In [1]:
```
%config Completer.use_jedi = False
```

In [2]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings('ignore')
```

In [3]:
```
df = pd.read_csv('train.csv')
```

In [4]:
```
df.head(3)
```

Out[4]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marita
0	1000001	P00069042	F	0-17	10	A	2	
1	1000001	P00248942	F	0-17	10	A	2	
2	1000001	P00087842	F	0-17	10	A	2	

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 550068 entries, 0 to 550067
Data columns (total 12 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_1          550068 non-null  int64  
 9   Product_Category_2          376430 non-null  float64
 10  Product_Category_3          166821 non-null  float64
 11  Purchase                    550068 non-null  int64  
dtypes: float64(2), int64(5), object(5)
memory usage: 50.4+ MB
```

In [6]:
```
df.describe().transpose()
```

Out[6]:

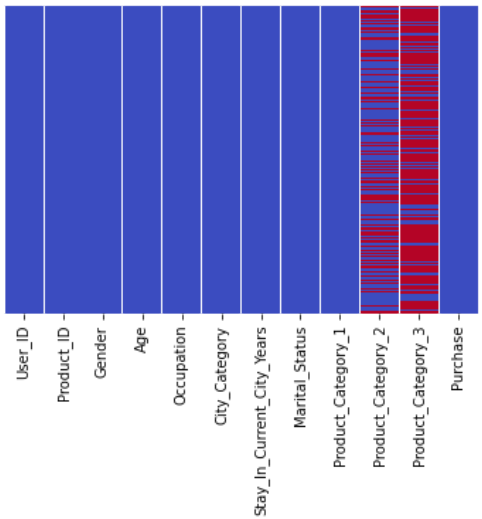
	count	mean	std	min	25%	50%	75%
User_ID	550068.0	1.003029e+06	1727.591586	1000001.0	1001516.0	1003077.0	1004478.(
Occupation	550068.0	8.076707e+00	6.522660	0.0	2.0	7.0	14.(
Marital_Status	550068.0	4.096530e-01	0.491770	0.0	0.0	0.0	1.(
Product_Category_1	550068.0	5.404270e+00	3.936211	1.0	1.0	5.0	8.(

	count	mean	std	min	25%	50%	75%
Product_Category_2	376430.0	9.842329e+00	5.086590	2.0	5.0	9.0	15.(
Product_Category_3	166821.0	1.266824e+01	4.125338	3.0	9.0	14.0	16.(
Purchase	550068.0	9.263969e+03	5023.065394	12.0	5823.0	8047.0	12054.(

In [7]:
```
df.isnull().sum()
```

Out[7]:
```
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_1              0
Product_Category_2         173638
Product_Category_3         383247
Purchase                        0
dtype: int64
```

In [8]:
```
sns.heatmap(df.isnull(), yticklabels=False, cbar=False, cmap='coolwarm');
```



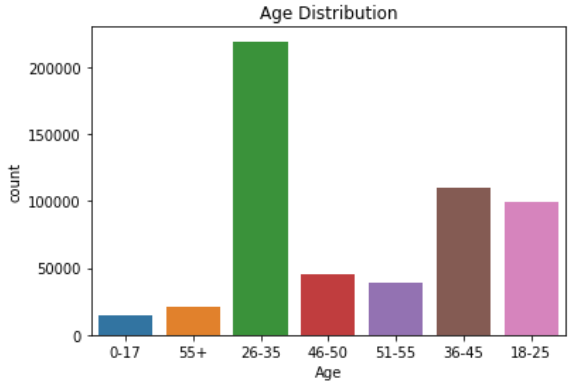
In [9]:
```
newdf = df.copy()
```

Exploratory Data Analysis

Age Distribution

In [10]:
```
sns.countplot(newdf['Age']);
```

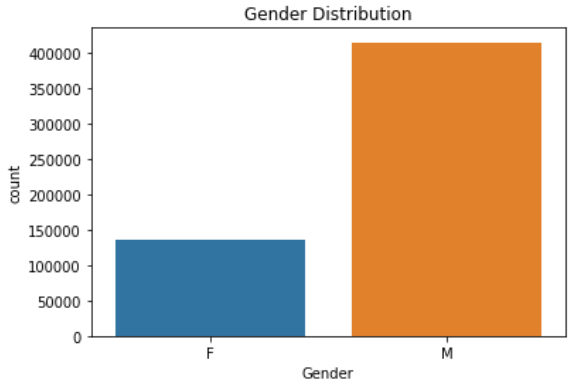
```
plt.title('Age Distribution');
```



Most Populated Age Group is 26-35 years

Gender Distribution

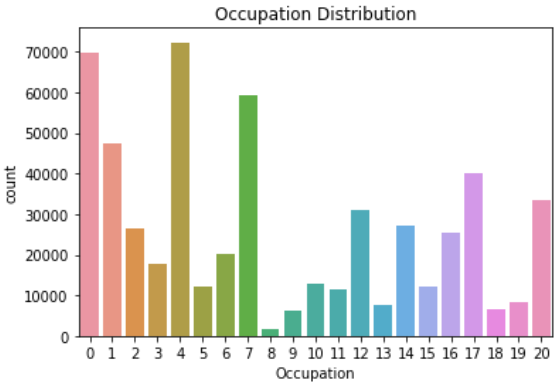
In [11]:
```
sns.countplot(newdf['Gender']);
plt.title('Gender Distribution');
```



More Males than Females

Occupation Distribution

In [12]:
```
sns.countplot(newdf['Occupation']);
plt.title('Occupation Distribution');
```

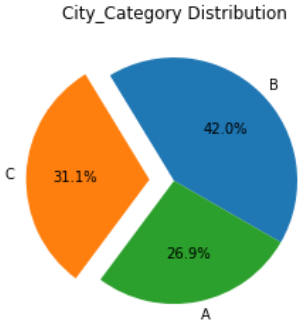



Occupation number 0 and 4 employ the most customers. Occupation number 8 and 9 employ the least customers.

City Category Distribution

In [13]:
```
city = newdf['City_Category'].value_counts()
```

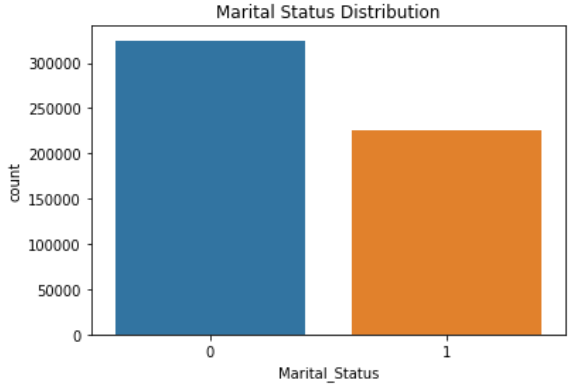
In [14]:
```
plt.pie(city.values, labels=city.index, startangle=-30,
        explode=(0,0.20,0), autopct='%1.1f%%');
plt.title('City_Category Distribution');
```



Most Customers are from City B

Marital Status Distribution

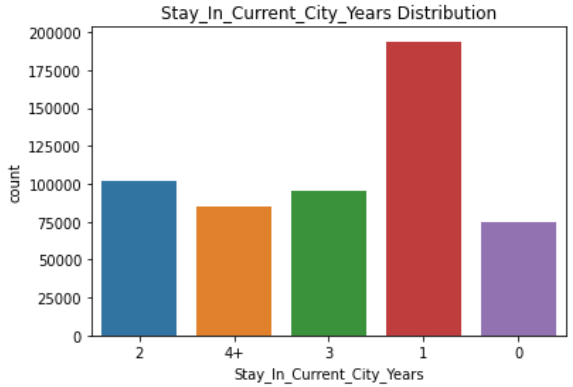
In [15]:
```
sns.countplot(newdf['Marital_Status']);
plt.title('Marital Status Distribution');
```



Majority of Customers are Unmarried

Stay in City Distribution

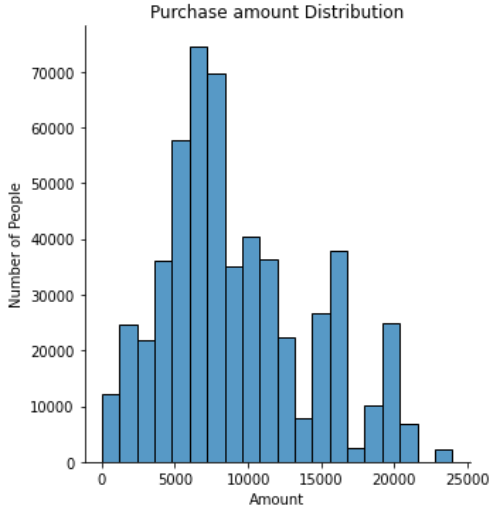
In [16]:
```
sns.countplot(newdf['Stay_In_Current_City_Years']);
plt.title('Stay_In_Current_City_Years Distribution');
```



Most customers are living in the city for 1 years

Purchase Distribution

In [17]:
```
sns.displot(newdf['Purchase'], bins=20);
plt.title('Purchase amount Distribution');
plt.xlabel('Amount');
plt.ylabel('Number of People');
```

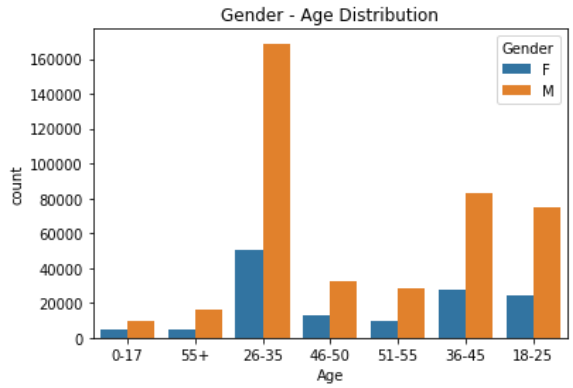



There is a direct correlation with number of customers and amount spent

Bivariate Analysis

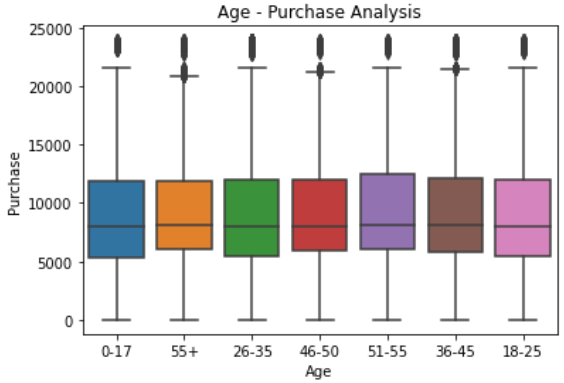
Age - Gender Analysis

In [18]:
```
sns.countplot(newdf['Age'], hue=newdf['Gender']);
plt.title('Gender - Age Distribution');
```



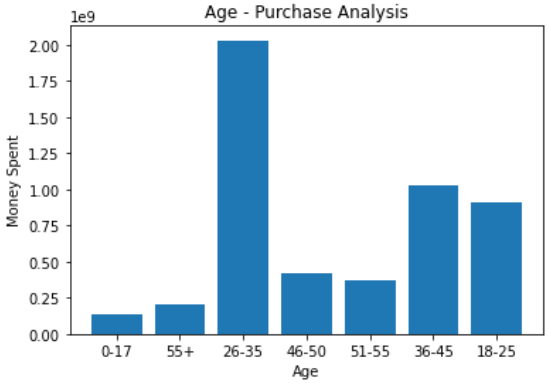
Age - Purchase Analysis

In [19]:
```
sns.boxplot(newdf['Age'], newdf['Purchase']);
plt.title('Age - Purchase Analysis');
```



In [20]:
```
age = ['0-17', '55+', '26-35', '46-50', '51-55', '36-45', '18-25']
purchase = []
for item_age in age:
    purchase.append(newdf[newdf['Age'] == item_age]['Purchase'].sum())
```

In [21]:
```
plt.bar(age, purchase, align='center');
plt.xlabel('Age');
plt.ylabel('Money Spent');
plt.title('Age - Purchase Analysis');
```



In [22]:
```
newdf['Purchase'].mean()
```

Out[22]: 9263.968712959126

In [23]:
```
newdf['Combined_G_M'] = newdf.apply(lambda x: '%s-%s' % (x['Gender'], x['Marital_Sta
```

In [24]:
```
sns.heatmap(newdf.corr(), annot=True)
```

Out[24]: <AxesSubplot:>