In [1]:

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

In [2]:

```
df = pd.read_csv('walmart_data.csv')
df.head()
```

Out[2]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_Catego
0	1000001	P00069042	F	0-17	10	A	2	0	
1	1000001	P00248942	F	0-17	10	A	2	0	
2	1000001	P00087842	F	0-17	10	A	2	0	1
3	1000001	P00085442	F	0-17	10	A	2	0	1
4	1000002	P00285442	M	55+	16	C	4+	0	

In [3]:

```
df.shape
```

Out[3]:

```
(550068, 10)
```

In [4]:

```
df.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 [5]:

```
df.isnull().sum()
```

Out[5]:

```
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
```

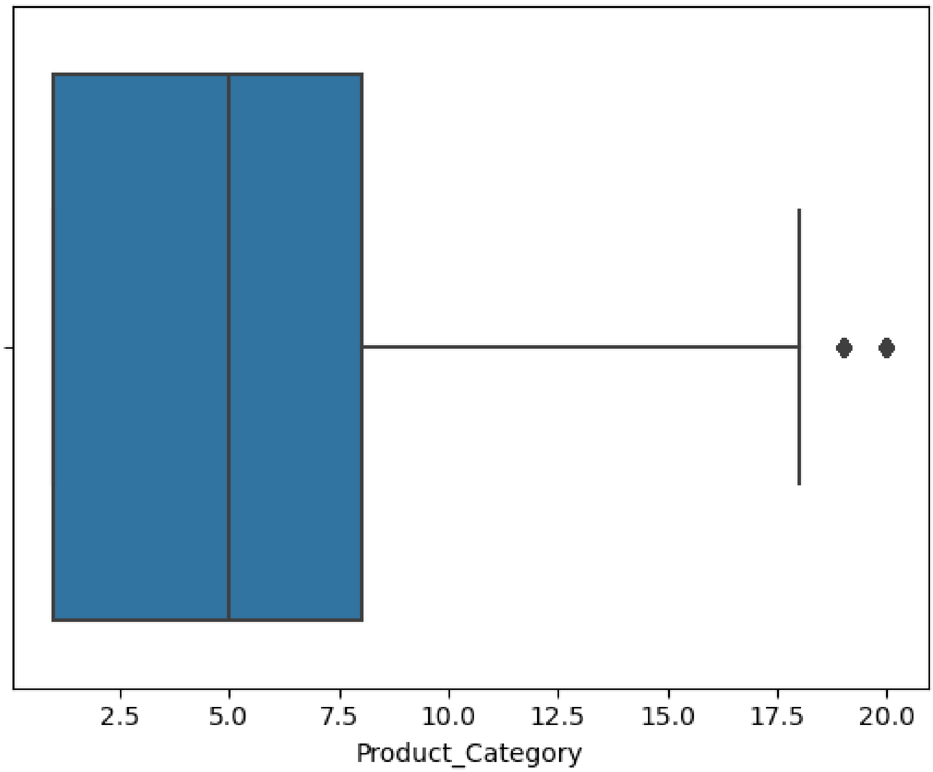
Outliers for Product_category columns

In [6]:

```
sns.boxplot(data = df, x = 'Product_Category')
```

Out[6]:

```
<Axes: xlabel='Product_Category'>
```



In [7]:

```
Q1 = df['Product_Category'].quantile(0.25)
Q3 = df['Product_Category'].quantile(0.75)

IQR = Q3 - Q1
df[(df['Product_Category'] < (Q1 - 1.5*IQR)) | (df['Product_Category'] > (Q3+1.5*IQR))]
```

Out[7]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_C
545915	1000001	P00375436	F	0-17	10	A	2	0	
545916	1000002	P00372445	M	55+	16	C	4+	0	
545917	1000004	P00375436	M	46-50	7	B	2	1	
545918	1000006	P00375436	F	51-55	9	A	1	0	
545919	1000007	P00372445	M	36-45	1	B	1	1	
...	...	...	...	...	...	...	...	...	

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_C
550063	1006033	P00372445	M	51-55	13	B	1	1	
550064	1006035	P00375436	F	26-35	1	C	3	0	
550065	1006036	P00375436	F	26-35	15	B	4+	1	
550066	1006038	P00375436	F	55+	1	C	2	0	
550067	1006039	P00371644	F	46-50	0	B	4+	1	

4153 rows × 10 columns

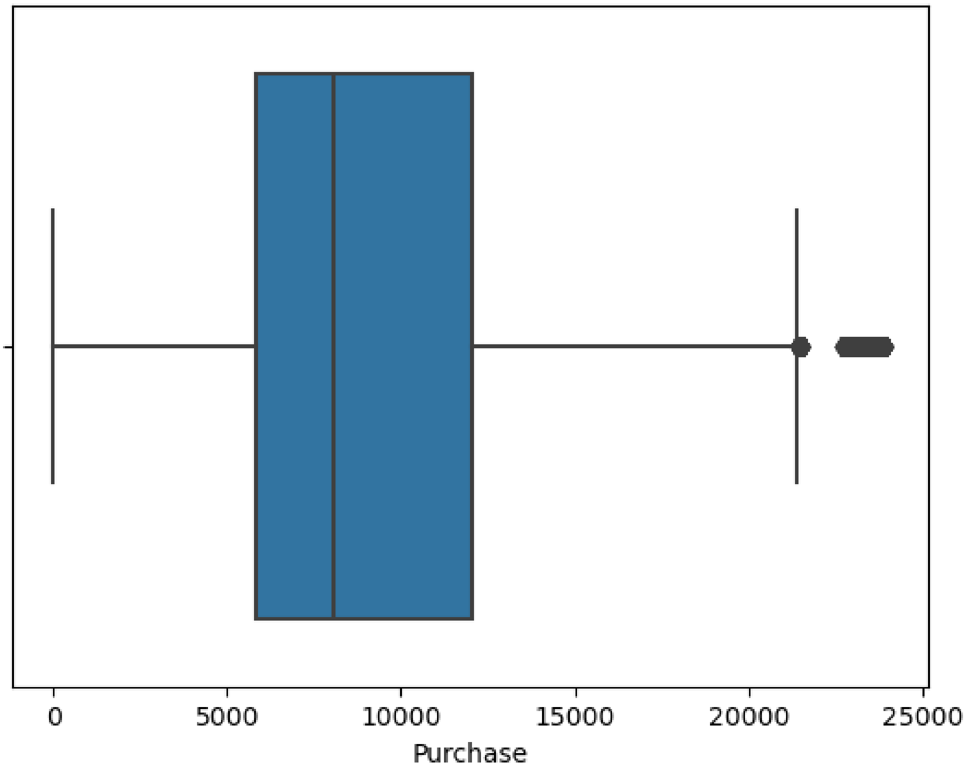
Outlier for Purchase amount

In [8]:

```
sns.boxplot(data = df, x = 'Purchase')
```

Out[8]:

<Axes: xlabel='Purchase'>



In [9]:

```
Q1 = df['Purchase'].quantile(0.25)
Q3 = df['Purchase'].quantile(0.75)

IQR = Q3 - Q1
df[(df['Purchase'] < (Q1 - 1.5*IQR)) | (df['Purchase'] > (Q3+1.5*IQR))]
```

Out[9]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_C
343	1000058	P00117642	M	26-35	2	B	3	0	
375	1000062	P00119342	F	36-45	3	A	1	0	
652	1000126	P00087042	M	18-	9	B	1	0	

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_C
736	1000139	P00159542	F	26-35	20	C	2	0	
1041	1000175	P00052842	F	26-35	2	B	1	0	
...	...	...	...	...	...	...	...	...	
544488	1005815	P00116142	M	26-35	20	B	1	0	
544704	1005847	P00085342	F	18-25	4	B	2	0	
544743	1005852	P00202242	F	26-35	1	A	0	1	
545663	1006002	P00116142	M	51-55	0	C	1	1	
545787	1006018	P00052842	M	36-45	1	C	3	0	

2677 rows × 10 columns

In [10]:

```
df['Age'].value_counts()
```

Out[10]:

```
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 [11]:

```
bin = [0,5,10,15,20]
df['Product_Bin'] = pd.cut(df['Product_Category'], bins = bin)
```

In [12]:

```
df.head()
```

Out[12]:

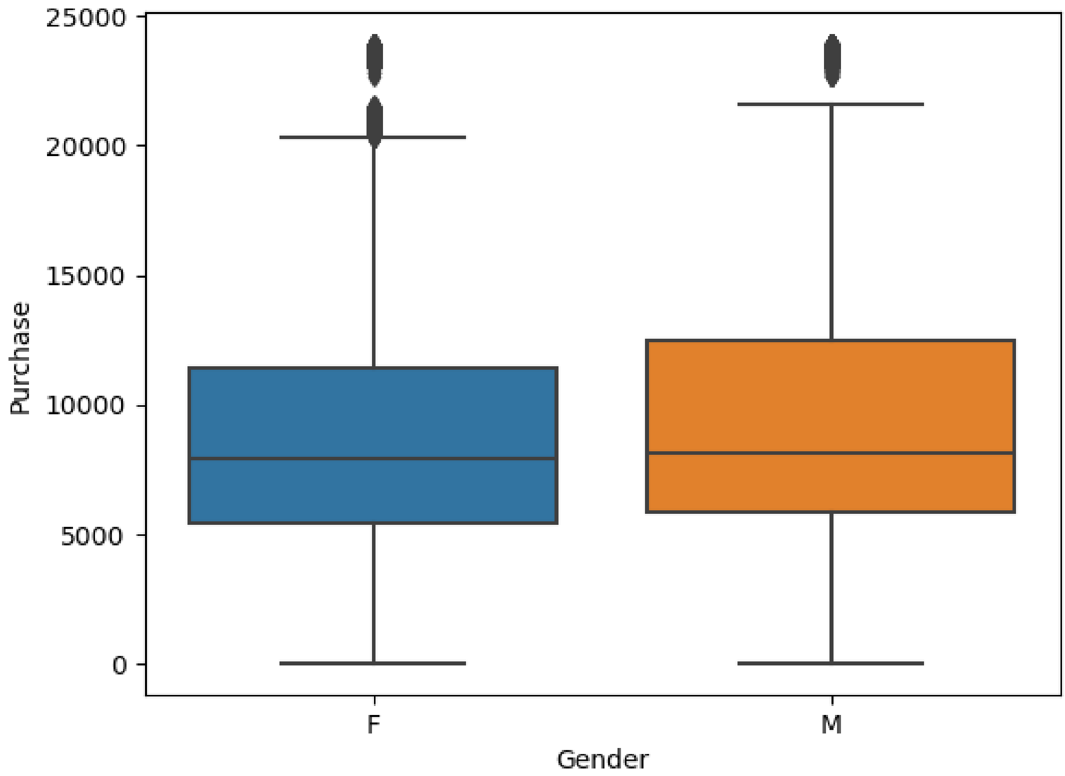
	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_Catego
0	1000001	P00069042	F	0-17	10	A	2	0	
1	1000001	P00248942	F	0-17	10	A	2	0	
2	1000001	P00087842	F	0-17	10	A	2	0	1
3	1000001	P00085442	F	0-17	10	A	2	0	1
4	1000002	P00285442	M	55+	16	C	4+	0	

In [120]:

```
sns.boxplot(data = df, x = 'Gender', y = 'Purchase')
```

Out[120]:

<Axes: xlabel='Gender', ylabel='Purchase'>

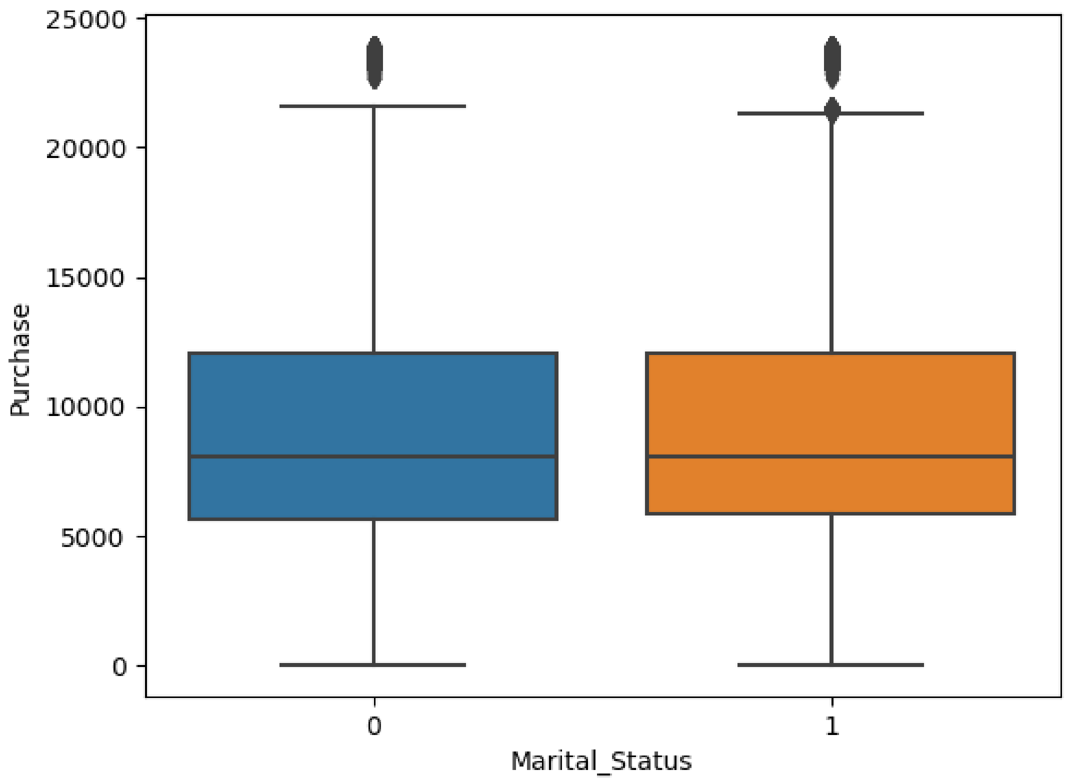


In [122]:

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

Out[122]:

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

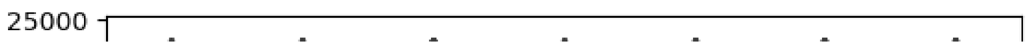


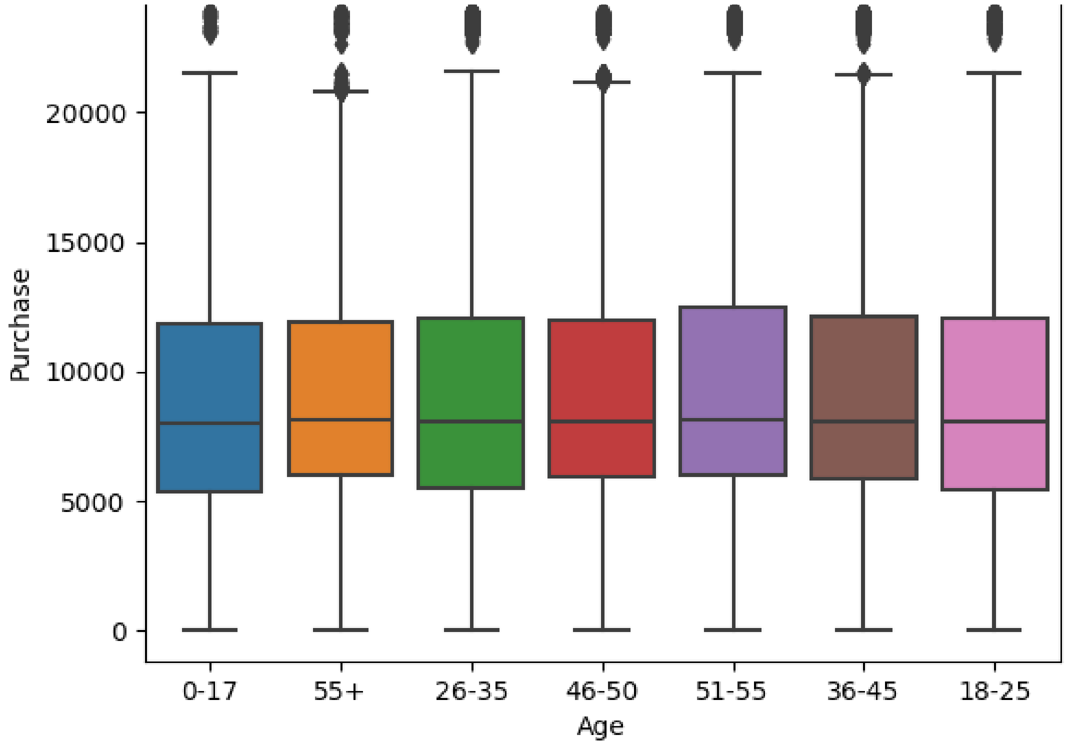
In [123]:

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

Out[123]:

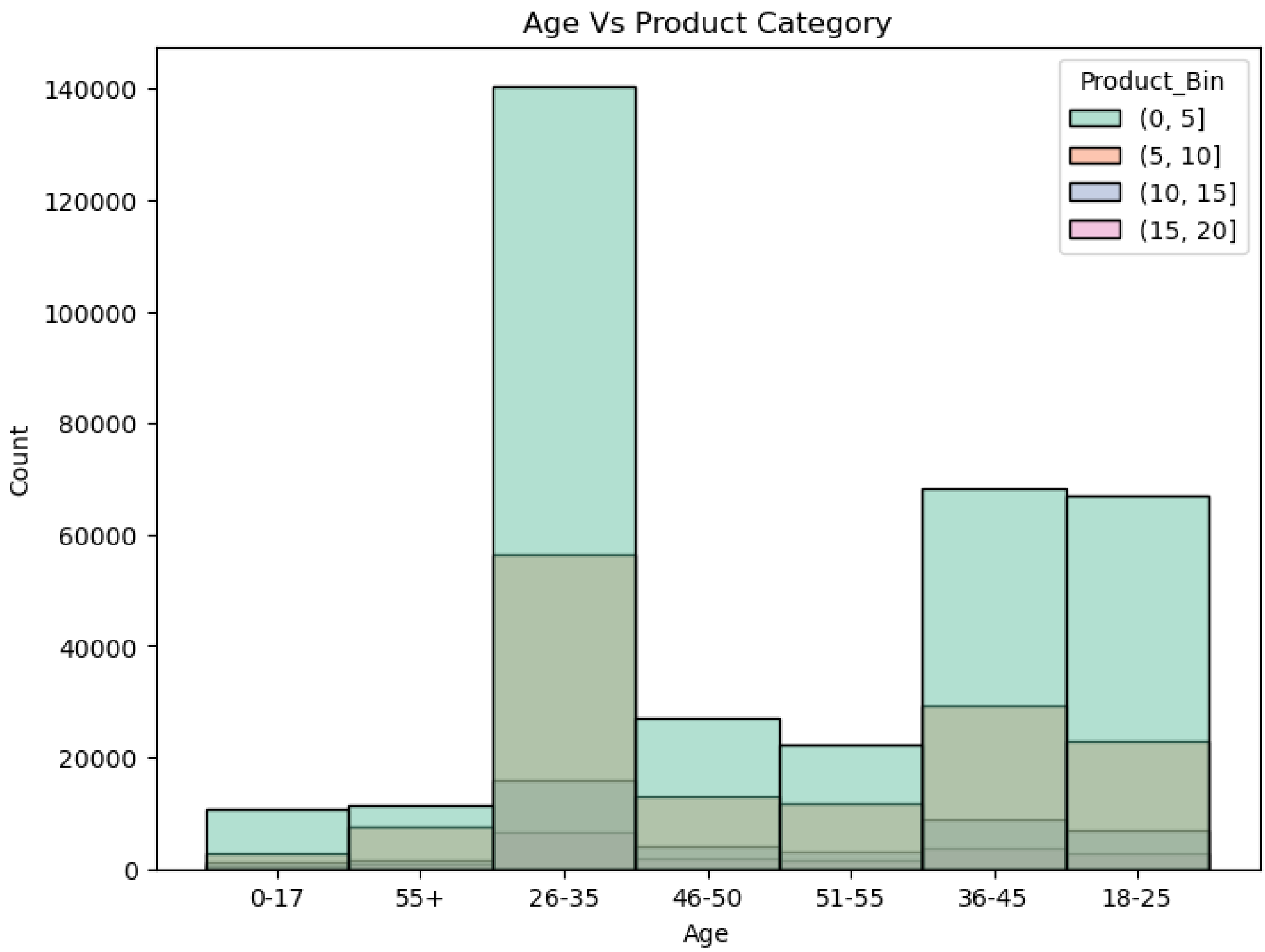
<Axes: xlabel='Age', ylabel='Purchase'>





In [13]:

```
plt.figure(figsize = (8,6))
sns.histplot(data = df, x = 'Age', hue = 'Product_Bin', palette='Set2')
plt.title('Age Vs Product Category')
plt.show()
```



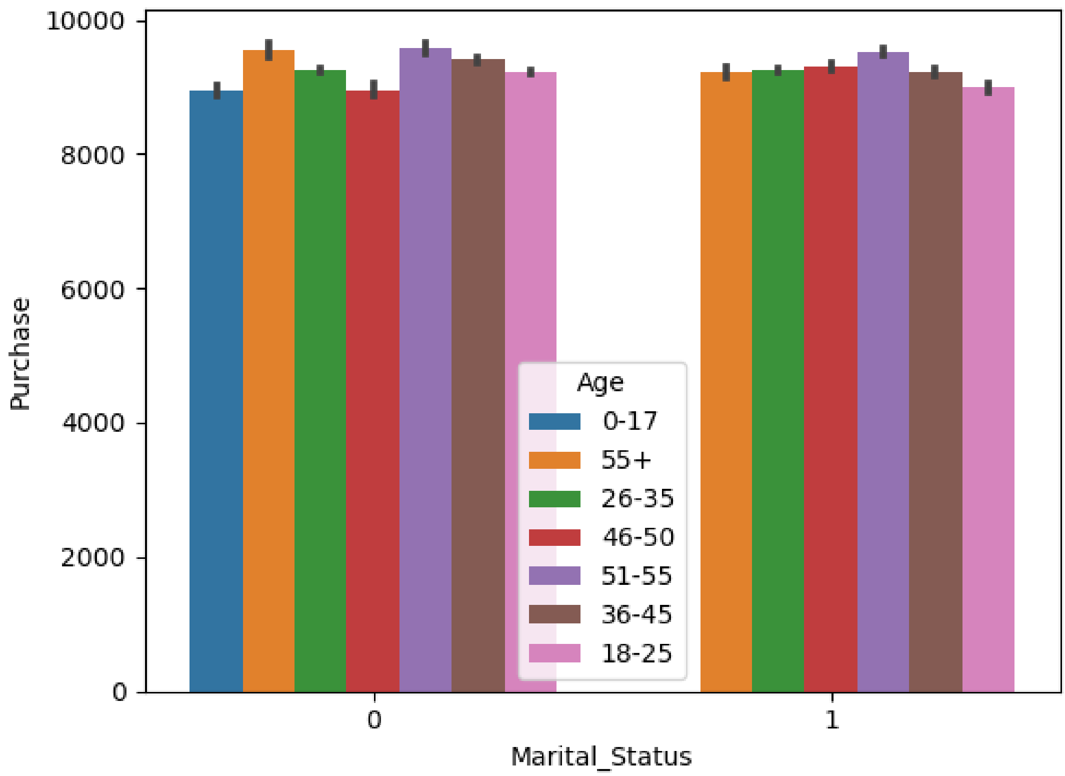
In [14]:

```
sns.barplot(data = df, x = 'Marital_Status', y = 'Purchase', hue = 'Age')
```

Out[14]:

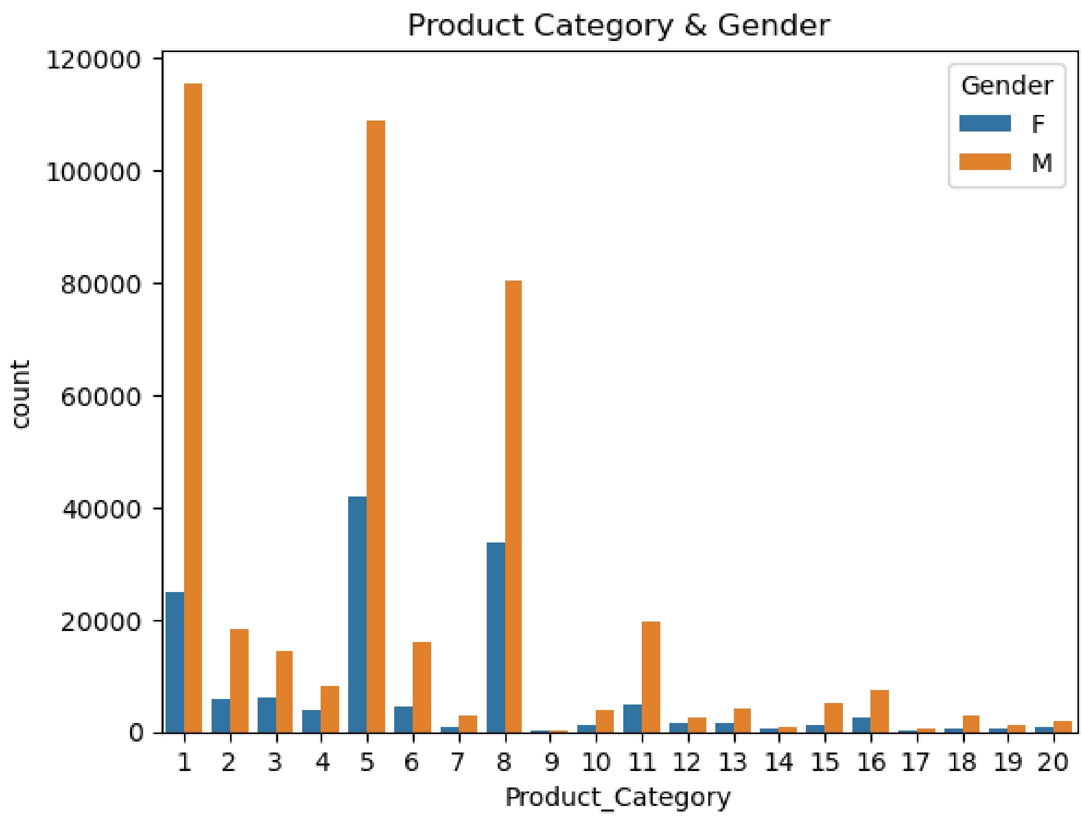
<AxesSubplot:xlabel='Marital_Status', ylabel='Purchase'>

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



In [15]:

```
sns.countplot(data = df, x = 'Product_Category', hue = 'Gender')
plt.title('Product Category & Gender')
plt.show()
```



In [16]:

```
s = df[df['Gender'] == 'F']
female_mean = s['Purchase'].mean()
female_mean
```

Out[16]:

```
8734.565765155476
```

In [17]:

```
female_std = s['Purchase'].std()
female_std
```

Out[17]:

```
4767.233289291444
```

In [18]:

```
r = df[df['Gender'] == 'M']
male_mean = r['Purchase'].mean()
male_mean
```

Out[18]:

```
9437.526040472265
```

In [19]:

```
male_std = r['Purchase'].std()
male_std
```

Out[19]:

```
5092.186209777949
```

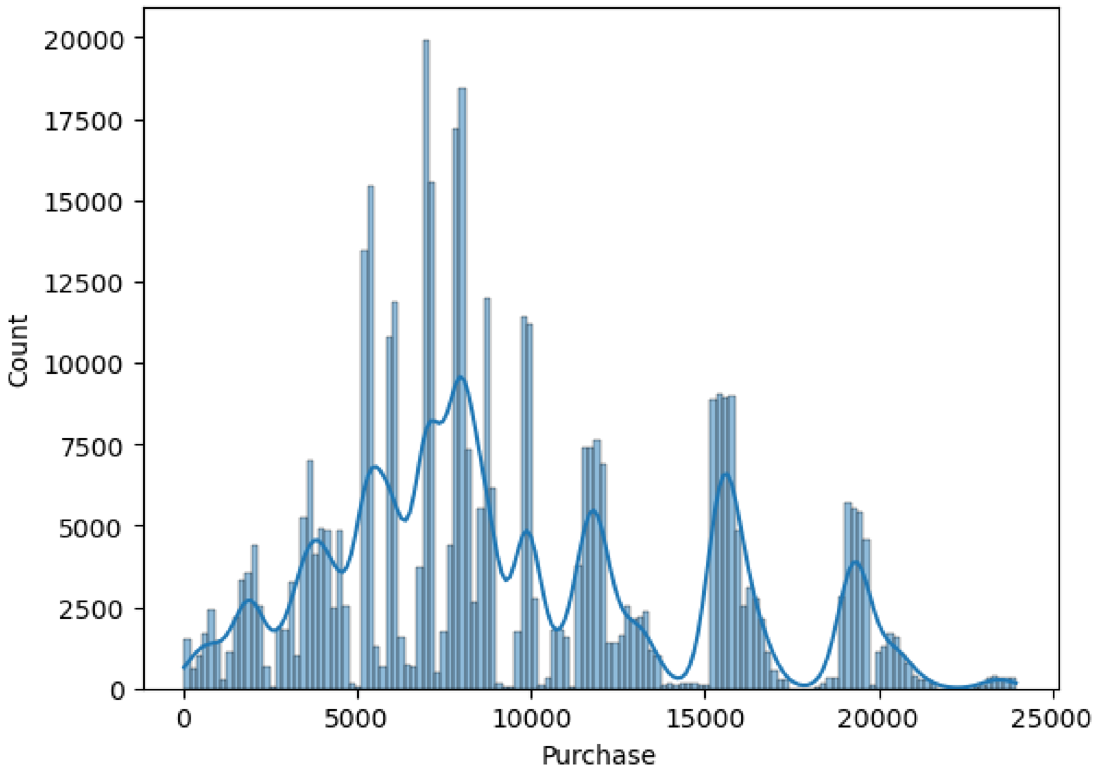
- **The Average purchase order of Male is greater than female**

In [20]:

```
sns.histplot(data = r, x = 'Purchase', kde = True)
```

Out[20]:

```
<Axes: xlabel='Purchase', ylabel='Count'>
```



In [143]:

```
norm.ppf(0.025)
```

Out[143]:

```
-1.959963984540054
```

In [144]:

```
norm.ppf(0.975)
```

Out[144]:

```
1.959963984540054
```

In [140]:

```
lower_range_male = male_mean - 1.95 * male_std
lower_range_male
```

Out[140]:

```
-492.97444793366776
```

In [141]:

```
upper_range_male = male_mean + 1.95 * male_std
upper_range_male
```

Out[141]:

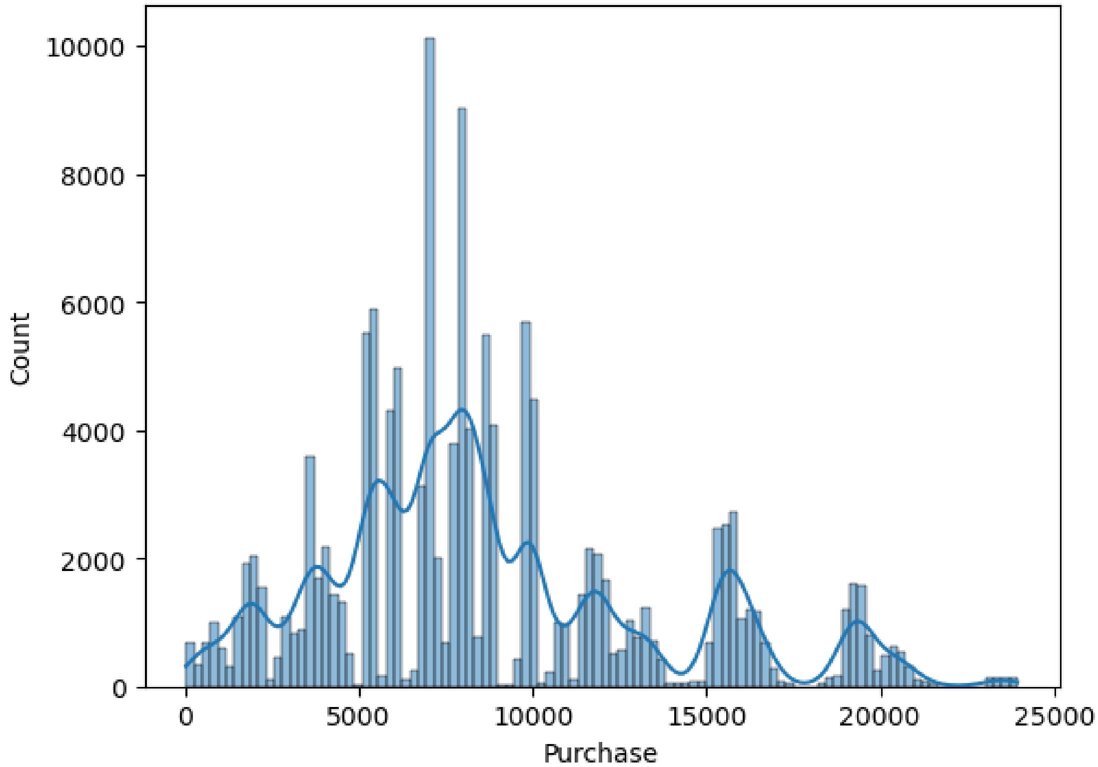
```
19366.551770200334
```

In [25]:

```
sns.histplot(data = s, x = 'Purchase', kde = True)
```

Out[25]:

```
<Axes: xlabel='Purchase', ylabel='Count'>
```



In [138]:

```
lower_range_female = female_mean - 1.95 * female_std
lower_range_female
```

Out[138]:

```
-560.5468785183166
```

In [139]:

```
upper_range_female = female_mean + 1.95 * female_std
```

```
upper_range_female
```

Out[139]:

```
18031.662949718317
```

Confidence Interval for whole data Purchase and Gender column

Consider Confidence level at 95%

- **The average purchase value between the 95% of the data lies between the range 0 and 19366 for Male**
- **The average purchase value between the 95% of the data lies between the range 0 and 18031 for Female**
- **There is difference between the range of the Male and female average purchase value**

Sample size considering 300 for male

In [28]:

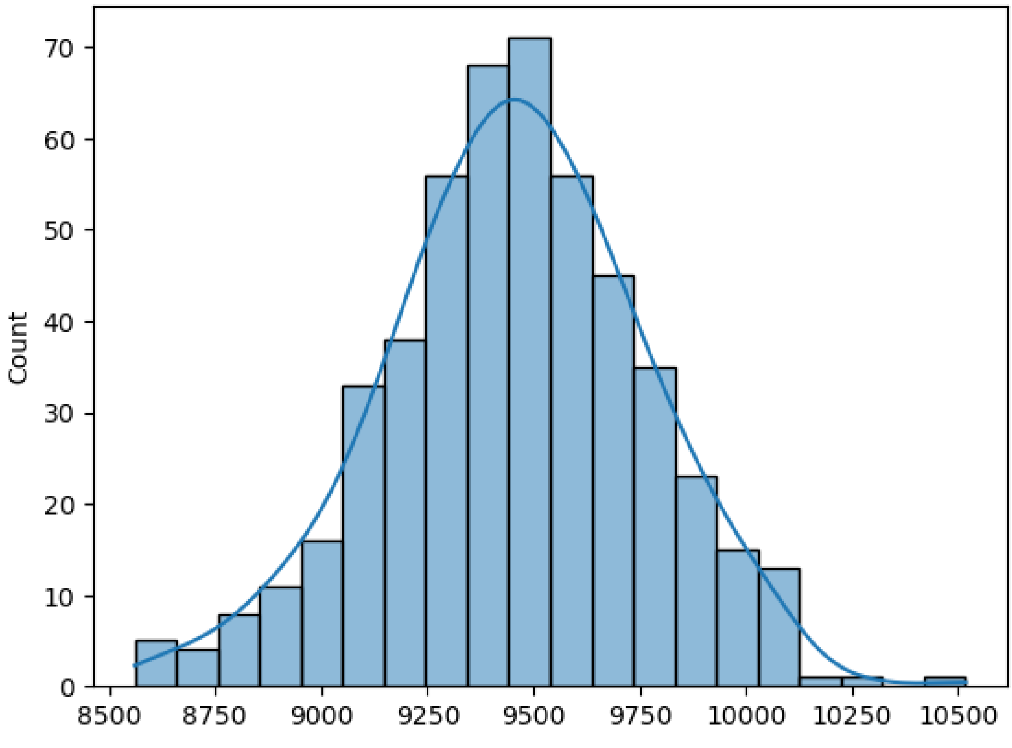
```
sam = [r['Purchase'].sample(300).mean() for i in range (500)]
```

In [29]:

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

Out[29]:

```
<Axes: ylabel='Count'>
```



In [30]:

```
male_mean = np.mean(sam)
male_mean
```

Out[30]:

```
9453.856746666666
```

In [31]:

```
se = male_std/np.sqrt(300)
se
```

Out[31]:

293.9975078978999

In [136]:

```
lower_range_male = male_mean - 1.95 * se
lower_range_male
```

Out[136]:

9379.459147093245

In [137]:

```
upper_range_male = male_mean + 1.95 * se
upper_range_male
```

Out[137]:

9494.118175173424

Sample size considering 300 for female

In [34]:

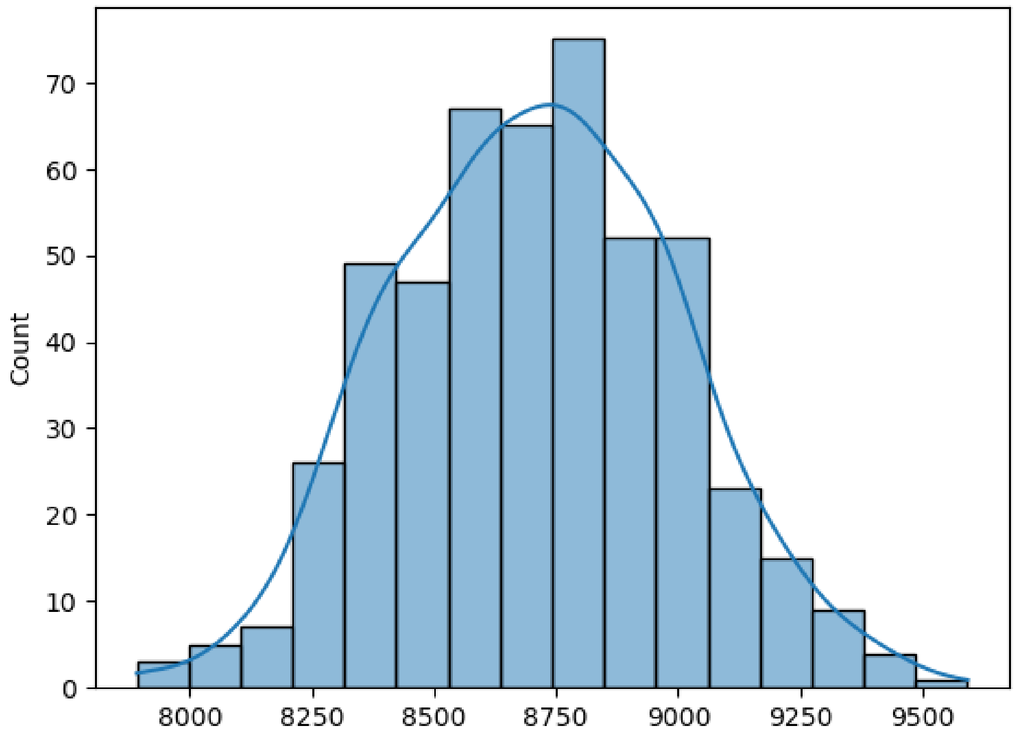
```
sam_f = [s['Purchase'].sample(300).mean() for i in range (500)]
```

In [35]:

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

Out[35]:

<Axes: ylabel='Count'>



In [36]:

```
female_mean = np.mean(sam_f)
female_mean
```

Out[36]:

8709.835406666667

In [37]:

```
se = female_std/np.sqrt(300)
```

```
se = female_std/np.sqrt(300)
se
```

Out[37]:

275.236342286216

In [134]:

```
lower_range_female = female_mean - 1.95 * se
lower_range_female
```

Out[134]:

8678.22852155991

In [135]:

```
upper_range_female = female_mean + 1.95 * se
upper_range_female
```

Out[135]:

8792.887549640089

Comparing the width of the confidence interval for sample size 300

- **The average purchase value between the 95% of the data lies between the range 9379 and 9494 for Male**
- **The average purchase value between the 95% of the data lies between the range 8678 and 8792 for Female**
- **The average purchase value of the Male is slightly greater than Female for the sample size of 300**

Considering the Sample size 3000 for Male

In [40]:

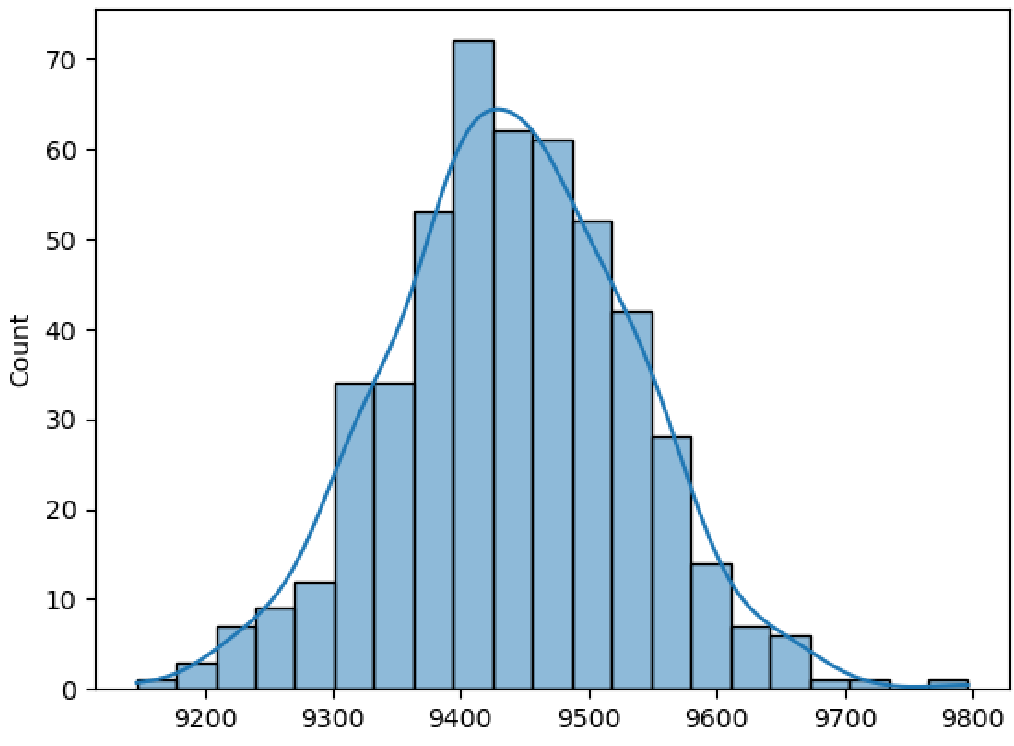
```
sam_m = [r['Purchase'].sample(3000).mean() for i in range (500)]
```

In [41]:

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

Out[41]:

<Axes: ylabel='Count'>



In [42]:

```
male_mean = np.mean(sam_m)
male_mean
```

Out[42]:

```
9439.396187333334
```

In [43]:

```
se = male_std/np.sqrt(300)
se
```

Out[43]:

```
293.9975078978999
```

In [132]:

```
lower_range_male = male_mean - 1.95 * se
lower_range_male
```

Out[132]:

```
9379.459147093245
```

In [133]:

```
upper_range_male = male_mean + 1.95 * se
upper_range_male
```

Out[133]:

```
9494.118175173424
```

Considering the Sample size 3000 for female

In [46]:

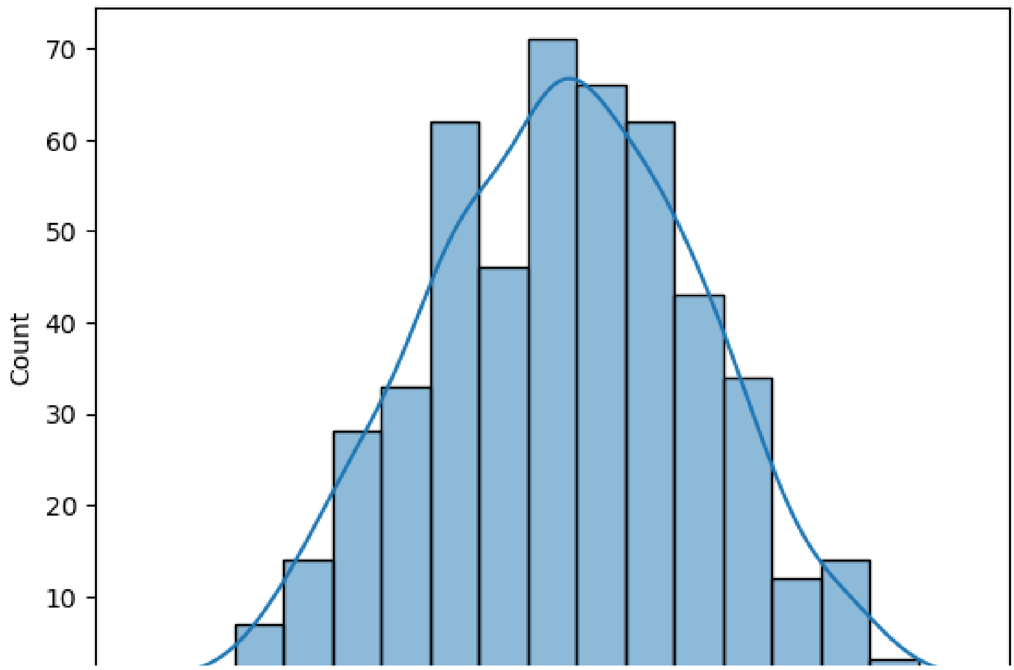
```
sam_f = [s['Purchase'].sample(3000).mean() for i in range (500)]
```

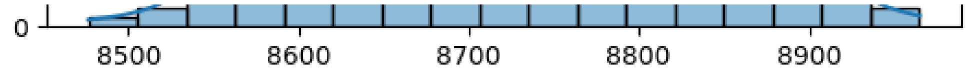
In [47]:

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

Out[47]:

<Axes: ylabel='Count'>





In [48]:

```
female_mean = np.mean(sam_f)
female_mean
```

Out[48]:

```
8727.49192
```

In [49]:

```
se = female_std/np.sqrt(300)
se
```

Out[49]:

```
275.236342286216
```

In [130]:

```
lower_range_female = female_mean - 1.95 * se
lower_range_female
```

Out[130]:

```
8678.22852155991
```

In [131]:

```
upper_range_female = female_mean + 1.95 * se
upper_range_female
```

Out[131]:

```
8792.887549640089
```

Comparing the width of the confidence interval for sample size 3000

- **The average purchase value between the 95% of the data lies between the range 9379 and 9494 for Male**
- **The average purchase value between the 95% of the data lies between the range 8678 and 8792 for Female**
- **The average purchase value of the Male is greater than Female for the sample size of 3000**

Considering Sample Size as 30000 for Male

In [52]:

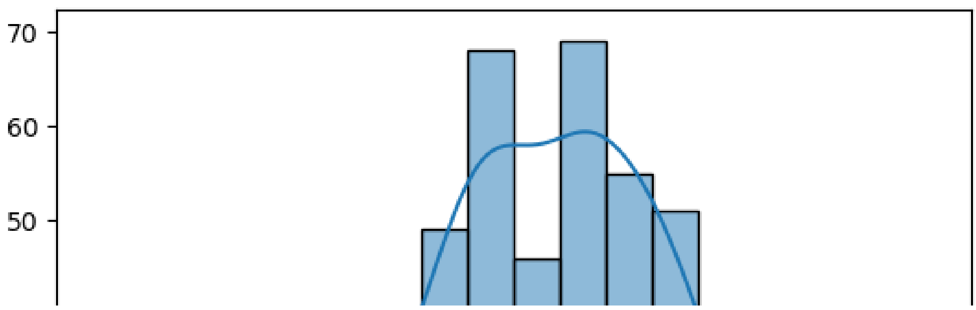
```
sam_m = [r['Purchase'].sample(30000).mean() for i in range (500)]
```

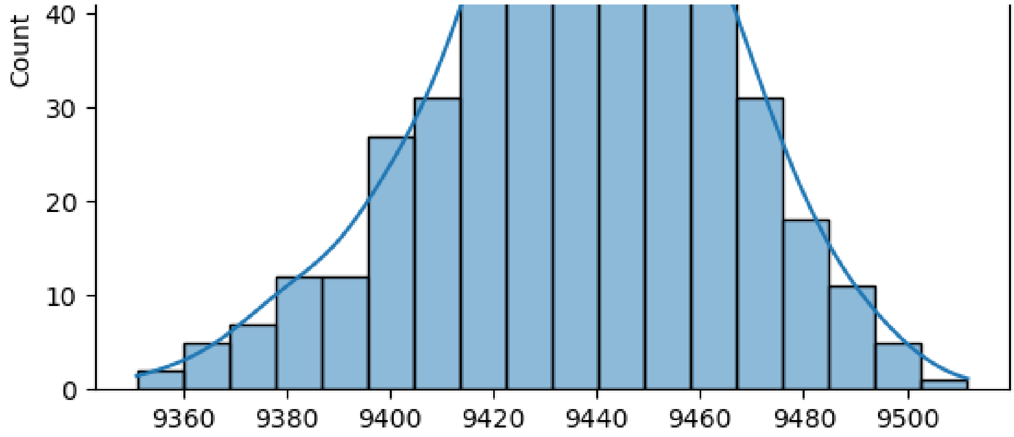
In [53]:

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

Out[53]:

```
<Axes: ylabel='Count'>
```





In [54]:

```
male_mean = np.mean(sam_m)
male_mean
```

Out[54]:

```
9436.788661133334
```

In [129]:

```
se = male_std/np.sqrt(30000)
lower_range_male = male_mean - 1.95 * se
upper_range_male = male_mean + 1.95 * se
lower_range_male, upper_range_male
```

Out[129]:

```
(9379.459147093245, 9494.118175173424)
```

Considering Sample Size as 30000 for Female

In [56]:

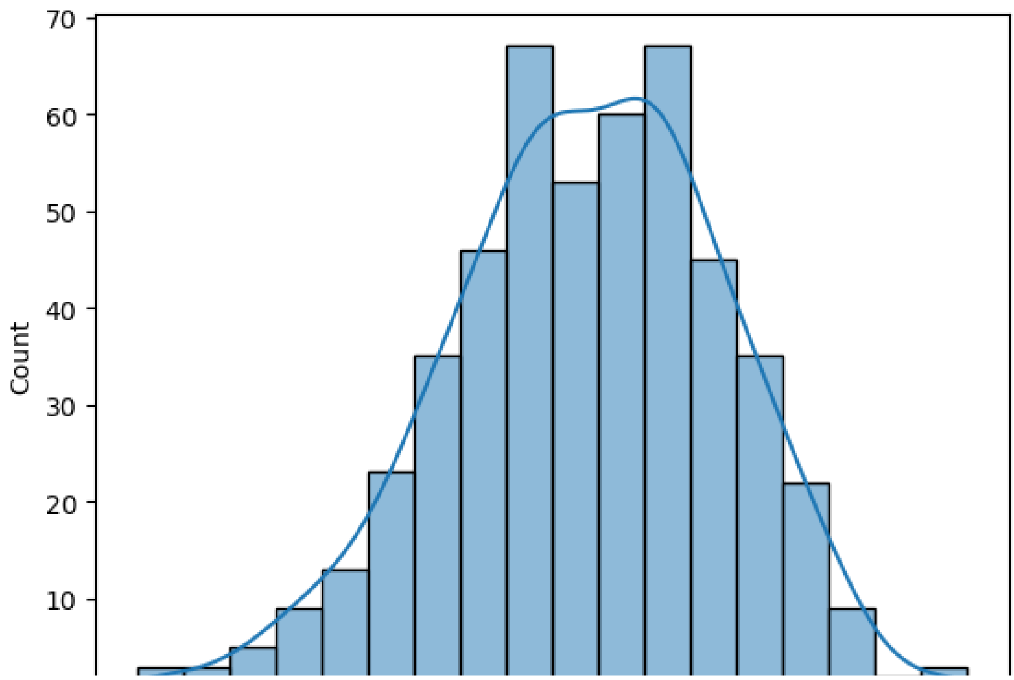
```
sam_f = [s['Purchase'].sample(30000).mean() for i in range (500)]
```

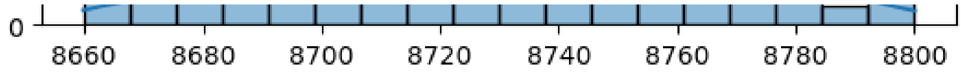
In [57]:

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

Out[57]:

```
<Axes: ylabel='Count'>
```





In [58]:

```
female_mean = np.mean(sam_f)
female_mean
```

Out[58]:

```
8735.5580356
```

In [128]:

```
se = female_std/np.sqrt(30000)
lower_range_femmale = female_mean - 1.95 * se
upper_range_female = female_mean + 1.95 * se
lower_range_female, upper_range_female
```

Out[128]:

```
(8276.104318650607, 8789.22912234581)
```

Comparing the width of the confidence interval for sample size 30000

- **The average purchase value between the 95% of the data lies between the range 9379 and 9494 for Male**
- **The average purchase value between the 95% of the data lies between the range 8276 and 8789 for Female**
- **The average purchase value of the Male is greater than Female for the sample size of 30000**

Confidence Interval for 300 Sample for Purchase and Age column

In [75]:

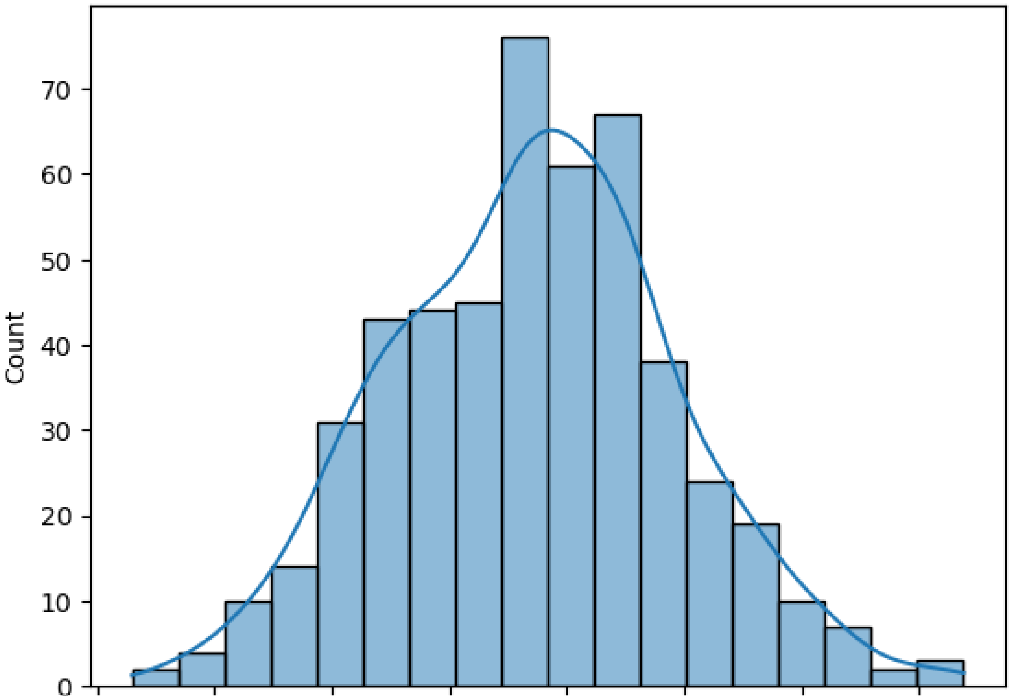
```
age_0 = df[df['Age'] == '0-17']
age_s = [age_0['Purchase'].sample(300).mean() for i in range(500)]
```

In [76]:

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

Out[76]:

```
<Axes: ylabel='Count'>
```



In [77]:

```
norm.ppf(0.025)
```

Out[77]:

```
-1.959963984540054
```

In [78]:

```
a = np.array(age_s).mean()
a_s = np.array(age_s).std()
lower_range_age0 = a - 1.95 * a_s
higher_range_age0 = a + 1.95 * a_s
lower_range_age0, higher_range_age0
```

Out[78]:

```
(8338.728590068351, 9518.649436598318)
```

In [79]:

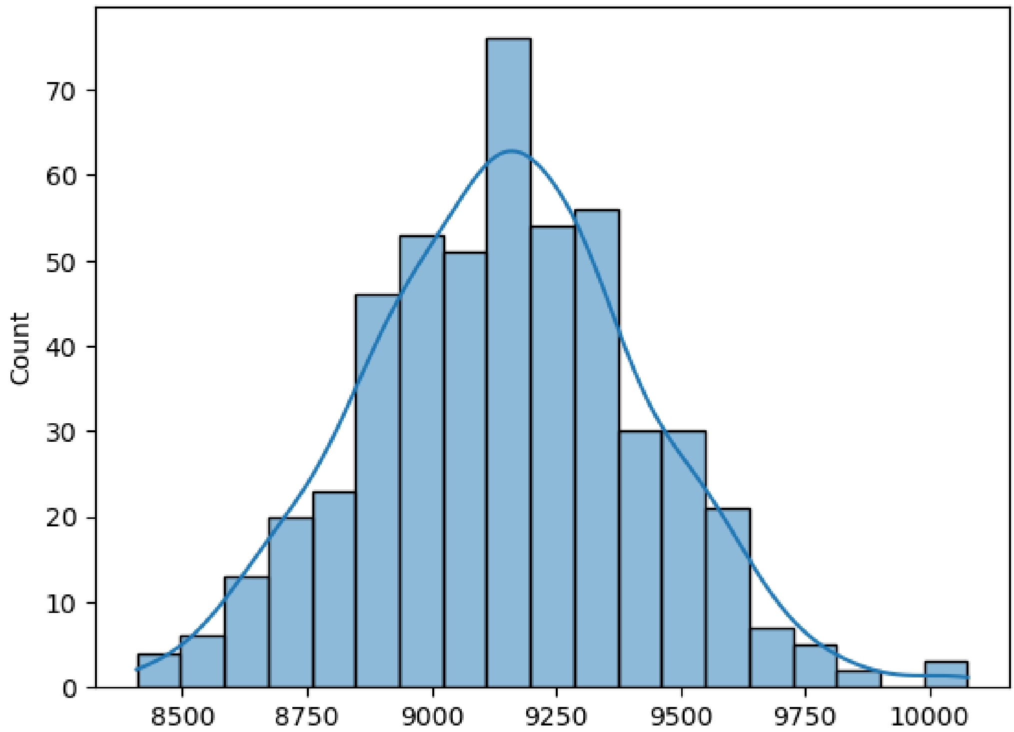
```
age_0 = df[df['Age'] == '18-25']
age_s = [age_0['Purchase'].sample(300).mean() for i in range(500)]
```

In [80]:

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

Out[80]:

```
<Axes: ylabel='Count'>
```



In [81]:

```
a = np.array(age_s).mean()
a_s = np.array(age_s).std()
lower_range_age0 = a - 1.95 * a_s
higher_range_age0 = a + 1.95 * a_s
lower_range_age0, higher_range_age0
```

Out[81]:

```
(8601.521152852414, 9692.838113814256)
```

In [83]:

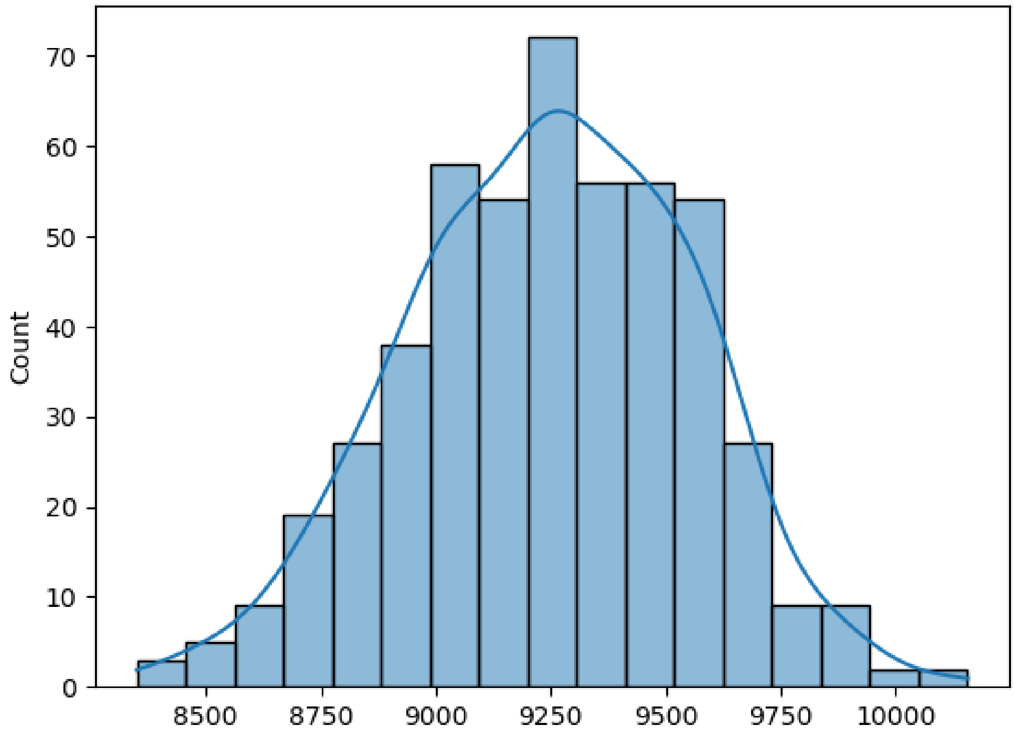
```
age_0 = df[df['Age'] == '26-35']
age_s = [age_0['Purchase'].sample(300).mean() for i in range(500)]
```

In [84]:

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

Out[84]:

```
<Axes: ylabel='Count'>
```



In [85]:

```
a = np.array(age_s).mean()
a_s = np.array(age_s).std()
lower_range_age0 = a - 1.95 * a_s
higher_range_age0 = a + 1.95 * a_s
lower_range_age0, higher_range_age0
```

Out[85]:

```
(8644.988349661706, 9844.868397004959)
```

In [86]:

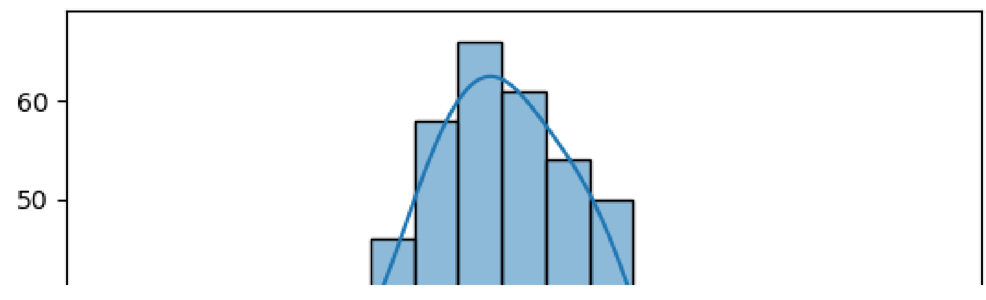
```
age_0 = df[df['Age'] == '36-45']
age_s = [age_0['Purchase'].sample(300).mean() for i in range(500)]
```

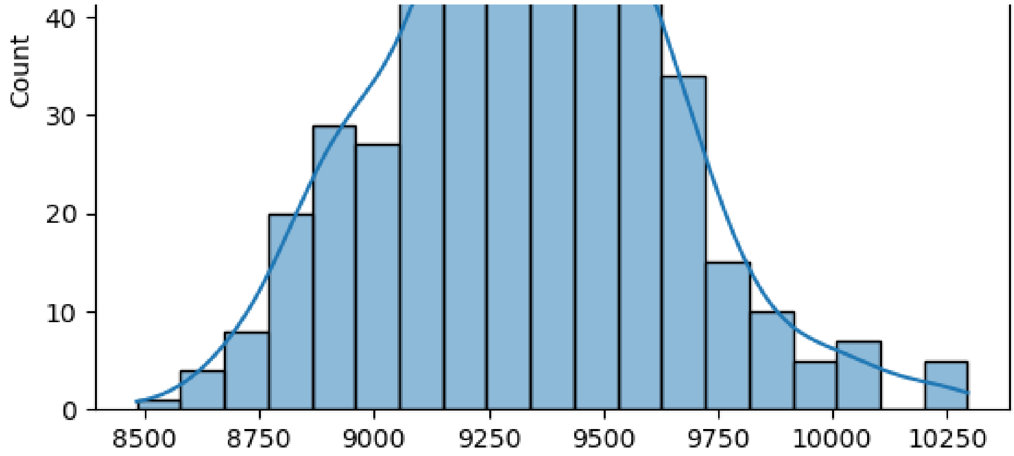
In [87]:

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

Out[87]:

```
<Axes: ylabel='Count'>
```





In [88]:

```
a = np.array(age_s).mean()
a_s = np.array(age_s).std()
lower_range_age0 = a - 1.95 * a_s
higher_range_age0 = a + 1.95 * a_s
lower_range_age0, higher_range_age0
```

Out[88]:

```
(8741.166707468898, 9923.977212531105)
```

In [89]:

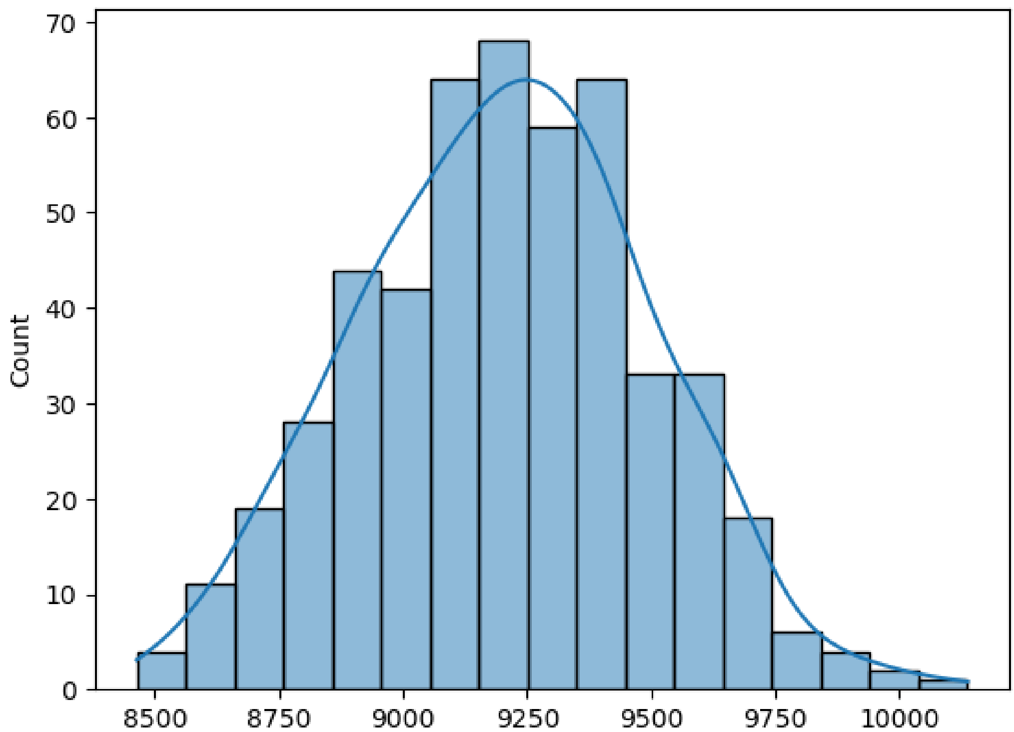
```
age_0 = df[df['Age'] == '46-50']
age_s = [age_0['Purchase'].sample(300).mean() for i in range(500)]
```

In [90]:

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

Out[90]:

```
<Axes: ylabel='Count'>
```



In [91]:

```
a = np.array(age_s).mean()
a_s = np.array(age_s).std()
lower_range_age0 = a - 1.95 * a_s
```

```
higher_range_age0 = a + 1.95 * a_s
lower_range_age0, higher_range_age0
```

Out[91]:

```
(8635.692085877328, 9772.08558078934)
```

In [92]:

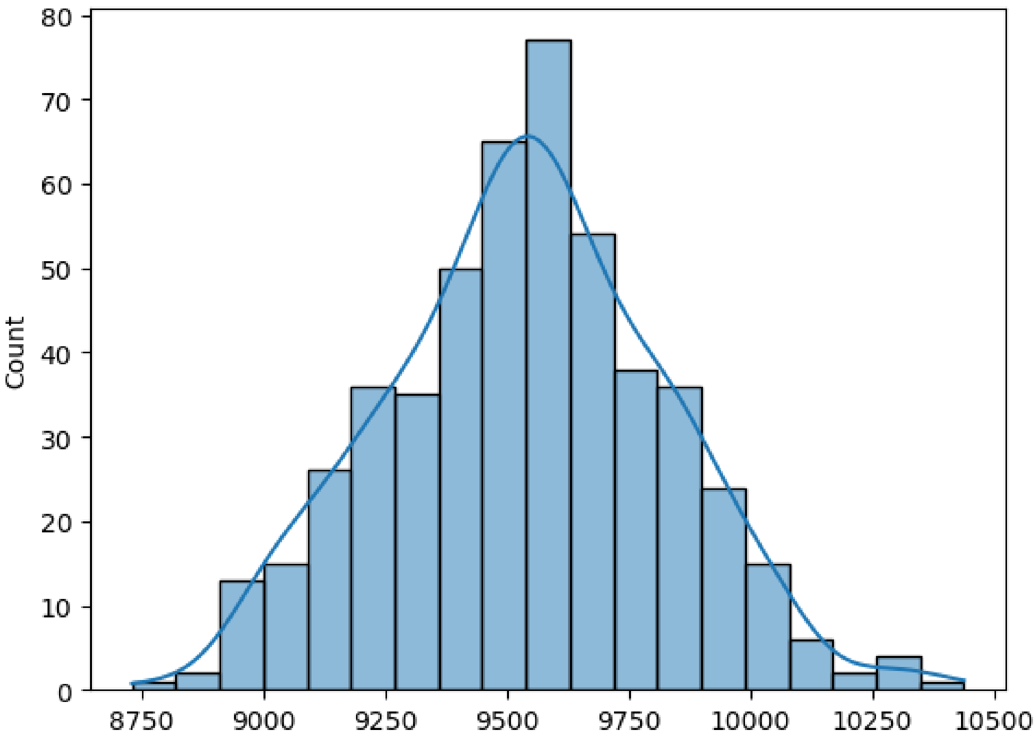
```
age_0 = df[df['Age'] == '51-55']
age_s = [age_0['Purchase'].sample(300).mean() for i in range(500)]
```

In [93]:

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

Out[93]:

```
<Axes: ylabel='Count'>
```



In [94]:

```
a = np.array(age_s).mean()
a_s = np.array(age_s).std()
lower_range_age0 = a - 1.95 * a_s
higher_range_age0 = a + 1.95 * a_s
lower_range_age0, higher_range_age0
```

Out[94]:

```
(8985.281312953037, 10093.104780380298)
```

In [95]:

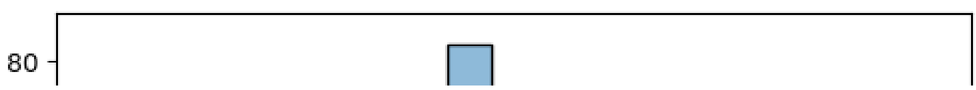
```
age_0 = df[df['Age'] == '55+']
age_s = [age_0['Purchase'].sample(300).mean() for i in range(500)]
```

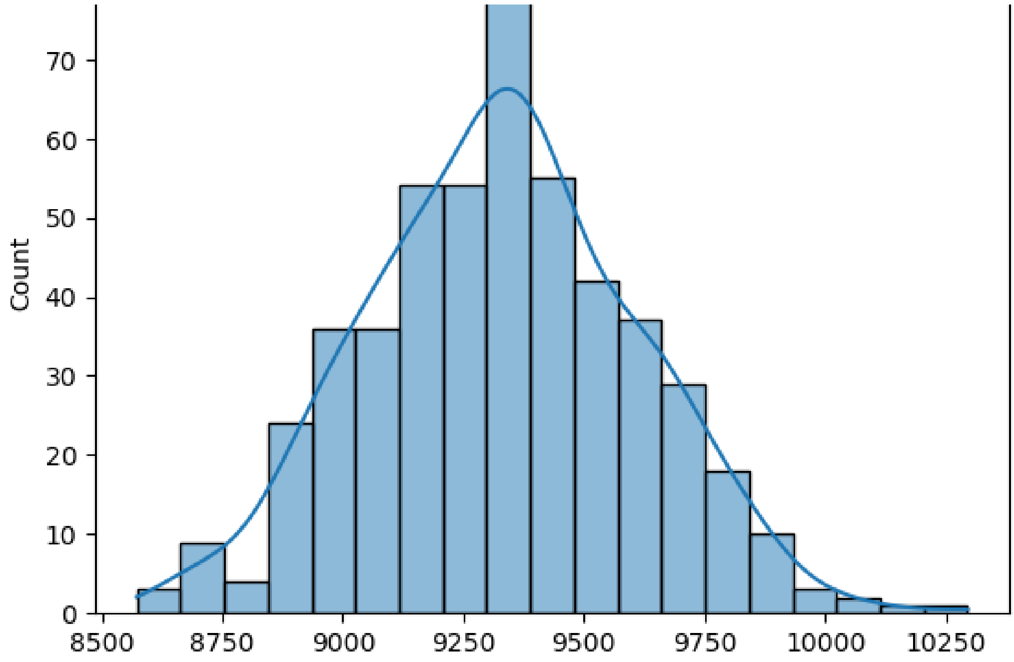
In [96]:

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

Out[96]:

```
<Axes: ylabel='Count'>
```





In [97]:

```
a = np.array(age_s).mean()
a_s = np.array(age_s).std()
lower_range_age0 = a - 1.95 * a_s
higher_range_age0 = a + 1.95 * a_s
lower_range_age0, higher_range_age0
```

Out[97]:

```
(8784.999301765343, 9871.033684901322)
```

- **For age 0-17 confidence interval of means: (8338, 9158)**
- **For age 18-25 confidence interval of means: (8601, 9692)**
- **For age 26-35 confidence interval of means: (8644, 9844)**
- **For age 36-45 confidence interval of means: (8741, 9923)**
- **For age 46-50 confidence interval of means: (8635, 9772)**
- **For age 51-55 confidence interval of means: (8985, 10093)**
- **For age 55+ confidence interval of means: (8784, 9871)**

Confidence Interval for Purchase and Marital Status column

In [98]:

```
m1= df[df['Marital_Status'] == 1]
m1_mean = m1['Purchase'].mean()
m1_mean
```

Out[98]:

```
9261.174574082374
```

In [99]:

```
m1_std = m1['Purchase'].std()
m1_std
```

Out[99]:

```
5016.89737779313
```

In [100]:

```
m0= df[df['Marital_Status'] == 0]
m0_mean = m0['Purchase'].mean()
m0_mean
```

Out[100]:

9265.907618921507

In [101]:

```
m0_std = m0['Purchase'].std()
m0_std
```

Out[101]:

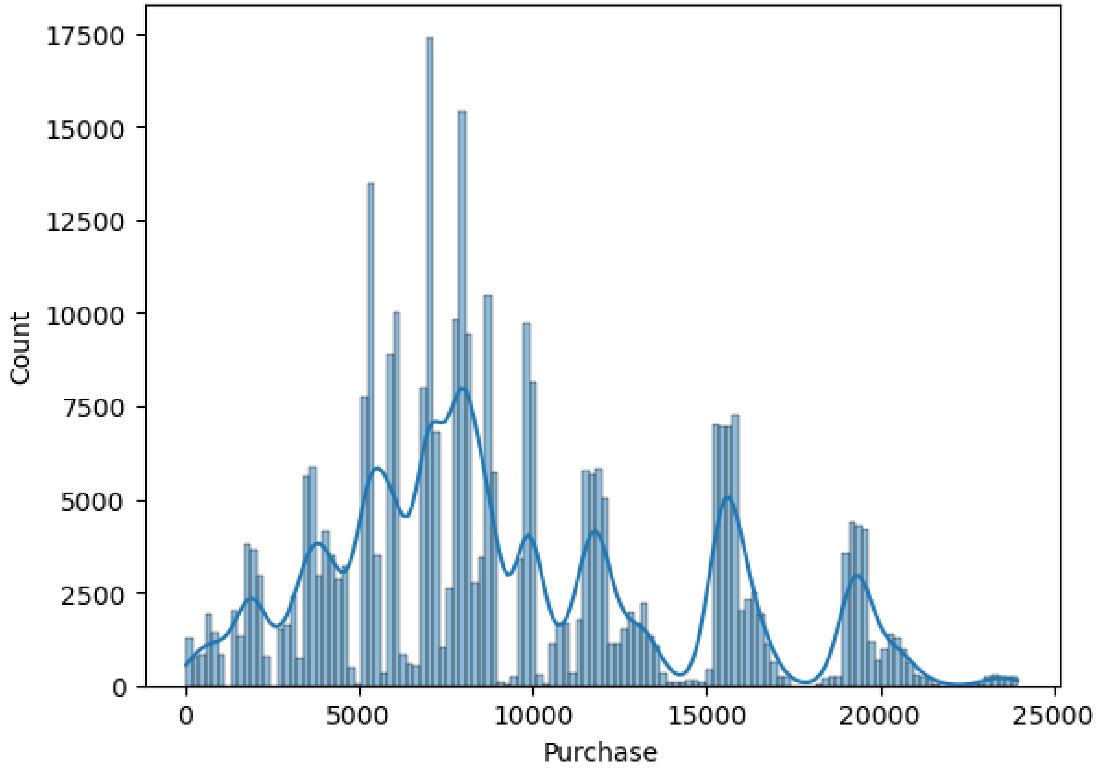
5027.347858674457

In [102]:

```
sns.histplot(data = m0, x = 'Purchase', kde = True)
```

Out[102]:

<Axes: xlabel='Purchase', ylabel='Count'>



In [103]:

```
lower_range_m0 = m0_mean - 1.64 * m0_std
upper_range_m0 = m0_mean + 1.64 * m0_std
(lower_range_m0,upper_range_m0)
```

Out[103]:

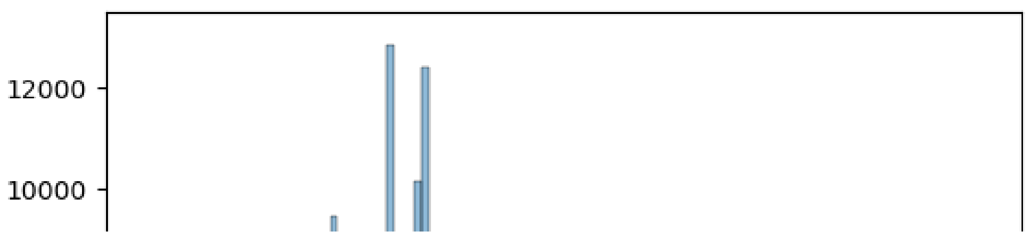
(1021.0571306953971, 17510.758107147616)

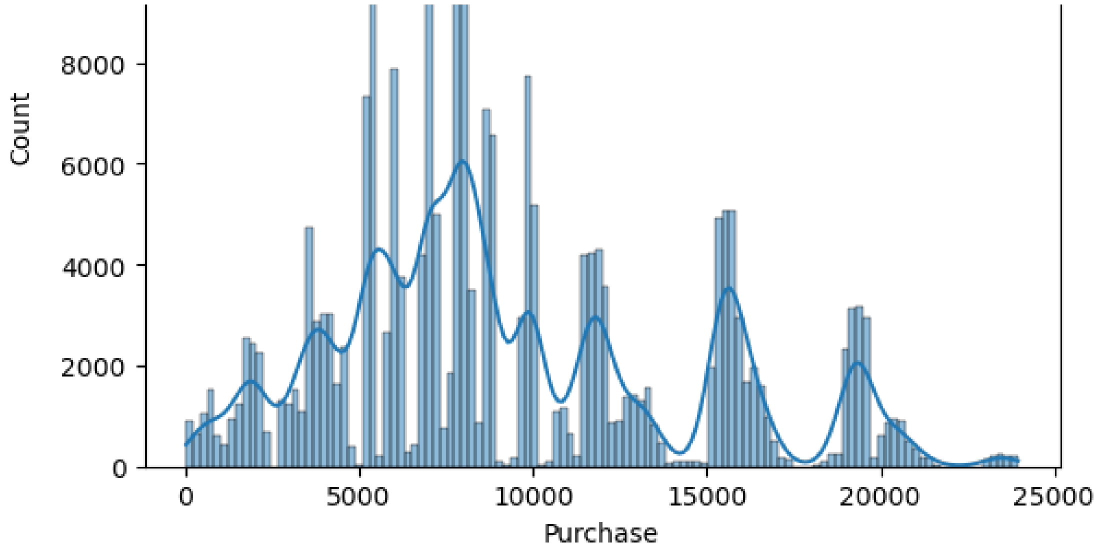
In [104]:

```
sns.histplot(data = m1, x = 'Purchase', kde = True)
```

Out[104]:

<Axes: xlabel='Purchase', ylabel='Count'>





In [105]:

```
lower_range_m1 = m1_mean - 1.64 * m1_std
upper_range_m1 = m1_mean + 1.64 * m1_std
(lower_range_m1,upper_range_m1)
```

Out[105]:

```
(1033.4628745016416, 17488.886273663105)
```

Confidence Interval for whole data

Consider Confidence level at 95%

- **The average purchase value between the 95% of the data lies between the range 1021 and 17510 for m0**
- **The average purchase value between the 95% of the data lies between the range 1033 and 17488 for m1**
- **There is difference between the range of the single and married average purchase value**

Sample size considering 300 for Married

In [106]:

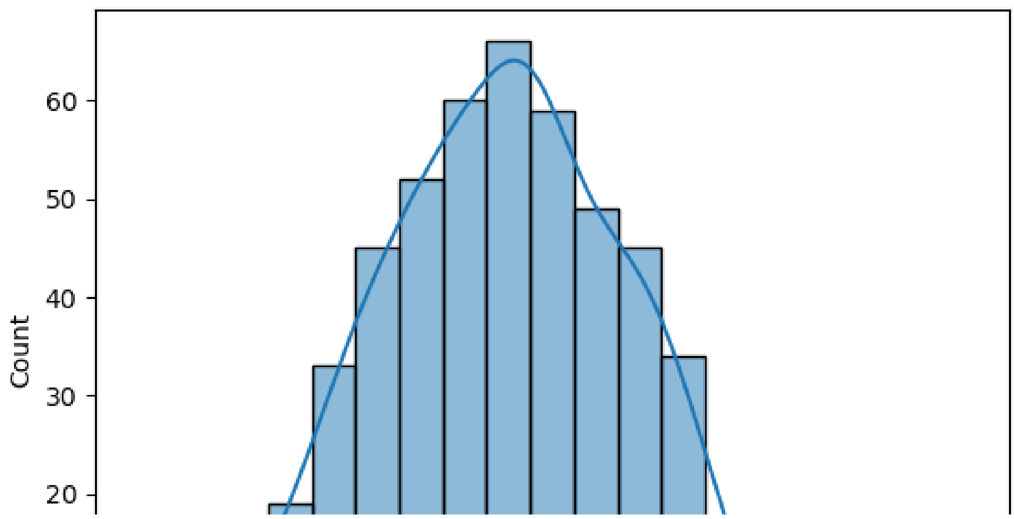
```
sam_m1 = [m1['Purchase'].sample(300).mean() for i in range (500)]
```

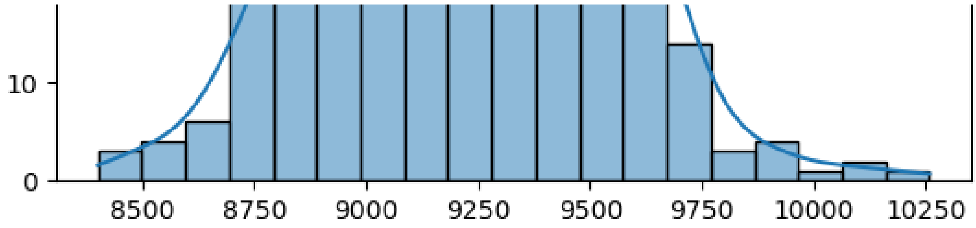
In [107]:

```
sns.histplot(x = sam_m1, kde = True)
```

Out[107]:

```
<Axes: ylabel='Count'>
```





In [127]:

```
m1_mean = np.mean(sam_m1)
se= m1_std/np.sqrt(300)
lower_range_m1 = m1_mean - 1.95 * se
upper_range_m1 = m1_mean + 1.95 * se
(lower_range_m1,upper_range_m1)
```

Out[127]:

```
(8698.825140944708, 9828.46289105529)
```

Sample size considering 300 for Not Married

In [109]:

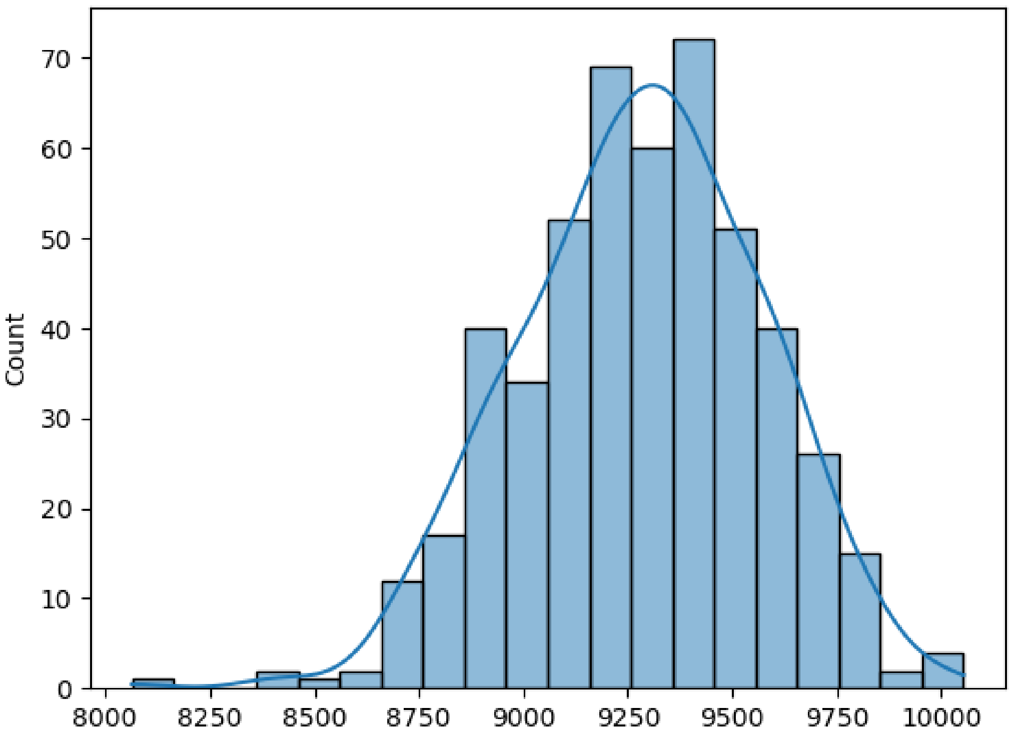
```
sam_m0 = [m0['Purchase'].sample(300).mean() for i in range (500)]
```

In [110]:

```
sns.histplot(x = sam_m0, kde = True)
```

Out[110]:

```
<Axes: ylabel='Count'>
```



In [126]:

```
m0_mean = np.mean(sam_m1)
se= m0_std/np.sqrt(300)
lower_range_m0 = m0_mean - 1.95 * se
upper_range_m0 = m0_mean + 1.95 * se
(lower_range_m0,upper_range_m0)
```

Out[126]:

```
(8697.648591294459, 9829.639440705538)
```

Comparing the width of the confidence interval for sample size 300

- **The average purchase value between the 95% of the data lies between the range 8698 and 9828 for Married**
- **The average purchase value between the 95% of the data lies between the range 8697 and 9829 for Not married**

Sample size considering 3000 for Married

In [112]:

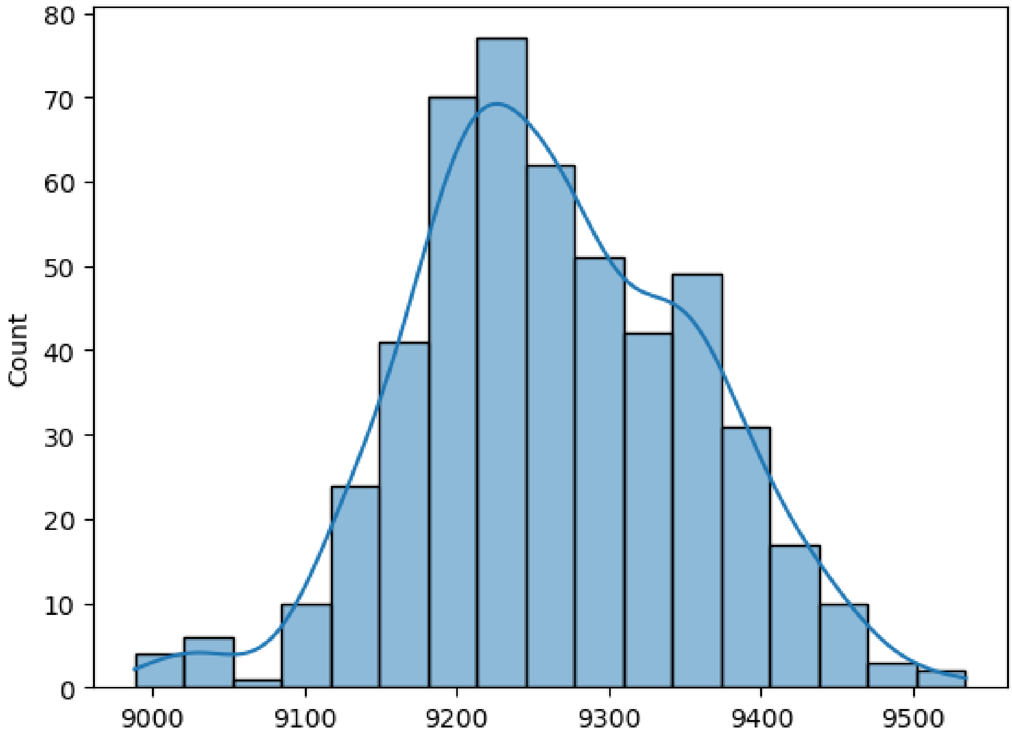
```
sam_m1 = [m1['Purchase'].sample(3000).mean() for i in range (500)]
```

In [113]:

```
sns.histplot(x = sam_m1, kde = True)
```

Out[113]:

```
<Axes: ylabel='Count'>
```



In [125]:

```
m1_mean = np.mean(sam_m1)
se= m1_std/np.sqrt(300)
lower_range_m1 = m1_mean - 1.95 * se
upper_range_m1 = m1_mean + 1.95 * se
(lower_range_m1,upper_range_m1)
```

Out[125]:

```
(8698.825140944708, 9828.46289105529)
```

Sample size considering 3000 for Not Married

In [116]:

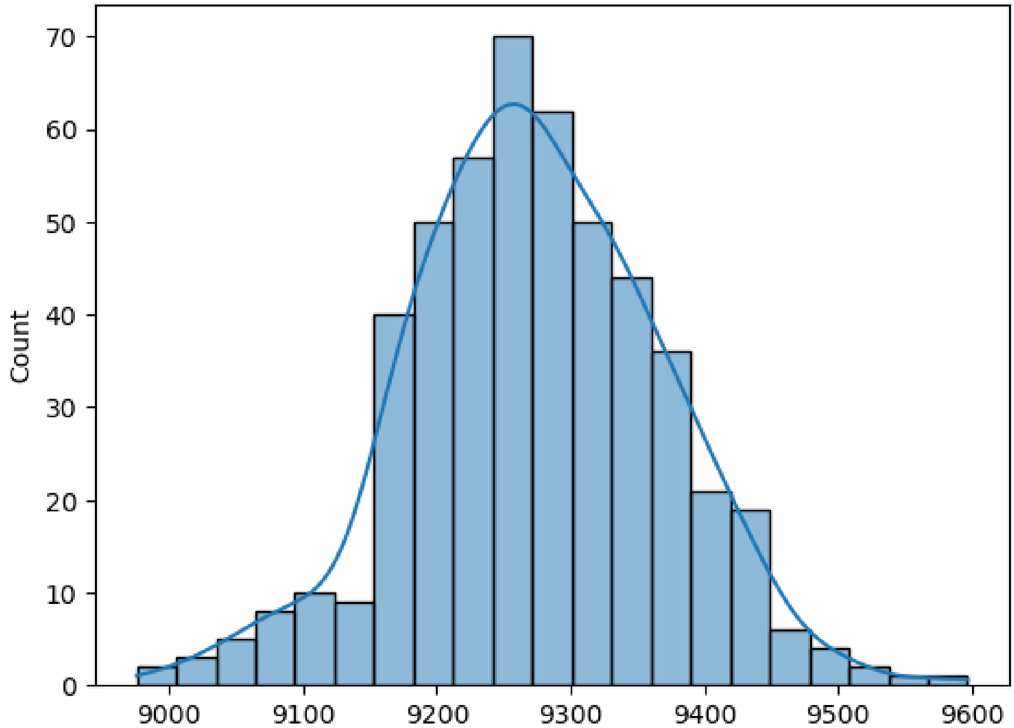
```
sam_m0 = [m0['Purchase'].sample(3000).mean() for i in range (500)]
```

In [117]:

```
sns.histplot(x = sam_m0, kde = True)
```

Out[117]:

<Axes: ylabel='Count'>



In [124]:

```
m0_mean = np.mean(sam_m1)
se= m0_std/np.sqrt(300)
lower_range_m0 = m0_mean - 1.95 * se
upper_range_m0 = m0_mean + 1.95 * se
(lower_range_m0,upper_range_m0)
```

Out[124]:

```
(8697.648591294459, 9829.639440705538)
```

Comparing the width of the confidence interval for sample size 3000

- **The average purchase value between the 95% of the data lies between the range 8698 and 9828 for Married**
- **The average purchase value between the 95% of the data lies between the range 8697 and 9829 for Not married**

Recommendations

- **To increase sales, the company should implement strategies tailored to both genders, considering that men generally spend more. While targeting male customers, it's essential not to overlook females by offering discounts and special offers.**
- **since the age group of 51-55 demonstrates higher spending, allocating more resources to attract customers from other age brackets is crucial.**
- **Certain product categories, such as 19, 20, and 13, show minimal purchase activity. Considering dropping these categories could streamline inventory and resource allocation, optimizing overall operations**
- **Moreover, the analysis reveals a significant frequency of purchase orders falling within the 5k to 10k range. Focusing efforts on promoting and enhancing the appeal of products within this mid-range price segment can potentially drive higher sales and revenue.**

Questions:

- **Are women spending more money per transaction than men? Why or Why not?**

- No the women are not spending more money than men
- There may be various reason to this some of them must be :
  - Men must be earning greater than women
  - Quality of product for women is not good
- Confidence intervals and distribution of the mean of the expenses by female and male customers
  - At 95% confidence interval and sample of 30000
  - The average purchase value between the 95% of the data lies between the range 9379 and 9494 for Male
  - The average purchase value between the 95% of the data lies between the range 8276 and 8789 for Female
- Are confidence intervals of average male and female spending overlapping? How can Walmart leverage this conclusion to make changes or improvements?
  - No the average spending is not overlapping. But this can be change by add some female centric marketing it can be achievable
- Results when the same activity is performed for Married vs Unmarried (10 Points)
  - At 95% confidence interval and sample of 3000
  - The average purchase value between the 95% of the data lies between the range 8698 and 9828 for Married
  - The average purchase value between the 95% of the data lies between the range 8697 and 9829 for Not married
- Results when the same activity is performed for Age
  - At 95% confidence interval and sample of 300
  - For age 0-17 confidence interval of means: (8338, 9158)
  - For age 18-25 confidence interval of means: (8601, 9692)
  - For age 26-35 confidence interval of means: (8644, 9844)
  - For age 36-45 confidence interval of means: (8741, 9923)
  - For age 46-50 confidence interval of means: (8635, 9772)
  - For age 51-55 confidence interval of means: (8985, 10093)
  - For age 55+ confidence interval of means: (8784, 9871)

In [ ]: