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

import pandas as pd
df = pd.read_csv(
    "C:\\Users\\Lenovo\\Downloads\\projo\\AviationData.csv",
    encoding='windows-1252',
    dtype={
        6: str,
        7: str,
        28: str
    }
)
print("Dataset if fyn")
```

```
Dataset if fyn
```

```python
#Look at the first few rows of the dataset
df.head()
```

```
         Event.Id Investigation.Type Accident.Number  Event.Date  \
0  20001218X45444           Accident      SEA87LA080  1948-10-24
1  20001218X45447           Accident      LAX94LA336  1962-07-19
2  20061025X01555           Accident      NYC07LA005  1974-08-30
3  20001218X45448           Accident      LAX96LA321  1977-06-19
4  20041105X01764           Accident      CHI79FA064  1979-08-02

          Location        Country   Latitude   Longitude Airport.Code
\
0  MOOSE CREEK, ID  United States        NaN         NaN          NaN

1   BRIDGEPORT, CA  United States        NaN         NaN          NaN

2    Saltville, VA  United States  36.922223  -81.878056          NaN

3       EUREKA, CA  United States        NaN         NaN          NaN

4       Canton, OH  United States        NaN         NaN          NaN


  Airport.Name  ... Purpose.of.flight Air.carrier Total.Fatal.Injuries
\
0          NaN  ...          Personal         NaN                  2.0

1          NaN  ...          Personal         NaN                  4.0

2          NaN  ...          Personal         NaN                  3.0
```

```
3          NaN  ...          Personal         NaN                  2.0

4          NaN  ...          Personal         NaN                  1.0


  Total.Serious.Injuries Total.Minor.Injuries Total.Uninjured  \
0                    0.0                  0.0             0.0
1                    0.0                  0.0             0.0
2                    NaN                  NaN             NaN
3                    0.0                  0.0             0.0
4                    2.0                  NaN             0.0

  Weather.Condition  Broad.phase.of.flight   Report.Status
Publication.Date
0               UNK                 Cruise  Probable Cause
NaN
1               UNK                Unknown  Probable Cause       19-
09-1996
2               IMC                 Cruise  Probable Cause       26-
02-2007
3               IMC                 Cruise  Probable Cause       12-
09-2000
4               VMC               Approach  Probable Cause       16-
04-1980

[5 rows x 31 columns]
```

```
#check for ,missimg values and data types
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 88889 entries, 0 to 88888
Data columns (total 31 columns):
 #   Column                  Non-Null Count  Dtype
---  ------                  --------------  -----
 0   Event.Id                88889 non-null  object
 1   Investigation.Type      88889 non-null  object
 2   Accident.Number         88889 non-null  object
 3   Event.Date              88889 non-null  object
 4   Location                88837 non-null  object
 5   Country                 88663 non-null  object
 6   Latitude                34382 non-null  object
 7   Longitude               34373 non-null  object
 8   Airport.Code            50132 non-null  object
 9   Airport.Name            52704 non-null  object
 10  Injury.Severity         87889 non-null  object
 11  Aircraft.damage         85695 non-null  object
 12  Aircraft.Category       32287 non-null  object
 13  Registration.Number     87507 non-null  object
 14  Make                    88826 non-null  object
 15  Model                   88797 non-null  object 
 16  Amateur.Built           88787 non-null  object 
 17  Number.of.Engines       82805 non-null  float64
 18  Engine.Type             81793 non-null  object 
 19  FAR.Description         32023 non-null  object 
 20  Schedule                12582 non-null  object 
 21  Purpose.of.flight       82697 non-null  object 
 22  Air.carrier             16648 non-null  object 
 23  Total.Fatal.Injuries    77488 non-null  float64
 24  Total.Serious.Injuries  76379 non-null  float64
 25  Total.Minor.Injuries    76956 non-null  float64
 26  Total.Uninjured         82977 non-null  float64
 27  Weather.Condition       84397 non-null  object 
 28  Broad.phase.of.flight   61724 non-null  object 
 29  Report.Status           82505 non-null  object 
 30  Publication.Date        75118 non-null  object 
dtypes: float64(5), object(26)
memory usage: 21.0+ MB
```

```
df.describe()
```

```
       Number.of.Engines  Total.Fatal.Injuries  Total.Serious.Injuries
\
count       82805.000000          77488.000000            76379.000000

mean            1.146585              0.647855                0.279881

std             0.446510              5.485960                1.544084

min             0.000000              0.000000                0.000000

25%             1.000000              0.000000                0.000000

50%             1.000000              0.000000                0.000000

75%             1.000000              0.000000                0.000000

max             8.000000            349.000000              161.000000


       Total.Minor.Injuries  Total.Uninjured
count          76956.000000     82977.000000
mean               0.357061         5.325440
std                2.235625        27.913634
min                0.000000         0.000000
25%                0.000000         0.000000
50%                0.000000         1.000000
75%                0.000000         2.000000
max              380.000000       699.000000
```

```
missing_values = df.isnull().sum()
missing_values
```

```
Event.Id                      0
Investigation.Type            0
Accident.Number               0
Event.Date                    0
Location                     52
Country                     226
Latitude                  54507
Longitude                 54516
Airport.Code              38757
Airport.Name              36185
Injury.Severity            1000
Aircraft.damage            3194
Aircraft.Category         56602
Registration.Number        1382
Make                         63
Model                        92
Amateur.Built               102
Number.of.Engines          6084
Engine.Type                7096
FAR.Description           56866
Schedule                  76307
Purpose.of.flight          6192
Air.carrier               72241
Total.Fatal.Injuries      11401
Total.Serious.Injuries    12510
Total.Minor.Injuries      11933
Total.Uninjured            5912
Weather.Condition          4492
Broad.phase.of.flight     27165
Report.Status              6384
Publication.Date          13771
dtype: int64
```

```
missing_percentage = (missing_values/ len(df))*100
missing_data = pd.DataFrame({'Missing Values' : missing_values,
'percentage': missing_percentage})
print(missing_data[missing_data['Missing Values']>0])
```

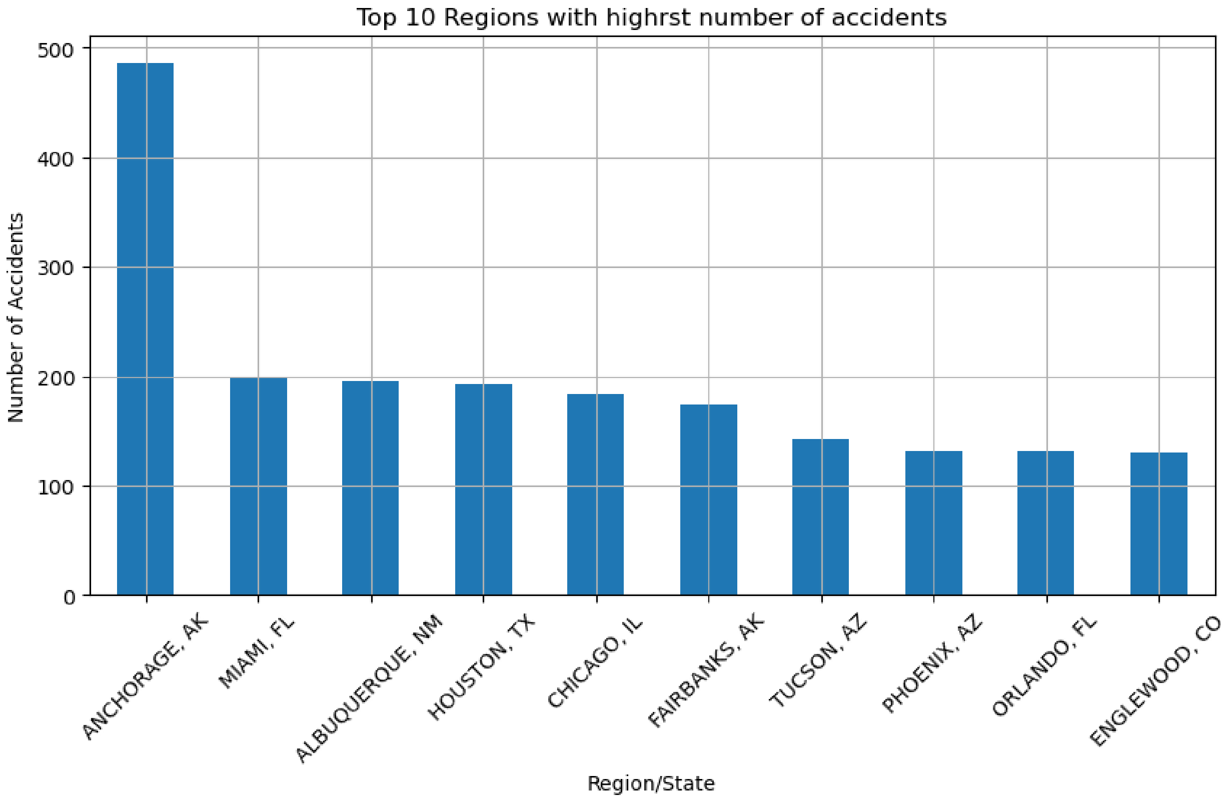
```
                        Missing Values  percentage
Location                            52    0.058500
Country                            226    0.254250
Latitude                         54507   61.320298
Longitude                        54516   61.330423
Airport.Code                     38757   43.601570
Airport.Name                     36185   40.708074
```

```
Injury.Severity                      1000    1.124999
Aircraft.damage                      3194    3.593246
Aircraft.Category                   56602   63.677170
Registration.Number                  1382    1.554748
Make                                   63    0.070875
Model                                  92    0.103500
Amateur.Built                         102    0.114750
Number.of.Engines                    6084    6.844491
Engine.Type                          7096    7.982990
FAR.Description                     56866   63.974170
Schedule                            76307   85.845268
Purpose.of.flight                    6192    6.965991
Air.carrier                         72241   81.271023
Total.Fatal.Injuries                11401   12.826109
Total.Serious.Injuries              12510   14.073732
Total.Minor.Injuries                11933   13.424608
Total.Uninjured                      5912    6.650992
Weather.Condition                    4492    5.053494
Broad.phase.of.flight               27165   30.560587
Report.Status                        6384    7.181991
Publication.Date                    13771   15.492356
```

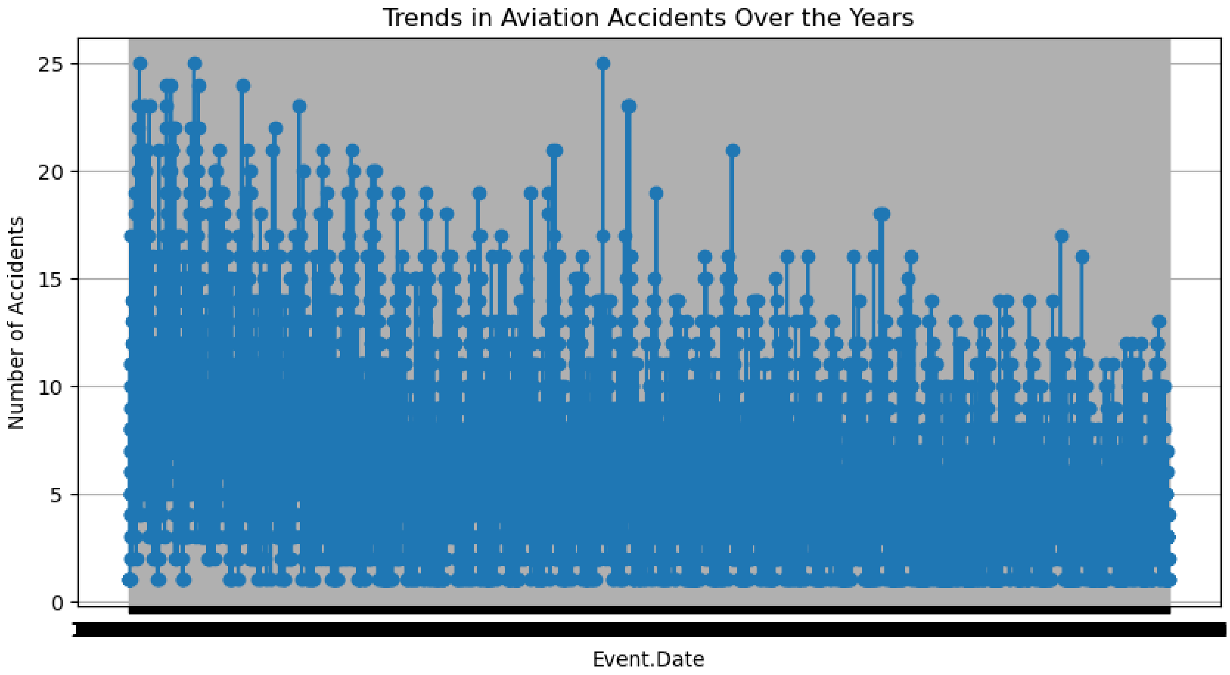
```
numerical_columns = df.select_dtypes(include=['float64',
'int64']).columns
df[numerical_columns]
=df[numerical_columns].fillna(df[numerical_columns].median())

categorical_columns = df.select_dtypes(include=['object']).columns
for column in categorical_columns:
    df[column] = df[column].fillna(df[column].mode()[0])

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

```
0
```

```
accidents_by_region = df['Location'].value_counts()[:10]

accidents_by_region.plot(kind ='bar', figsize=(10, 5))
plt.title('Top 10 Regions with highrst number of accidents')
plt.xlabel('Region/State')
plt.ylabel('Number of Accidents')
plt.xticks(rotation=45)
plt.grid()
plt.show()
```



```
accidents_per_year = df.groupby('Event.Date')['Event.Id'].count()

plt.figure(figsize=(10, 5))
plt.plot(accidents_per_year.index, accidents_per_year.values,
marker='o')
plt.title('Trends in Aviation Accidents Over the Years')
plt.xlabel('Event.Date')
plt.ylabel('Number of Accidents')
plt.grid()
plt.show()
```



```
#Accidents by Location
location_data =
data_cleaned['location_column_name'].value_counts().head(10)
plt.figure(figsize=(12, 6))
sns.barplot(x=location_data.values, y=location_data.index)
plt.title('Top 10 Locations with Most Accidents')
plt.xlabel('Number of Accidents')
plt.ylabel('Location')
plt.show()

-----------------------------------------------------------------------
-----
NameError                                 Traceback (most recent call
last)
Cell In[32], line 2
      1 #Accidents by Location
----> 2 location_data =
data_cleaned['location_column_name'].value_counts().head(10)
      3 plt.figure(figsize=(12, 6))
      4 sns.barplot(x=location_data.values, y=location_data.index)

NameError: name 'data_cleaned' is not defined

severity_year =
data_cleaned.groupby(data_cleaned['date_column_name'].dt.year)
['severity_column_name'].value_counts().unstack().fillna(0)

plt.figure(figsize=(12, 6))
severity_year.plot(kind='bar', stacked=True, figsize=(12, 6))
```

```
plt.title('Accident Severity by Year')
plt.xlabel('Year')
plt.ylabel('Number of Accidents')
plt.legend(title='Severity Level')
plt.xticks(rotation=45)
plt.grid()
plt.show()

## Findings
1 Identification of trends in accidents over time
2 Common types of accidents that occur
3 Geographic Locations with the highest accidents

## Recomendations
Based on the analysis, here are three recommendations:
1 Enhance safety protocols - Implement stricter safety protocols for
the most common accident types
2 Targeted training - Provide targeted training sessions for pilots
and crew operating in the top accident prone locations
3 Investment in technology - Invest in advanced technology and safety
systems, focusing on the time perionds where accidents are peaking
```