In [3]:
```
import pandas as pd

url = "https://raw.githubusercontent.com/mrdbourke/zero-to-mastery-ml/master/data/car
df = pd.read_csv(url)
```

In [5]:
```
print(df.head())
```

```
    Make Colour  Odometer (KM)  Doors    Price
0   Honda  White        35431.0    4.0  15323.0
1     BMW   Blue       192714.0    5.0  19943.0
2   Honda  White        84714.0    4.0  28343.0
3  Toyota  White       154365.0    4.0  13434.0
4  Nissan   Blue       181577.0    3.0  14043.0
```

In [7]:
```
print(df.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 5 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Make           951 non-null    object 
 1   Colour         950 non-null    object 
 2   Odometer (KM)  950 non-null    float64
 3   Doors          950 non-null    float64
 4   Price          950 non-null    float64
dtypes: float64(3), object(2)
memory usage: 39.2+ KB
None
```

In [9]:
```
df.isna().sum()
```

Out[9]:
```
Make             49
Colour           50
Odometer (KM)    50
Doors            50
Price            50
dtype: int64
```

In [11]:
```
import numpy as np

df_cat = df.select_dtypes(exclude=[np.number])
df_num = df.select_dtypes(include=[np.number])
```

In [13]:
```
print("Categorical Columns:\n", df_cat.columns)
print("Numerical Columns:\n", df_num.columns)
```

```
Categorical Columns:
 Index(['Make', 'Colour'], dtype='object')
Numerical Columns:
 Index(['Odometer (KM)', 'Doors', 'Price'], dtype='object')
```

In [15]:
```
for col in df_cat.columns:
    print(f"{col} : {df_cat[col].unique()}")
```

```
Make : ['Honda' 'BMW' 'Toyota' 'Nissan' nan]
Colour : ['White' 'Blue' 'Red' 'Green' nan 'Black']
```

In [17]:
```
for col in df_cat.columns:
    print(f"\n{col} value counts:")
    print(df_cat[col].value_counts(dropna=False))
```

```
Make value counts:
Make
Toyota    379
Honda     292
Nissan    183
BMW        97
NaN        49
Name: count, dtype: int64

Colour value counts:
Colour
White    390
Blue     302
Black     95
Red       88
Green     75
NaN       50
Name: count, dtype: int64
```

In [19]:
```python
for col in df_cat.columns:
    df[col].fillna(df[col].mode()[0], inplace=True)

for col in df_num.columns:
    df[col].fillna(df[col].median(), inplace=True)
```

```
/tmp/ipykernel_12971/4219121791.py:2: FutureWarning: A value is trying to be set on a
copy of a DataFrame or Series through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work because th
e intermediate object on which we are setting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({c
ol: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform the
operation inplace on the original object.


  df[col].fillna(df[col].mode()[0], inplace=True)
/tmp/ipykernel_12971/4219121791.py:5: FutureWarning: A value is trying to be set on a
copy of a DataFrame or Series through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work because th
e intermediate object on which we are setting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({c
ol: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform the
operation inplace on the original object.


  df[col].fillna(df[col].median(), inplace=True)
```

In [21]:
```python
for col in df_cat.columns:
    df[col] = df[col].fillna(df[col].mode()[0])
```

In [23]:
```python
for col in df_num.columns:
    df[col] = df[col].fillna(df[col].median())
```

In [25]:
```python
from sklearn.preprocessing import LabelEncoder

le = LabelEncoder()

for col in df_cat.columns:
    df[col] = le.fit_transform(df[col].astype(str))

print(df.head())
```

```
   Make  Colour  Odometer (KM)  Doors    Price
0     1       4        35431.0    4.0  15323.0
1     0       1       192714.0    5.0  19943.0
2     1       4        84714.0    4.0  28343.0
3     3       4       154365.0    4.0  13434.0
4     2       1       181577.0    3.0  14043.0
```

In [27]:
```
df_ohe = pd.get_dummies(df, drop_first=True)
print(df_ohe.head())
```

```
   Make  Colour  Odometer (KM)  Doors    Price
0     1       4        35431.0    4.0  15323.0
1     0       1       192714.0    5.0  19943.0
2     1       4        84714.0    4.0  28343.0
3     3       4       154365.0    4.0  13434.0
4     2       1       181577.0    3.0  14043.0
```

In [31]:
```
df['Price'] = df['Price'].replace('[\\$,]', '', regex=True).astype(float)
print(df['Price'].head())
```

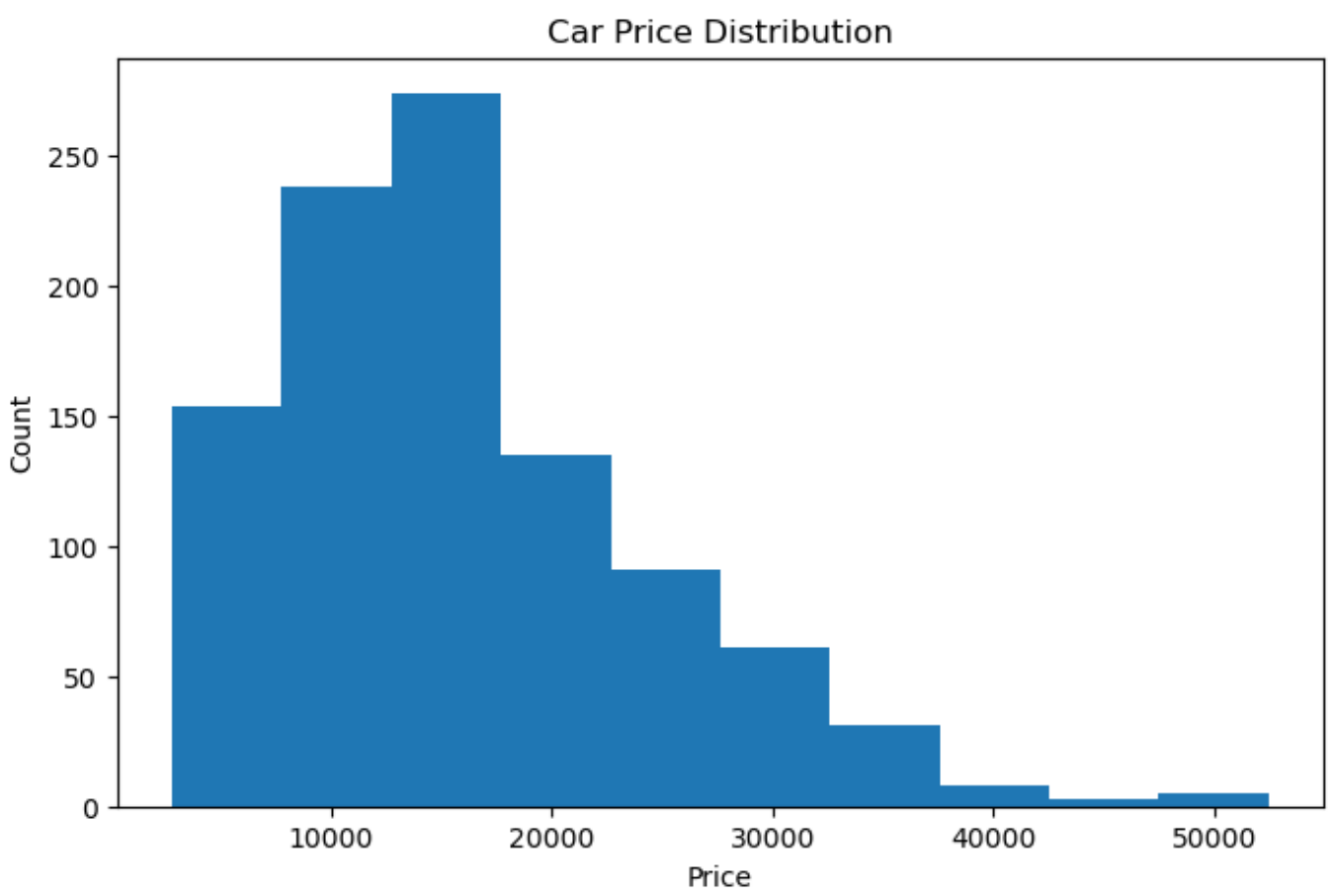
```
0    15323.0
1    19943.0
2    28343.0
3    13434.0
4    14043.0
Name: Price, dtype: float64
```

In [33]:
```
df['Odometer_Group'] = pd.cut(df['Odometer (KM)'], bins=[0,50000,150000,300000], labe
print(df[['Odometer (KM)','Odometer_Group']].head())
```

```
   Odometer (KM) Odometer_Group
0        35431.0            Low
1       192714.0           High
2        84714.0            Mid
3       154365.0           High
4       181577.0           High
```

In [35]:
```
from matplotlib import pyplot as plt

plt.figure(figsize=(8,5))
plt.hist(df['Price'], bins=10)
plt.title("Car Price Distribution")
plt.xlabel("Price")
plt.ylabel("Count")
plt.show()
```


Car Price Distribution
250
200
150
100
50
0
Count
10000
20000
30000
40000
50000
Price

In [ ]: