Week 8 Pandas Data in Motion Challenge by Prince Ogwu

In [104]:
```
 # Read from a csv into pandas DataFrame object
missing_values = ['N/a', 'na', np.nan]
path = ('C:/datasets/coaster_db.csv')
```

In [137]:
```
#Import required library
import os
import statistics as st
import matplotlib.pyplot as plt #For visualization
import numpy as np #Working with Arrays
import pandas as pd #For data manipulation & analysis
import seaborn as sb # library for visualization
%matplotlib inline

# to suppress warnings
import warnings
```

1. How many columns and rows are in the dataset?

In [5]:

Out[5]: (1087, 56)

In [50]:
```
# The number of columns in the dataset
cols=len(df_coaster.axes[1])
```

```
Number of Columns: 56
```

In [51]:
```
# The number of rows in the dataset
rows=len(df_coaster.axes[0])
```

```
Number of rows: 1087
```

1. Is there any missing data?

In [6]:
```
# Confirm if we have missing value
df_coaster.isna().values.any()

```

Out[6]: True

3. Display the summary statistics of the numeric columns using the describe method.

In [10]:
```
# Check the summary of  numeric columns
```

Out[10]:

	count	mean	std	min	25%	50%	75%
Inversions	932.0	1.547210	2.114073	0.0000	0.00000	0.0000	3.0000
year_introduced	1087.0	1994.986201	23.475248	1884.0000	1989.00000	2000.0000	2010.0000
latitude	812.0	38.373484	15.516596	-48.2617	35.03105	40.2898	44.7996
longitude	812.0	-41.595373	72.285227	-123.0357	-84.55220	-76.6536	2.7781
speed1_value	937.0	53.850374	23.385518	5.0000	40.00000	50.0000	63.0000
speed_mph	937.0	48.617289	16.678031	5.0000	37.30000	49.7000	58.0000
height_value	965.0	89.575171	136.246444	4.0000	44.00000	79.0000	113.0000
height_ft	171.0	101.996491	67.329092	13.1000	51.80000	91.2000	131.2000
Inversions_clean	1087.0	1.326587	2.030854	0.0000	0.00000	0.0000	2.0000
Gforce_clean	362.0	3.824006	0.989998	0.8000	3.40000	4.0000	4.5000

4. Rename the following columns:

- coaster_name → Coaster_Name
- year_introduced → Year_Introduced
- opening_date_clean → Opening_Date
- speed_mph → Speed_mph
- height_ft → Height_ft
- Inversions_clean → Inversions
- Gforce_clean → Gforce

In [192]:
```
# Rename a feature in the dataFrame

df_coaster.rename(columns = { 'coaster_name':'Coaster_Name',
                              'year_introduced': 'Year_Introduced',
                              'opening_date_clean': 'Opening_Date',
                              'speed_mph': 'Speed_mph',
                              'height_ft': 'Height_ft',
                              'Inversions_clean': 'Inversions',
                              'Gforce_clean':'Gforce'

}, inplace = True )

```

5. Are there any duplicated rows?

In [12]:
```
# Checking for duplicated rows
df_coaster.duplicated().values.any()

```

Out[12]:
```
False
```

6. What are the top 3 years with the most roller coasters introduced?

In [140]:
```
# df_coaster.Year_Introduced.head(3)
top_Coaster= df_coaster.groupby('Year_Introduced')['Coaster_Name'].count()
top_Coaster
```

Out[140]:
```
Year_Introduced
1999    49
2000    47
1998    32
Name: Coaster_Name, dtype: int64
```

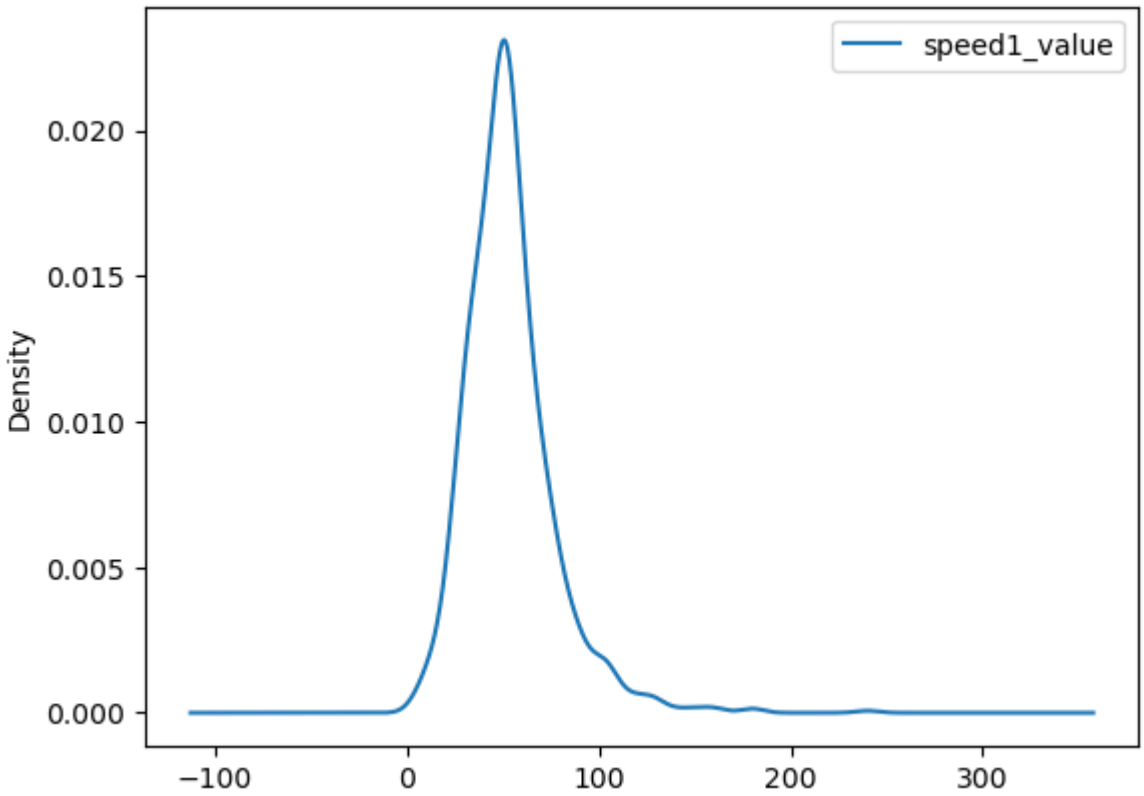
7. What is the average speed? Also display a plot to show it's distribution.

In [47]:
```
avg_Speed = df_coaster['speed1_value'].mean()
```

```
The Average speed is:  53.85
```

In [48]:

Out[48]: <AxesSubplot:ylabel='Density'>



In [ ]:

8. Explore the feature relationships. Are there any positively or negatively correlated relationships?

In [18]:

Out[18]:

	Inversions	Year_Introduced	latitude	longitude	speed1_value	Speed_mph	h
Inversions	1.000000	0.211003	-0.009815	0.061589	0.163419	0.252209	
Year_Introduced	0.211003	1.000000	-0.070982	0.175913	0.210191	0.204853	
latitude	-0.009815	-0.070982	1.000000	-0.298488	-0.121847	-0.063757	
longitude	0.061589	0.175913	-0.298488	1.000000	0.301179	0.051063	
speed1_value	0.163419	0.210191	-0.121847	0.301179	1.000000	0.851667	
Speed_mph	0.252209	0.204853	-0.063757	0.051063	0.851667	1.000000	
height_value	0.094811	0.087687	-0.004265	-0.092764	0.088761	0.241461	
Height_ft	0.171330	0.232150	0.011492	0.159733	0.815103	0.829404	
Inversions	1.000000	0.228758	-0.014043	0.087160	0.176105	0.265763	
Gforce	0.356865	-0.066657	0.042871	0.016485	0.379962	0.489337	

9. Create your own question and answer it.

In [49]:
```
1 #Check the total number of features with missing values
```

Out[49]:

Coaster_Name	0
Length	134
Speed	150
Location	0
Status	213
Opening date	250
Type	0
Manufacturer	59
Height restriction	256
Model	343
Height	122
Inversions	155
Lift/launch system	292
Cost	705
Trains	369
Park section	600
Duration	322
Capacity	512
G-force	725
Designer	509
Max vertical angle	730
Drop	593
Soft opening date	991
Fast Lane available	1018
Replaced	914
Track layout	752
Fastrack available	1068
Soft opening date.1	991
Closing date	851
Opened	1060
Replaced by	999
Website	1000
Flash Pass Available	1037
Must transfer from wheelchair	981
Theme	1043
Single rider line available	1006
Restraint Style	1065
Flash Pass available	1041
Acceleration	1027
Restraints	1063
Name	1052
Year_Introduced	0
latitude	275
longitude	275
Type_Main	0
Opening_Date	250
speed1	150
speed2	152
speed1_value	150
speed1_unit	150
Speed_mph	150
height_value	122
height_unit	122
Height_ft	916

```
Inversions                      0
Gforce                        725
dtype: int64
```

Remove the Soft opening date 1 column

In [65]:
```
1 # Drop Soft opening date.1 Column
2 df_coaster.drop('Soft opening date.1', inplace=True, axis=1)
```

```
Column successfully deleted
```

In [176]:
```
1
2 df_coaster.drop('Opening date', inplace=True, axis=1)
```

```
Column successfully deleted
```

Speed1 value has 150 Missing values,fill the missing values with the mean

In [120]:
```
1 x= df_coaster['speed1_value'].mean()
```

In [121]:

Out[121]:
```
0        6.000000
1       53.850374
2       53.850374
3       53.850374
4       53.850374
          ...
1082    53.000000
1083    73.000000
1084    59.300000
1085    34.000000
1086    58.000000
Name: speed1_value, Length: 1087, dtype: float64
```

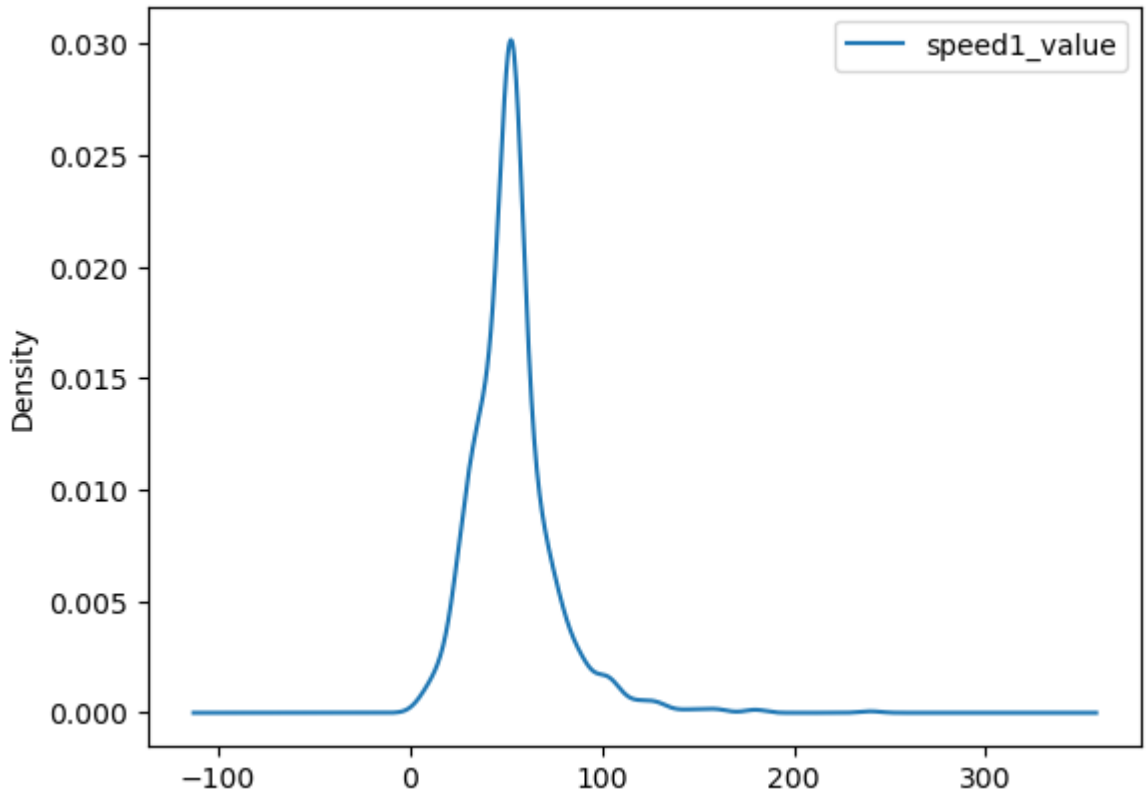
In [122]:

Out[122]:
```
0
```

visualize speed1_value column using density plot

In [152]:

Out[152]: <AxesSubplot:ylabel='Density'>



In [177]:
```
1 #Check for Data-type of DataFrame
```

Out[177]:

Coaster_Name	object
Length	object
Speed	object
Location	object
Status	object
Type	object
Manufacturer	object
Height restriction	object
Model	object
Height	object
Inversions	float64
Lift/launch system	object
Cost	object
Trains	object
Park section	object
Duration	object
Capacity	object
G-force	object
Designer	object

In [191]:
```
#Change the Opening Date type to Datetime
df_coaster['Opening_Date']= pd.to_datetime(df_coaster['Opening_Date'])

```

Out[191]:
```
0      1884-06-16
1      1895-01-01
2             NaT
3      1901-01-01
4      1901-01-01
          ...
1082          NaT
1083   2022-01-01
1084   2016-06-16
1085          NaT
1086   2022-01-01
Name: Opening_Date, Length: 1087, dtype: datetime64[ns]
```

Plot a heatmap of missing values

In [190]:

Out[190]: <AxesSubplot:>