```
import pandas as pd
import seaborn as sns
import numpy as np
import matplotlib.pyplot as plt
import re
import ast
```

IMPORTING THE DATA SET

```
messy=pd.read_csv('cars_for_sale(uncleaned).csv')
messy.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9246 entries, 0 to 9245
Data columns (total 10 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Car                   9071 non-null   object 
 1   Condition             9071 non-null   object 
 2   Mileage               9071 non-null   object 
 3   Price                 9071 non-null   object 
 4   Basics Info           9242 non-null   object 
 5   Vehicle History Info  9242 non-null   object 
 6   Vehicle Reviews Info  9242 non-null   object 
 7   Seller Rating         7716 non-null   float64
 8   Seller Rating Count   7716 non-null   object 
 9   Seller Address        8954 non-null   object 
dtypes: float64(1), object(9)
memory usage: 722.5+ KB
```

We found 2500 duplicateded in the data set so we remove them

```
messy.duplicated().sum()
```

```
np.int64(2531)
```

```
messy.drop_duplicates(inplace=True)
```

Questions for analysis

1. What is the average price of cars , and how does it vary by condition?
2. Are certain brands or models more expensive than others?
3. How does mileage affect the price of cars?

4. How does accident history impact car prices?
5. How do prices vary across car prodution year?
6. Are cars with higher ratings priced higher?

```
messy.head()

                                 Car Condition      Mileage  \
0             2024 Lexus LC 500 Base       New        0 mi.
1                2007 Acura TSX Base      Used   61,110 mi.
2            2016 McLaren 675LT Base      Used    6,305 mi.
3         2016 Audi TTS 2.0T quattro      Used   65,715 mi.
4  2018 BMW 740e xDrive iPerformance      Used   19,830 mi.

                       Price  \
0      $112,865MSRP $118,865
1                    $11,295
2  $219,997$5,464 price drop
3                    $23,999
4     $39,799$100 price drop

                                         Basics Info  \
0  {'Exterior color': ' Caviar ', 'Interior color...
1  {'Exterior color': ' Alabaster Silver Metallic...
2  {'Exterior color': ' McLaren Orange ', 'Interi...
3  {'Exterior color': ' Black ', 'Interior color'...
4  {'Exterior color': ' Imperial Blue Metallic ',...

                                Vehicle History Info  \
0                                                 {}
1  {'Accidents or damage': 'At least 1 accident o...
2  {'Accidents or damage': 'At least 1 accident o...
3  {'Accidents or damage': 'At least 1 accident o...
4  {'Accidents or damage': 'None reported', 'Clea...

                                Vehicle Reviews Info  Seller Rating  \
0                                                 {}            4.7
1                                                 {}            4.2
2  {'Comfort': '5.0', 'Interior': '5.0', 'Perform...            3.1
3  {'Comfort': '3.0', 'Interior': '5.0', 'Perform...            3.6
4  {'Comfort': '5.0', 'Interior': '5.0', 'Perform...            4.4

  Seller Rating Count                          Seller Address
0     (1,261 reviews)    1250 W Division St Chicago, IL 60642
1       (440 reviews)     1301 N Elston Ave Chicago, IL 60642
2       (421 reviews)     1561 N Fremont St Chicago, IL 60642
3       (123 reviews)  560 E North Ave West Chicago, IL 60185
4        (91 reviews)         6539 Ogden Ave Berwyn, IL 60402
```

but data set is messy and not ready yet to perform analysis on it

first column price we need to convert it to a real number

so first we convert it to string that can be converted to number

then we convert it to numeric

```
pattern = r"\$\d+(?:,\d{3})*"
messy['Price'] = messy['Price'].apply(lambda x: re.search(pattern,
str(x)).group(0) if re.search(pattern, str(x)) else None)
messy['Price']=
pd.to_numeric(messy['Price'].str.replace('$','').str.replace(',',''))
messy.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 6715 entries, 0 to 9243
Data columns (total 10 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Car                   6713 non-null   object 
 1   Condition             6713 non-null   object 
 2   Mileage               6713 non-null   object 
 3   Price                 6701 non-null   float64
 4   Basics Info           6714 non-null   object 
 5   Vehicle History Info  6714 non-null   object 
 6   Vehicle Reviews Info  6714 non-null   object 
 7   Seller Rating         5762 non-null   float64
 8   Seller Rating Count   5762 non-null   object 
 9   Seller Address        6637 non-null   object 
dtypes: float64(2), object(8)
memory usage: 577.1+ KB
```

the same thing we do with mileage column

```
messy['Mileage'] = messy['Mileage'].str.replace('mi.',
'').str.replace(',', '')
messy['Mileage']=pd.to_numeric(messy['Mileage'],errors='coerce')
messy.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 6715 entries, 0 to 9243
Data columns (total 10 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Car                   6713 non-null   object 
 1   Condition             6713 non-null   object 
 2   Mileage               6603 non-null   float64
 3   Price                 6701 non-null   float64
 4   Basics Info           6714 non-null   object 
 5   Vehicle History Info  6714 non-null   object 
 6   Vehicle Reviews Info  6714 non-null   object 
 7   Seller Rating         5762 non-null   float64
 8   Seller Rating Count   5762 non-null   object 
 9   Seller Address        6637 non-null   object 
dtypes: float64(3), object(7)
memory usage: 577.1+ KB
```

new cars mileage should be 0 but it appears to be Nan

```
messy[ (~messy['Condition'].isna()) & (messy['Mileage'].isna())]
```

```
                                    Car Condition  Mileage
Price  \
115                2024 Lexus LC 500 Base       New      NaN  115060.0

463             2024 Lexus RX 350h Luxury       New      NaN   68180.0

778     2024 RAM ProMaster 2500 High Roof       New      NaN   56150.0

1011            2024 Lexus RX 350h Luxury       New      NaN   67715.0

1038                2024 RAM 2500 Laramie       New      NaN   81999.0

...                                   ...       ...      ...       ...

8698            2024 Jeep Gladiator Sport       New      NaN   54571.0

8826              2024 RAM 2500 Tradesman       New      NaN   67097.0

8893                2024 Ford Maverick XL       New      NaN   28880.0

9016       2024 Chrysler Pacifica Limited       New      NaN   57331.0

9169              2024 Jeep Compass Sport       New      NaN   27528.0


                                            Basics Info Vehicle
History Info  \
115   {'Exterior color': ' Ultra White ', 'Interior ...
{}
463   {'Exterior color': ' Iridium ', 'Interior colo...
{}
778   {'Exterior color': ' Bright White Clearcoat ',...
{}
```

```
1011  {'Exterior color': ' Eminent White Pearl ', 'I...
{}
1038  {'Exterior color': ' Diamond Black ', 'Interio...
{}
...                                                 ...
...
8698  {'Exterior color': ' Granite Crystal Clearcoat...
{}
8826  {'Exterior color': ' Granite Crystal Clearcoat...
{}
8893  {'Exterior color': ' White ', 'Interior color'...
{}
9016  {'Exterior color': ' Bright White Clearcoat ',...
{}
9169  {'Exterior color': ' Diamond Black ', 'Interio...
{}

                                   Vehicle Reviews Info  Seller Rating
\
115                                                  {}            4.9

463   {'Comfort': '5.0', 'Interior': '5.0', 'Perform...            4.9

778                                                  {}            4.9

1011  {'Comfort': '5.0', 'Interior': '5.0', 'Perform...            4.7

1038                                                 {}            4.9

...                                                 ...            ...

8698                                                 {}            4.9

8826                                                 {}            4.9

8893  {'Comfort': '4.0', 'Interior': '3.0', 'Perform...            4.3

9016                                                 {}            4.9

9169  {'Comfort': '5.0', 'Interior': '5.0', 'Perform...            4.9


     Seller Rating Count                                Seller Address

115      (2,710 reviews)         2000 N Waukegan Rd Glenview, IL 60025

463      (2,710 reviews)         2000 N Waukegan Rd Glenview, IL 60025

778      (4,658 reviews)         8355 W 159th St Tinley Park, IL 60477

1011     (2,711 reviews)         8300 W 159th St Orland Park, IL 60462
```

```
1038     (4,656 reviews)         8355 W 159th St Tinley Park, IL 60477
...                  ...                                           ...
8698     (4,656 reviews)         8355 W 159th St Tinley Park, IL 60477
8826     (4,656 reviews)         8355 W 159th St Tinley Park, IL 60477
8893     (2,866 reviews)  8100 West 159th Street Orland Park, IL 60462
9016     (4,656 reviews)         8355 W 159th St Tinley Park, IL 60477
9169     (4,656 reviews)         8355 W 159th St Tinley Park, IL 60477

[110 rows x 10 columns]
```

```
len(messy[ (~messy['Condition'].isna()) & (messy['Mileage'].isna())])
```

```
110
```

so we edit them to set them to 0

```
messy.loc[(messy['Condition'] == 'New') & (messy['Mileage'].isna()),
'Mileage'] = 0
len(messy[ (~messy['Condition'].isna()) & (messy['Mileage'].isna())])
```

```
0
```

```
messy['Brand'] = messy['Car'].str.split().str[1]
messy['Brand'].value_counts()
```

```
Brand
Ford             642
Jeep             626
Chevrolet        610
Nissan           444
Mercedes-Benz    335
BMW              334
Subaru           316
Honda            297
Toyota           268
Audi             228
Cadillac         220
Kia              219
Lexus            210
Volkswagen       209
RAM              177
```

```
INFINITI         140
Hyundai          140
Dodge            113
Tesla            111
Lincoln          102
Mazda             90
GMC               88
Volvo             86
Chrysler          79
Buick             72
Porsche           68
Acura             66
Jaguar            45
Land              41
Mitsubishi        41
Maserati          31
Ferrari           29
Genesis           28
MINI              28
Alfa              25
Rivian            19
Rolls-Royce       19
Scion             19
Aston             16
Lamborghini       15
Pontiac           11
Bentley            9
Saab               7
Polestar           6
McLaren            6
Saturn             6
Hummer             5
Mercury            3
Oldsmobile         3
Fisker             2
Plymouth           2
Isuzu              2
Triumph            1
Lotus              1
Delorean           1
FIAT               1
Bugatti            1
Name: count, dtype: int64
```

We will use the production year of the car so we extract it from car column and set it in another 'year' column

```
messy['year']=messy['Car'].str[0:5]
messy['year']=pd.to_numeric(messy['year'])
messy.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 6715 entries, 0 to 9243
Data columns (total 12 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Car                   6713 non-null   object 
 1   Condition             6713 non-null   object 
 2   Mileage               6713 non-null   float64
 3   Price                 6701 non-null   float64
 4   Basics Info           6714 non-null   object 
 5   Vehicle History Info  6714 non-null   object 
 6   Vehicle Reviews Info  6714 non-null   object 
 7   Seller Rating         5762 non-null   float64
 8   Seller Rating Count   5762 non-null   object 
 9   Seller Address        6637 non-null   object 
 10  Brand                 6713 non-null   object 
 11  year                  6713 non-null   float64
dtypes: float64(4), object(8)
memory usage: 682.0+ KB
```

```
messy.nunique()
```

```
Car                     3449
Condition                 31
Mileage                 3977
Price                   4432
Basics Info             6574
Vehicle History Info      37
Vehicle Reviews Info     267
Seller Rating             32
Seller Rating Count      311
Seller Address           388
Brand                     57
year                      56
dtype: int64
```

We have too many conditions that is certifified from the manufacturer >>> so we combine them into one condition 'Certified'

```
messy['Condition'].value_counts()

Condition
Used                         3624
New                          2703
Chevrolet Certified            55
Mercedes-Benz Certified        31
Ford Certified                 28
BMW Certified                  27
Porsche Certified              23
Audi Certified                 22
Nissan Certified               21
Subaru Certified               20
Jeep Certified                 20
Volkswagen Certified           18
GMC Certified                  13
Buick Certified                13
Ferrari Certified              11
Cadillac Certified             11
Honda Certified                 9
Certified                       8
Dodge Certified                 8
Rolls-Royce Certified           6
Hyundai Certified               6
Lincoln Certified               6
Chrysler Certified              5
RAM Certified                   5
INFINITI Certified              4
Genesis Certified               4
Volvo Certified                 3
Acura Certified                 3
Kia Certified                   3
Maserati Certified              2
Aston Martin Certified          1
Name: count, dtype: int64

messy['Condition']=messy['Condition'].apply(lambda x: 'Certified' if x
not in ('New','Used',np.nan) else x)
messy['Condition'].value_counts()

Condition
Used            3624
New             2703
```

```
Certified     386
Name: count, dtype: int64
```

We wont use these columns so we can drop them.

```
messy=messy.drop(columns=['Basics Info','Vehicle Reviews Info'])
messy.isna().sum()
```

```
Car                       2
Condition                 2
Mileage                   2
Price                    14
Vehicle History Info      1
Seller Rating           953
Seller Rating Count     953
Seller Address           78
Brand                     2
year                      2
dtype: int64
```

Now we will only drop nulls from the important columns only

```
messy = messy.dropna(subset=['Price'])
messy.isna().sum()
```

```
Car                       0
Condition                 0
Mileage                   0
Price                     0
Vehicle History Info      0
Seller Rating           951
Seller Rating Count     951
Seller Address           76
Brand                     0
year                      0
dtype: int64
```

1. **Extracting Data:**

```
The column `Vehicle History Info` contains nested data in string
format.
We use `ast.literal_eval` to convert it into a Python dictionary.
```

2. **Creating a New Column:**

```
Extract the `"Accidents or damage"` field from the parsed dictionary.
If the field is missing, we default it to `'Unknown'`.
```

3. **Analyzing Price Relation:**

```
Group vehicles by the `"Accidents or damage"` status.
Compute the average price, median price, and the total number of
vehicles for each group.
```

```
messy['Vehicle History Info'] = messy['Vehicle History
Info'].apply(ast.literal_eval)

# Extract the "Accidents or damage" field
messy['Accidents or damage'] = messy['Vehicle History
Info'].apply(lambda x: x.get('Accidents or damage', 'Unknown'))

price_relation = messy.groupby('Accidents or damage')['Price'].agg(
    Average_Price='mean',
    Median_Price='median',
    Vehicle_Count='count'
).reset_index()

print(price_relation)
```

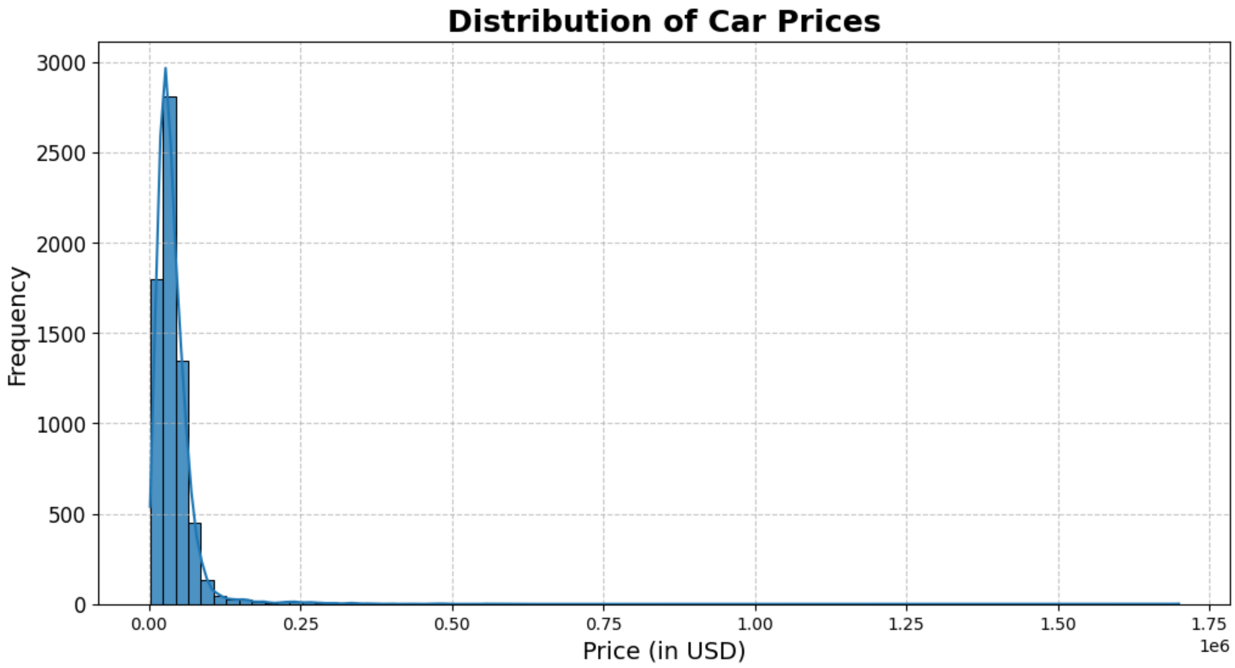
```
                        Accidents or damage  Average_Price  Median_Price
\
0  At least 1 accident or damage reported   23530.398431       19895.0

1                           None reported   38454.074773       26975.0

2                                 Unknown   49298.148668       45396.5


   Vehicle_Count
0           1275
1           2648
2           2778
```

```
messy['Price'].describe()
```

```
count    6.701000e+03
mean     4.011012e+04
std      3.963931e+04
min      1.997000e+03
25%      2.199100e+04
50%      3.286200e+04
75%      4.898800e+04
max      1.699800e+06
Name: Price, dtype: float64
```

there is huge variance and outliers in the price

```
plt.figure(figsize=(12, 6))
m=sns.histplot(messy['Price'], kde=True, bins=int(len(messy)**0.5),
color="#1f77b4", alpha=0.8)
plt.title('Distribution of Car Prices', fontsize=18, weight="bold")
plt.xlabel('Price (in USD)', fontsize=14)
plt.ylabel('Frequency', fontsize=14)
plt.yticks(fontsize=12)
plt.grid(True, linestyle='--', alpha=0.7)
plt.show()
```



```
messy['Mileage'].describe()
```

```
count      6701.000000
mean      34180.811371
std       43298.978289
min           0.000000
```

```
25%            9.000000
50%        16000.000000
75%        59057.000000
max       324349.000000
Name: Mileage, dtype: float64
```

setting the quantiles of price and INTER QUARTILE RANGE

then we make non_outliers of price data frame

```
df_copy = messy.copy()
Q1 = df_copy['Price'].quantile(0.25)
Q3 = df_copy['Price'].quantile(0.75)
IQR = Q3 - Q1
lower_bound = Q1 - 1.5 * IQR
upper_bound = Q3 + 1.5 * IQR

outliers = df_copy[(df_copy['Price'] < lower_bound) |
(df_copy['Price'] > upper_bound)]
non_outliers = df_copy[(df_copy['Price'] >= lower_bound) &
(df_copy['Price'] <= upper_bound)]
```

Some info about the outliers

```
outlier_stats = {
        'total_count': len(df_copy),
        'outliers_count': len(outliers),
        'outliers_percentage': len(outliers) / len(df_copy) * 100,
        'min_outlier': outliers['Price'].min(),
        'max_outlier': outliers['Price'].max()
    }
outlier_stats , non_outliers['Price'].describe()

({'total_count': 6701,
  'outliers_count': 273,
  'outliers_percentage': 4.074018803163707,
  'min_outlier': np.float64(89485.0),
  'max_outlier': np.float64(1699800.0)},
 count     6428.000000
 mean     34950.378345
 std      18131.699991
 min       1997.000000
25%      21499.750000
50%      31892.000000
75%      46671.250000
max      89345.000000
Name: Price, dtype: float64)
```

Making the final figures and the visuals using cleaned dataset

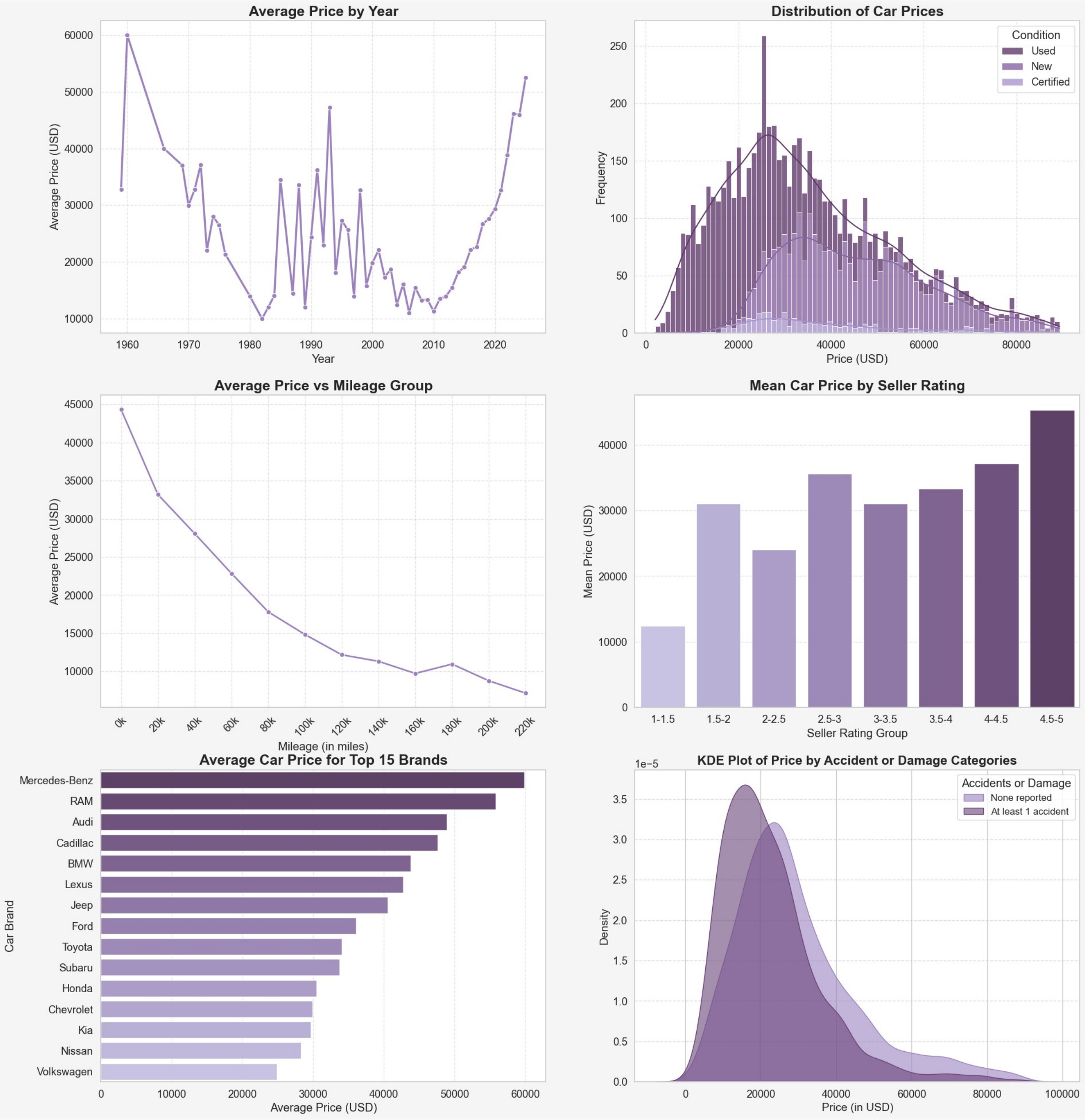
```python
import pandas as pd
import numpy as np
import math
import seaborn as sns
import matplotlib.pyplot as plt

# Set Seaborn theme and a consistent color palette

sns.set_theme(style="whitegrid", font_scale=1.2)
blues_purples = sns.color_palette("ch:0.5,-0.2,dark=0.3,light=0.8",
n_colors=16)
sns.palplot(blues_purples)

# Define a custom color for consistency (from viridis palette)
base_color = blues_purples[7]  # Dark purple from viridis
secondary_color = blues_purples[14]  # Teal from viridis

# Create subplots (3 rows, 2 columns)
fig, axes = plt.subplots(3, 2, figsize=(22, 24))
fig.patch.set_facecolor('#f5f5f5')
# ---- Plot 1: Average Price by Year ----
avg_price_by_year = non_outliers.groupby('year')
['Price'].mean().reset_index()
sns.lineplot(data=avg_price_by_year, x='year', y='Price', marker='o',
color=base_color, linewidth=2.5, ax=axes[0, 0])
axes[0, 0].set_title('Average Price by Year', fontsize=18,
weight="bold")
axes[0, 0].set_xlabel('Year')
axes[0, 0].set_ylabel('Average Price (USD)')
axes[0, 0].grid(True, linestyle='--', alpha=0.5)

# ---- Plot 2: Distribution of Car Prices ----
sns.histplot(data=non_outliers, x='Price', hue='Condition',
multiple='stack', kde=True,
             bins=int(math.sqrt(len(non_outliers))),
palette=blues_purples[::-5], alpha=0.8, ax=axes[0, 1])
axes[0, 1].set_title('Distribution of Car Prices', fontsize=18,
weight="bold")
```

```
axes[0, 1].set_xlabel('Price (USD)')
axes[0, 1].set_ylabel('Frequency')
axes[0, 1].grid(True, linestyle='--', alpha=0.5)

# ---- Plot 3: Average Price vs Mileage Group ----
non_outliers['Mileage_Group'] = pd.cut(non_outliers['Mileage'],
bins=range(0, 240001, 20000),
                                       labels=[f'{i}k' for i in
range(0, 230, 20)])
avg_price_by_mileage = non_outliers.groupby('Mileage_Group')
['Price'].mean().reset_index()
sns.lineplot(data=avg_price_by_mileage, x='Mileage_Group', y='Price',
marker='o', color=base_color,
             linewidth=2, ax=axes[1, 0])
axes[1, 0].set_title('Average Price vs Mileage Group', fontsize=18,
weight="bold")
axes[1, 0].set_xlabel('Mileage (in miles)')
axes[1, 0].set_ylabel('Average Price (USD)')
axes[1, 0].tick_params(axis='x', rotation=45)
axes[1, 0].grid(True, linestyle='--', alpha=0.5)

# ---- Plot 4: Mean Price by Seller Rating Group ----
messy['Rating Group'] = pd.cut(messy['Seller Rating'], bins=[1, 1.5,
2, 2.5, 3, 3.5, 4, 4.5, 5],
                                      labels=["1-1.5", "1.5-2", "2-
2.5", "2.5-3", "3-3.5", "3.5-4", "4-4.5", "4.5-5"],
                                      include_lowest=True)
grouped_data = messy.groupby('Rating Group')
['Price'].mean().reset_index().dropna()
sns.barplot(x='Rating Group', y='Price',
data=grouped_data,palette=blues_purples[1::2], ax=axes[1, 1])
axes[1, 1].set_title('Mean Car Price by Seller Rating', fontsize=18,
weight='bold')
axes[1, 1].set_xlabel('Seller Rating Group')
axes[1, 1].set_ylabel('Mean Price (USD)')
axes[1, 1].grid(axis='y', linestyle='--', alpha=0.5)

# ---- Plot 5: Average Price for Top 15 Brands ----
top_15_brands = messy['Brand'].value_counts().head(15).index
filtered_data = messy[messy['Brand'].isin(top_15_brands)]
avg_price_per_brand = filtered_data.groupby('Brand')
['Price'].mean().reset_index()
avg_price_per_brand = avg_price_per_brand.sort_values(by='Price',
ascending=False)
sns.barplot(x='Price', y='Brand', data=avg_price_per_brand,
palette=blues_purples[::-1], ax=axes[2, 0])
axes[2, 0].set_title('Average Car Price for Top 15 Brands',
fontsize=18, weight='bold')
axes[2, 0].set_xlabel('Average Price (USD)')
axes[2, 0].set_ylabel('Car Brand')
```

```
axes[2, 0].grid(axis='x', linestyle='--', alpha=0.5)

filtered_data = non_outliers[non_outliers['Accidents or
damage'].isin(['None reported', 'At least 1 accident or damage
reported'])]

# Create the KDE plot
sns.kdeplot(data=filtered_data[filtered_data['Accidents or damage'] ==
'None reported'],
            x='Price',
            label='None reported',
            color=base_color,
            fill=True,
            alpha=0.6)
sns.kdeplot(data=filtered_data[filtered_data['Accidents or damage'] ==
'At least 1 accident or damage reported'],
            x='Price',
            label='At least 1 accident',
            color=secondary_color,
            fill=True,
            alpha=0.6)

# Add titles and labels
axes[2,1].set_title('KDE Plot of Price by Accident or Damage
Categories', fontsize=16, weight='bold')
axes[2,1].set_xlabel('Price (in USD)', fontsize=14)
axes[2,1].set_ylabel('Density', fontsize=14)
axes[2,1].legend(title='Accidents or Damage', fontsize=12)


# Show the plot
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.show()

# ---- Add main title and adjust layout ----
fig.suptitle('Comprehensive Car Data Analysis Dashboard', fontsize=24,
weight='bold', y=1.03)
plt.tight_layout()
plt.show()
```

```
C:\Users\amrsa\AppData\Local\Temp\ipykernel_18004\2070641585.py:29:
UserWarning: The palette list has more values (4) than needed (3),
which may not be intended.
  sns.histplot(data=non_outliers, x='Price', hue='Condition',
multiple='stack', kde=True,
C:\Users\amrsa\AppData\Local\Temp\ipykernel_18004\2070641585.py:37:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead
```

```
See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
  non_outliers['Mileage_Group'] = pd.cut(non_outliers['Mileage'],
bins=range(0, 240001, 20000),
C:\Users\amrsa\AppData\Local\Temp\ipykernel_18004\2070641585.py:39:
FutureWarning: The default of observed=False is deprecated and will be
changed to True in a future version of pandas. Pass observed=False to
retain current behavior or observed=True to adopt the future default
and silence this warning.
  avg_price_by_mileage = non_outliers.groupby('Mileage_Group')
['Price'].mean().reset_index()
C:\Users\amrsa\AppData\Local\Temp\ipykernel_18004\2070641585.py:52:
FutureWarning: The default of observed=False is deprecated and will be
changed to True in a future version of pandas. Pass observed=False to
retain current behavior or observed=True to adopt the future default
and silence this warning.
  grouped_data = messy.groupby('Rating Group')
['Price'].mean().reset_index().dropna()
C:\Users\amrsa\AppData\Local\Temp\ipykernel_18004\2070641585.py:53:
FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `x` variable to `hue` and set
`legend=False` for the same effect.

  sns.barplot(x='Rating Group', y='Price',
data=grouped_data,palette=blues_purples[1::2], ax=axes[1, 1])
C:\Users\amrsa\AppData\Local\Temp\ipykernel_18004\2070641585.py:64:
FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `y` variable to `hue` and set
`legend=False` for the same effect.

  sns.barplot(x='Price', y='Brand', data=avg_price_per_brand,
palette=blues_purples[::-1], ax=axes[2, 0])
C:\Users\amrsa\AppData\Local\Temp\ipykernel_18004\2070641585.py:64:
UserWarning: The palette list has more values (16) than needed (15),
which may not be intended.
  sns.barplot(x='Price', y='Brand', data=avg_price_per_brand,
palette=blues_purples[::-1], ax=axes[2, 0])
```


Average Price by Year
Average Price (USD)
60000
50000
40000
30000
20000
10000
1960
1970
1980
1990
2000
2010
2020
Year
Distribution of Car Prices
Condition
Used
New
Certified
Frequency
250
200
150
100
50
0
20000
40000
60000
80000
Price (USD)
Average Price vs Mileage Group
Average Price (USD)
45000
40000
35000
30000
25000
20000
15000
10000
0k
20k
40k
60k
80k
100k
120k
140k
160k
180k
200k
220k
Mileage (in miles)
Mean Car Price by Seller Rating
Mean Price (USD)
40000
30000
20000
10000
0
1-1.5
1.5-2
2-2.5
2.5-3
3-3.5
3.5-4
4-4.5
4.5-5
Seller Rating Group
Average Car Price for Top 15 Brands
Car Brand
Mercedes-Benz
RAM
Audi
Cadillac
BMW
Lexus
Jeep
Ford
Toyota
Subaru
Honda
Chevrolet
Kia
Nissan
Volkswagen
0
10000
20000
30000
40000
50000
60000
Average Price (USD)
KDE Plot of Price by Accident or Damage Categories
1e−5
Accidents or Damage
None reported
At least 1 accident
Density
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
20000
40000
60000
80000
100000
Price (in USD)

```
<Figure size 640x480 with 0 Axes>
```