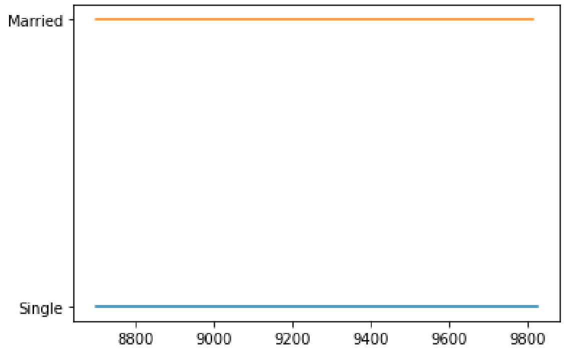
```
lower_interval_limit_Married=Married_mean_of_sample_mean-1.96*(np.std(Married_sample_mean_dist))
upper_interval_limit_Married=Married_mean_of_sample_mean+1.96*(np.std(Married_sample_mean_dist))
(lower_interval_limit_Married,upper_interval_limit_Married)
```

Out[56]:

```
(8699.456530835834, 9816.898275830836)
```

In [57]:

```
plt.plot((lower_interval_limit_Single, upper_interval_limit_Single), [0, 0])

plt.plot((lower_interval_limit_Married, upper_interval_limit_Married), [1, 1])

plt.yticks(range(2), ["Single", "Married"])

plt.show()
```



90% Confidence Interval

In [58]:

```
lower_interval_limit_Single=Single_mean_of_sample_mean-1.645*(np.std(Single_sample_mean_dist))
upper_interval_limit_Single=Single_mean_of_sample_mean+1.645*(np.std(Single_sample_mean_dist))
(lower_interval_limit_Single,upper_interval_limit_Single)
```

Out[58]:

```
(8790.092452643363, 9736.526687356636)
```

In [59]:

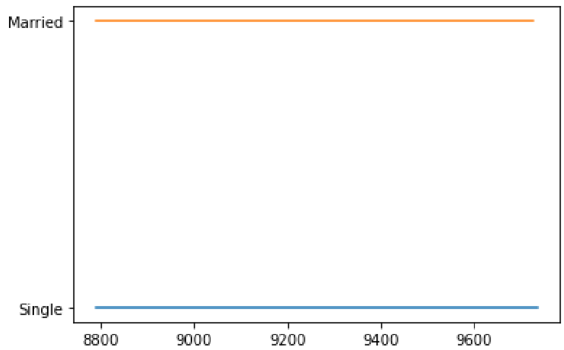
```
lower_interval_limit_Married=Married_mean_of_sample_mean-1.645*(np.std(Married_sample_mean_dist))
upper_interval_limit_Married=Married_mean_of_sample_mean+1.645*(np.std(Married_sample_mean_dist))
(lower_interval_limit_Married,upper_interval_limit_Married)
```

Out[59]:

```
(8789.250956772934, 9727.103849893736)
```

In [60]:

```
plt.plot((lower_interval_limit_Single, upper_interval_limit_Single), [0, 0])

plt.plot((lower_interval_limit_Married, upper_interval_limit_Married), [1, 1])

plt.yticks(range(2), ["Single", "Married"])

plt.show()
```



Age vs Purchase

In [61]:

```
amt_df = data.groupby(['User_ID', 'Age'])[['Purchase']].sum()
amt_df = amt_df.reset_index()
amt_df
```

Out[61]:

	User_ID	Age	Purchase
0	1000001	0-17	334093
1	1000002	55+	810472
2	1000003	26-35	341635
3	1000004	46-50	206468
4	1000005	26-35	821001
...	...	...	...
5886	1006036	26-35	4116058
5887	1006037	46-50	1119538
5888	1006038	55+	90034
5889	1006039	46-50	590319
5890	1006040	26-35	1653299

5891 rows × 3 columns

In [62]:

```
data1=data.groupby(["User_ID","Age"])[["Purchase"]].mean()
```

In [63]:

```
amt_df["Age"].value_counts()
```

Out[63]:

```
26-35    2053
36-45    1167
18-25    1069
46-50     531
51-55     481
55+       372
0-17      218
Name: Age, dtype: int64
```

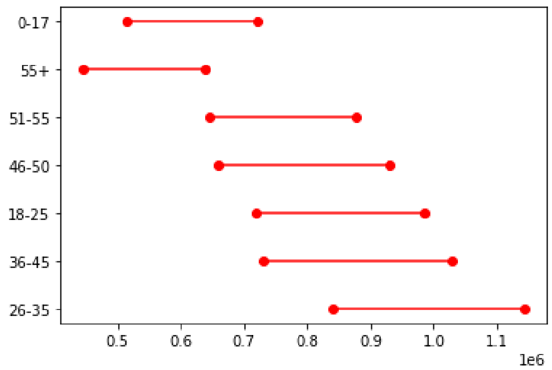
Confidence Interval

99% Confidence Interval

In [64]:

```
w=['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']
lower_list=[]
upper_list=[]
for val in ['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']:
    sample_mean_distribution=[]
    for i in range(iterations):

        new_df = amt_df[amt_df['Age']==val]
        sample_mean = new_df.sample(s,replace=True)['Purchase'].mean()
        sample_mean_distribution.append(sample_mean)
    a=np.mean(sample_mean_distribution)
    lower_limit=a-2.58*np.std(sample_mean_distribution)
    upper_limit=a+2.58*np.std(sample_mean_distribution)

    print(" age {} : confidence interval of means=({:.2f}, {:.2f})".format(val, lower_limit, upper_limit))
    lower_list.append(lower_limit)
    upper_list.append(upper_limit)

data_dict = {}
data_dict['category'] = ['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']
data_dict['lower'] = lower_list
data_dict['upper'] = upper_list
dataset = pd.DataFrame(data_dict)

for lower,upper,y in zip(dataset['lower'],dataset['upper'],range(len(dataset))):
    plt.plot((lower,upper),(y,y),'ro-')
plt.yticks(range(len(dataset)),list(dataset['category']))
plt.show()
```

```
 age 26-35 : confidence interval of means=(840029.35, 1143479.05)
 age 36-45 : confidence interval of means=(729653.77, 1029517.28)
 age 18-25 : confidence interval of means=(718875.67, 985099.35)
 age 46-50 : confidence interval of means=(658266.43, 929862.40)
 age 51-55 : confidence interval of means=(645965.65, 877616.70)
 age 55+ : confidence interval of means=(444247.27, 637934.60)
 age 0-17 : confidence interval of means=(514793.50, 720126.01)
```

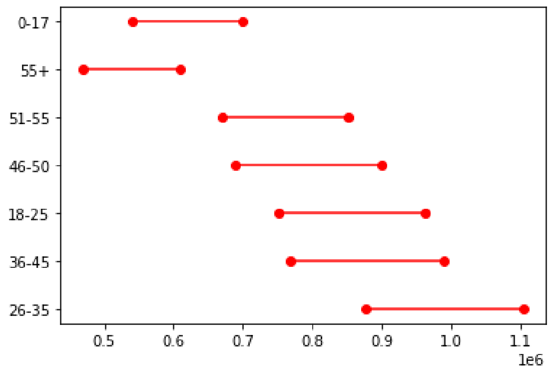


95% Confidence Interval

In [65]:

```
w=['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']
lower_list=[]
upper_list=[]
for val in ['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']:
    sample_mean_distribution=[]
    for i in range(iterations):

        new_df = amt_df[amt_df['Age']==val]
        sample_mean = new_df.sample(s,replace=True)['Purchase'].mean()
        sample_mean_distribution.append(sample_mean)
    a=np.mean(sample_mean_distribution)
    lower_limit=a-1.96*np.std(sample_mean_distribution)
    upper_limit=a+1.96*np.std(sample_mean_distribution)

    print(" age {} : confidence interval of means=({:.2f}, {:.2f})".format(val, lower_limit, upper_limit))
    lower_list.append(lower_limit)
    upper_list.append(upper_limit)

data_dict = {}
data_dict['category'] = ['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']
data_dict['lower'] = lower_list
data_dict['upper'] = upper_list
dataset = pd.DataFrame(data_dict)

for lower,upper,y in zip(dataset['lower'],dataset['upper'],range(len(dataset))):
    plt.plot((lower,upper),(y,y),'ro-')
plt.yticks(range(len(dataset)),list(dataset['category']))
plt.show()
```

```
 age 26-35 : confidence interval of means=(876435.96, 1104823.87)
 age 36-45 : confidence interval of means=(767865.68, 989408.77)
 age 18-25 : confidence interval of means=(750902.95, 961924.01)
 age 46-50 : confidence interval of means=(689713.91, 900322.91)
 age 51-55 : confidence interval of means=(670381.51, 851293.15)
 age 55+ : confidence interval of means=(468466.40, 609064.67)
 age 0-17 : confidence interval of means=(541191.02, 699701.09)
```

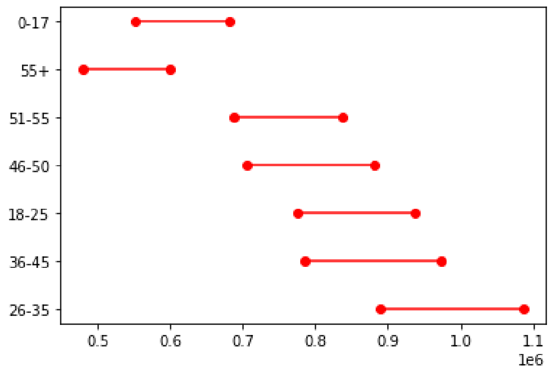


90% Confidence Interval

In [66]:

```
w=['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']
lower_list=[]
upper_list=[]
for val in ['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']:
    sample_mean_distribution=[]
    for i in range(iterations):

        new_df = amt_df[amt_df['Age']==val]
        sample_mean = new_df.sample(s,replace=True)['Purchase'].mean()
        sample_mean_distribution.append(sample_mean)
    a=np.mean(sample_mean_distribution)
    lower_limit=a-1.645*np.std(sample_mean_distribution)
    upper_limit=a+1.645*np.std(sample_mean_distribution)

    print(" age {} : confidence interval of means=({:.2f}, {:.2f})".format(val, lower_limit, upper_limit))
    lower_list.append(lower_limit)
    upper_list.append(upper_limit)

data_dict = {}
data_dict['category'] = ['26-35', '36-45', '18-25', '46-50', '51-55', '55+', '0-17']
data_dict['lower'] = lower_list
data_dict['upper'] = upper_list
dataset = pd.DataFrame(data_dict)

for lower,upper,y in zip(dataset['lower'],dataset['upper'],range(len(dataset))):
    plt.plot((lower,upper),(y,y),'ro-')
plt.yticks(range(len(dataset)),list(dataset['category']))
plt.show()
```

```
 age 26-35 : confidence interval of means=(889620.36, 1086352.31)
 age 36-45 : confidence interval of means=(785344.94, 973230.97)
 age 18-25 : confidence interval of means=(774807.07, 937327.28)
 age 46-50 : confidence interval of means=(705538.00, 880699.74)
 age 51-55 : confidence interval of means=(687659.60, 837664.20)
 age 55+ : confidence interval of means=(479256.51, 599222.16)
 age 0-17 : confidence interval of means=(551601.37, 681757.33)
```



Insights

#Gender Related

1. Male customers spend more than female customers and we can see :-
    - for 99% interval :- MALE = (8660.93, 10150.21),Female = (8033.46, 9463.13)
    - for 95% interval :- MALE = (8847.04 ,9978.44),Female = (8205.25 ,9291.36)
    - for 90% interval :- MALE = (8943.10 ,9889.78),Female = (8293.91 ,9202.70)
        - the difference is not very significant

#Age Related

1. There is no significant difference in purchasing patterns among differnt age groups .
2. Male customers in all age groups tend to spend mpre then their female counterparts.
3. It is clearly visible that age groups in the 18-50 spend more on average .

#Marital_Status Related

1. There is no significant difference among Married and Single Customers , as seen the confidence intervals completely overlap:-
    - for 99% interval:- Single (8515.41, 10000.98), Married (8501.39, 10015.50)

- for 95% interval:- Single (8693.91, 9822.48), Married (8683.32, 9833.57)
- for 90% interval:- Single (8784.60, 9731.79), Married (8775.75, 9741.14)

#Product_Category_Related

1. Products 1,5,8,11 are the products highly in demand and generate major revenue for the company

#City_Related

1. More Customers are in city B as compared to other two cities .
2. Customers in City C tend to spend more as compared to other cities.

Recommendations

1. As Products 1,5,8,11 genrate more revenue for the company, more discounts , schemes, offers should be made .
2. Other products should also be made attarctive by quantity discounts, buy get one offers .
3. As we have more customers in B City, and as male customers are more in number over there, we should target the males with the products and schemes to drive sales over there .
4. High or more Price products should be launched and made accessible in City C .
5. Age groups in the the category 18-50 are promising fot the company
6. The company should launch new products specifically for the age group 26-35 , as they are the more aggressive spenders .
7. The Single customers > Married Customers so we need to bring them in the loop and icrease their contribution to sales .
8. Customers with Occupation as [0,1,4,7,17] need to be targeted products:- tailormade or necessary or more suitable to their professions.