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

In [2]:
```
df = pd.read_csv(r"C:\Users\veera\Downloads\PRANAV B\docs\projects\Transactional
```

In [3]:
```
print("Data shape:", df.shape)
df.head()
```

```
Data shape: (284807, 31)
```

Out[3]:

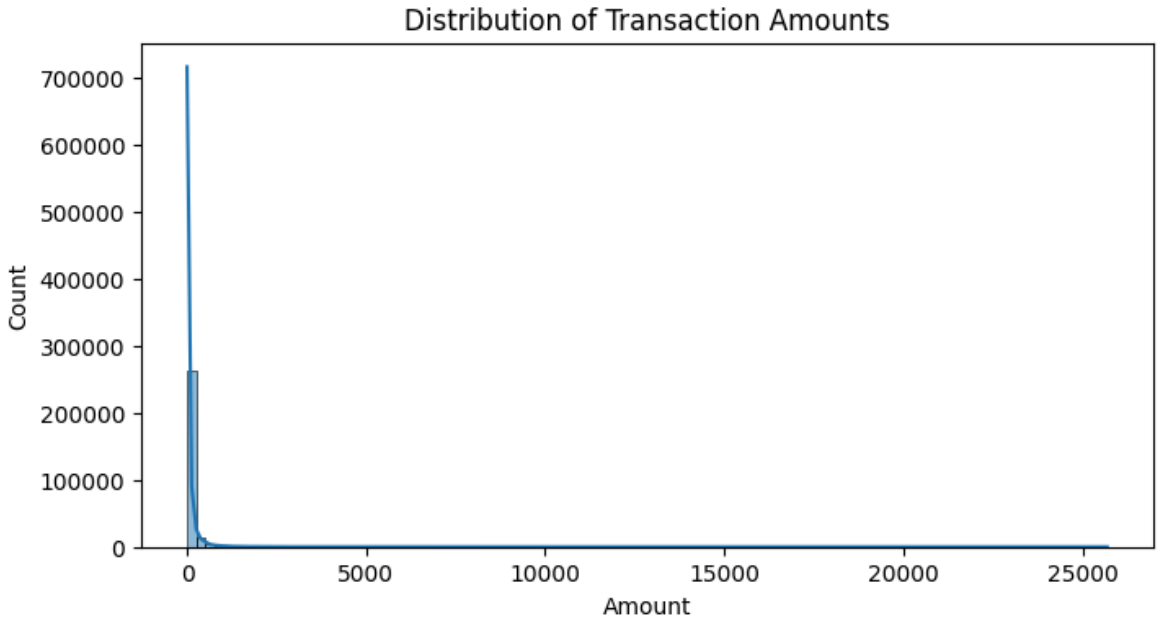
	Time	V1	V2	V3	V4	V5	V6	V7	
0	0.0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.0
1	0.0	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.0
2	1.0	-1.358354	-1.340163	1.773209	0.379780	-0.503198	1.800499	0.791461	0.2
3	1.0	-0.966272	-0.185226	1.792993	-0.863291	-0.010309	1.247203	0.237609	0.3
4	2.0	-1.158233	0.877737	1.548718	0.403034	-0.407193	0.095921	0.592941	-0.2

5 rows × 31 columns

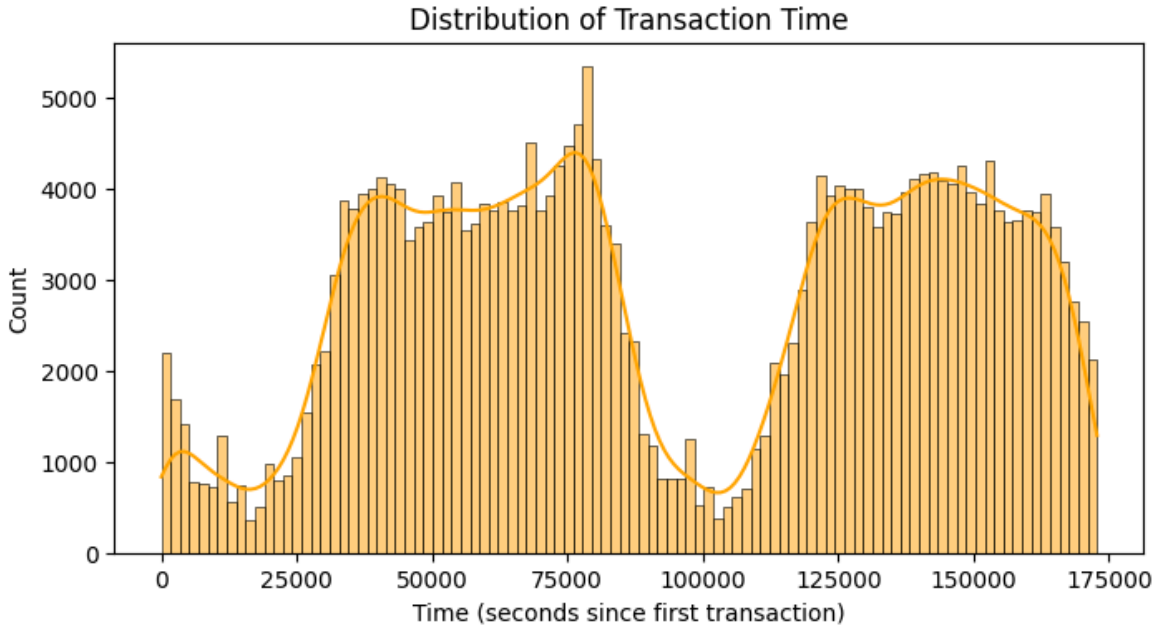
In [4]:
```
print(df['Class'].value_counts())
#Class – 1 = Fraud, 0 = Legit
```

```
Class
0    284315
1       492
Name: count, dtype: int64
```

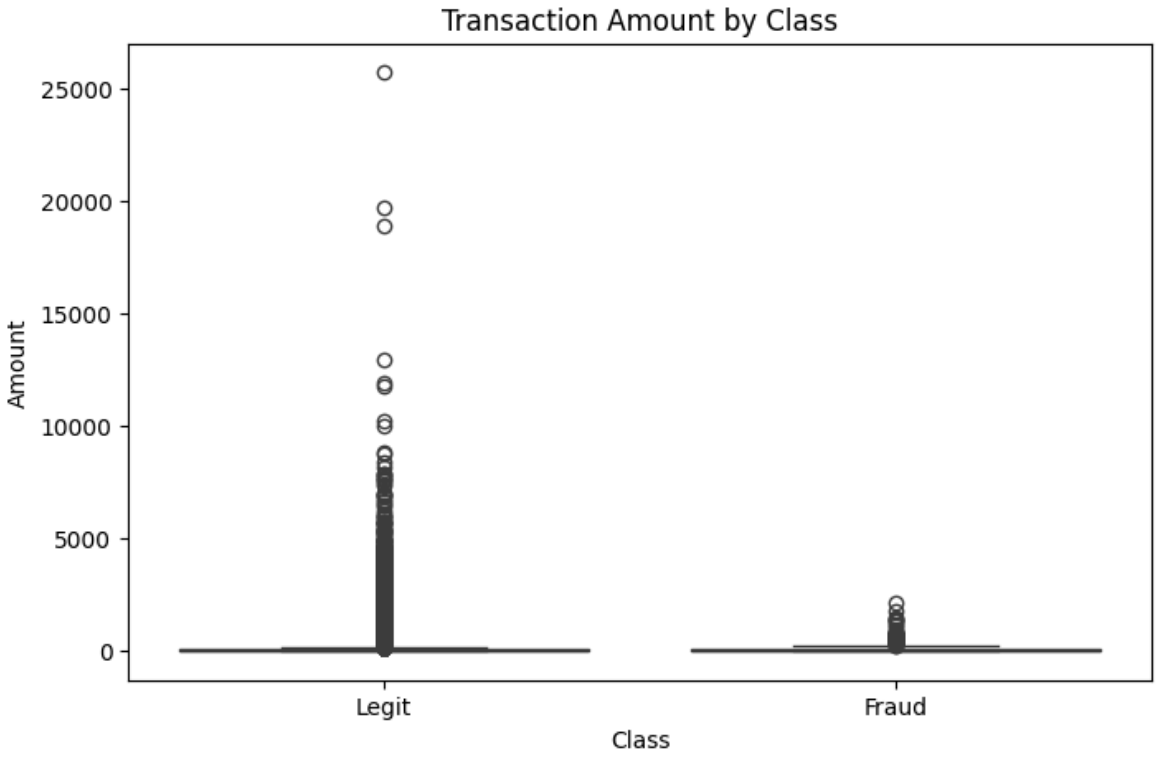
In [5]:
```
plt.figure(figsize=(8,4))
sns.histplot(df['Amount'], bins=100, kde=True)
plt.title("Distribution of Transaction Amounts")
plt.xlabel("Amount")
plt.show()
#Observation:
#Most transactions are small (skewed toward 0), but a few high-value ones exist.
```



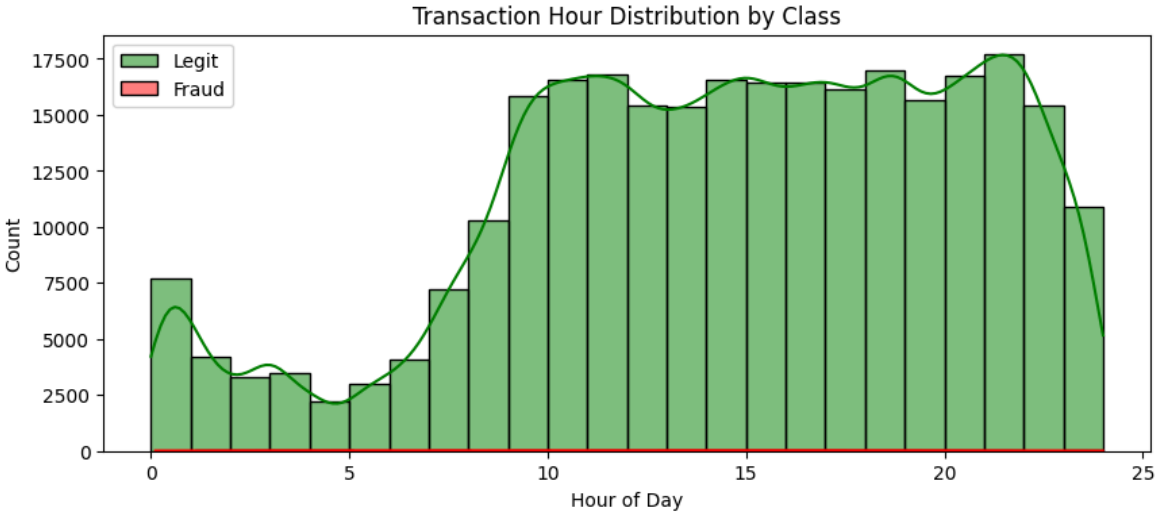
In [6]:
```
plt.figure(figsize=(8,4))
sns.histplot(df['Time'], bins=100, kde=True, color="orange")
plt.title("Distribution of Transaction Time")
plt.xlabel("Time (seconds since first transaction)")
plt.show()
#Observation:
#The dataset’s Time column indicates seconds elapsed since the first transaction
```



In [7]:
```
plt.figure(figsize=(8,5))
sns.boxplot(x='Class', y='Amount', data=df)
plt.title("Transaction Amount by Class")
plt.xticks([0,1], ['Legit', 'Fraud'])
plt.show()
#Observation:
#Fraudulent transactions often have distinct (sometimes smaller, sometimes large
```

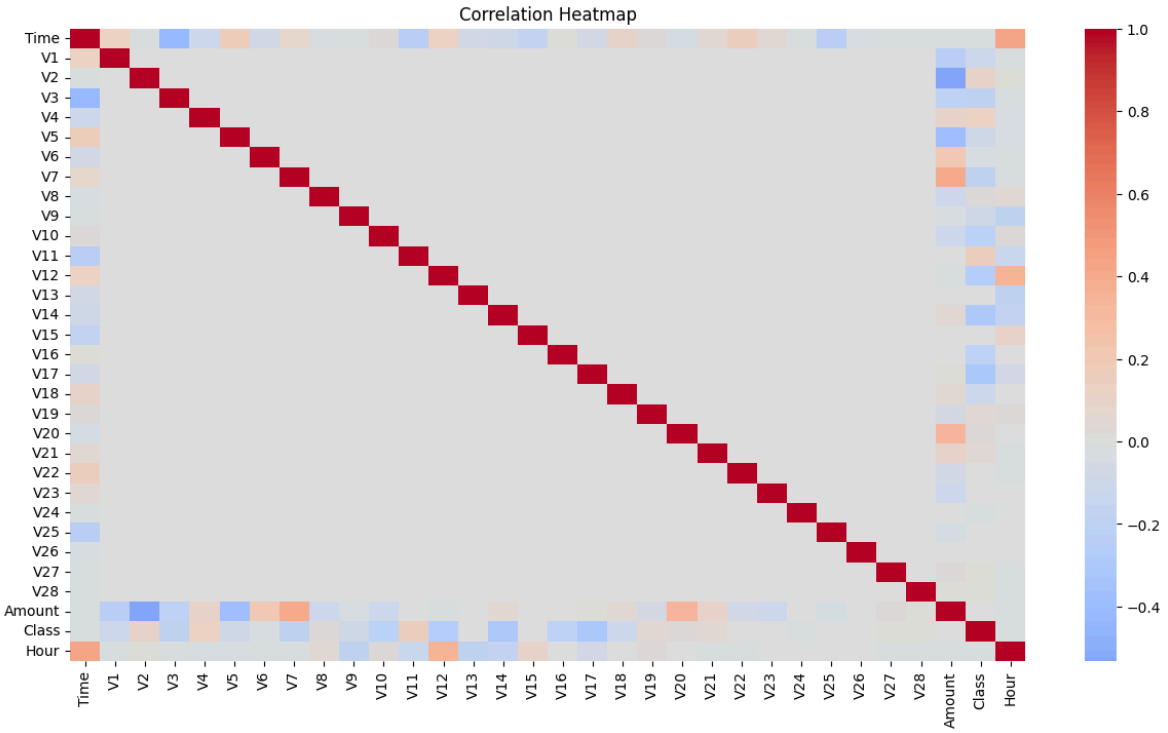


In [8]:
```
df['Hour'] = (df['Time'] / 3600) % 24

plt.figure(figsize=(10,4))
sns.histplot(df[df['Class']==0]['Hour'], bins=24, color='green', label='Legit',
sns.histplot(df[df['Class']==1]['Hour'], bins=24, color='red', label='Fraud', kd
plt.title("Transaction Hour Distribution by Class")
plt.xlabel("Hour of Day")
plt.legend()
plt.show()
#Observation:
#If frauds cluster at specific times (e.g., late night hours), it's a potential
```



In [9]:
```
plt.figure(figsize=(15,8))
corr = df.corr()
sns.heatmap(corr, cmap='coolwarm', center=0)
plt.title("Correlation Heatmap")
plt.show()

# Which features correlate most with fraud?
corr['Class'].sort_values(ascending=False).head(10)
```

```
#Insights
#You'll see certain components (e.g., V17, V14, V12, V10) strongly correlated wi
```



Out[9]:
```
Class    1.000000
V11      0.154876
V4       0.133447
V2       0.091289
V21      0.040413
V19      0.034783
V20      0.020090
V8       0.019875
V27      0.017580
V28      0.009536
Name: Class, dtype: float64
```

In [10]:
```
fraud = df[df['Class']==1]
legit = df[df['Class']==0]

plt.figure(figsize=(12,10))
for i, col in enumerate(['V14','V17','V12','V10']):
    plt.subplot(2,2,i+1)
    sns.kdeplot(legit[col], label='Legit', shade=True)
    sns.kdeplot(fraud[col], label='Fraud', shade=True)
    plt.title(f'{col} Distribution')
    plt.legend()
plt.tight_layout()
plt.show()
#Insights
#You'll visually see how distributions differ for these PCA components — great s
```

```
C:\Users\veera\AppData\Local\Temp\ipykernel_5020\3135931860.py:7: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(legit[col], label='Legit', shade=True)
C:\Users\veera\AppData\Local\Temp\ipykernel_5020\3135931860.py:8: FutureWarning:

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  sns.kdeplot(fraud[col], label='Fraud', shade=True)
```

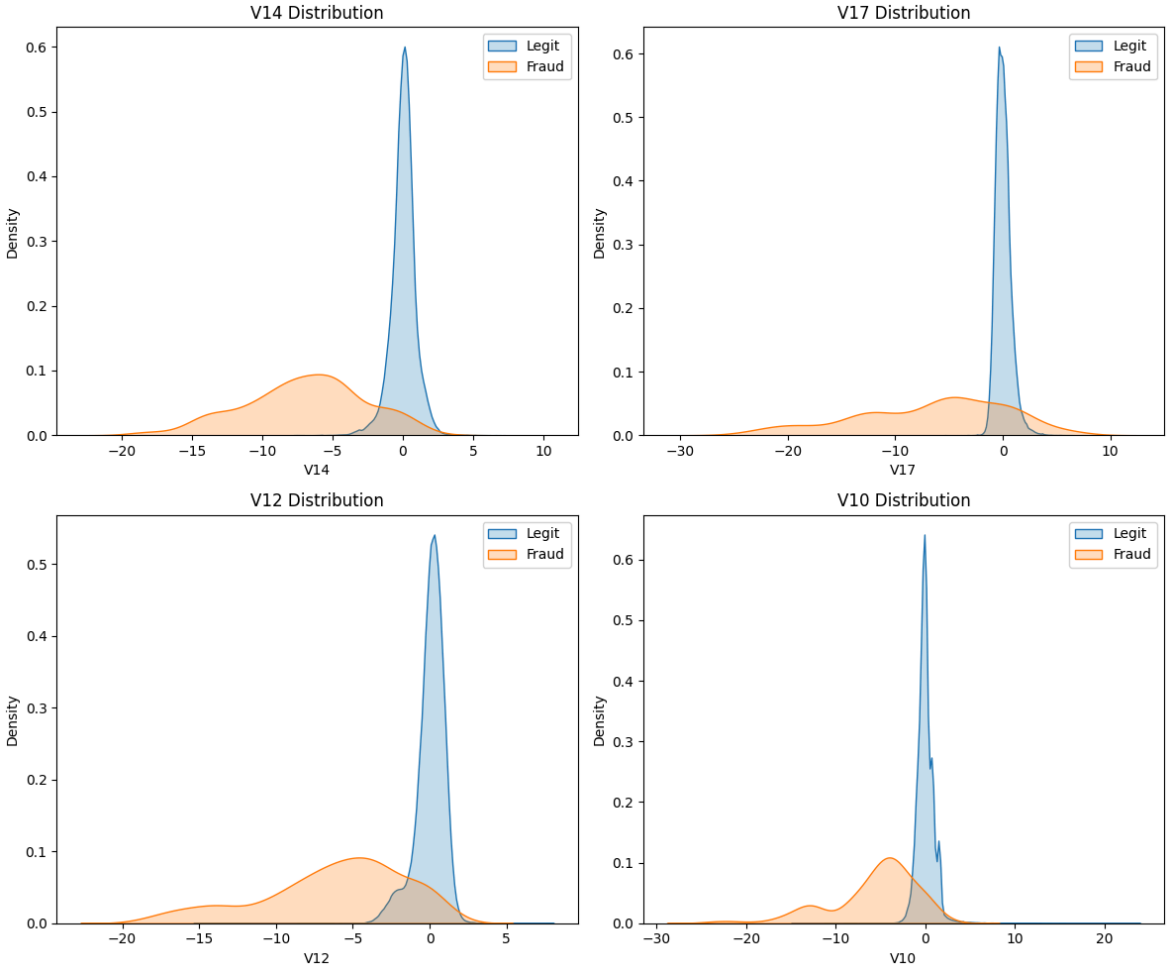

In [11]:
```
df.to_csv(r"C:\Users\veera\Downloads\PRANAV B\docs\projects\Transactional Fraud
```

In [ ]:
```
!jupyter nbconvert --to html "week2_EDA.ipynb" --output-dir="reports"
```