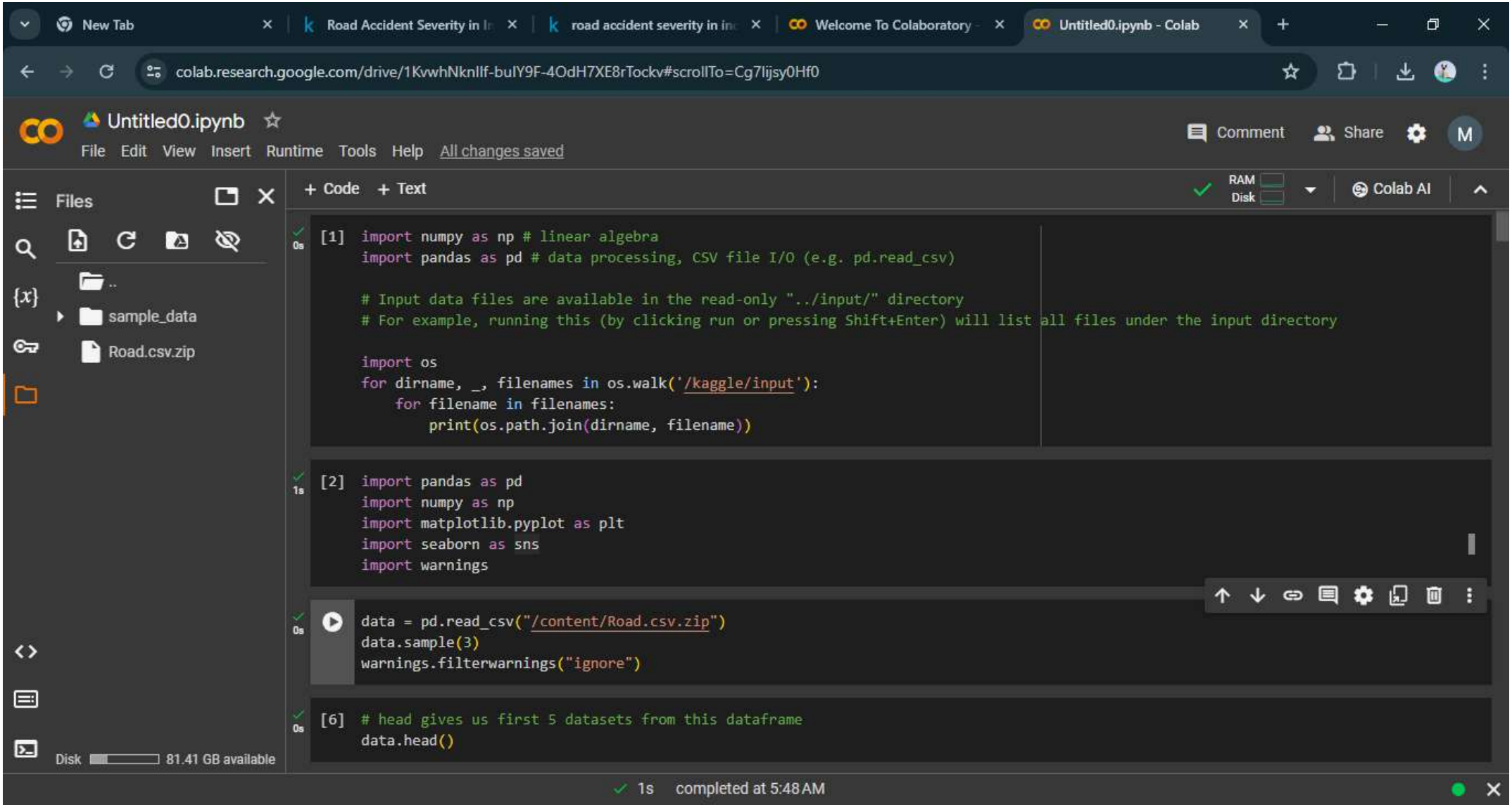
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Road Accident Severity in I
road accident severity in in
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sample_data
Road.csv.zip
[1] import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will list all files under the input directory
import os
for dirname, _, filenames in os.walk('/kaggle/input'):
for filename in filenames:
print(os.path.join(dirname, filename))
[2] import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
data = pd.read_csv("/content/Road.csv.zip")
data.sample(3)
warnings.filterwarnings("ignore")
[6] # head gives us first 5 datasets from this dataframe
data.head()
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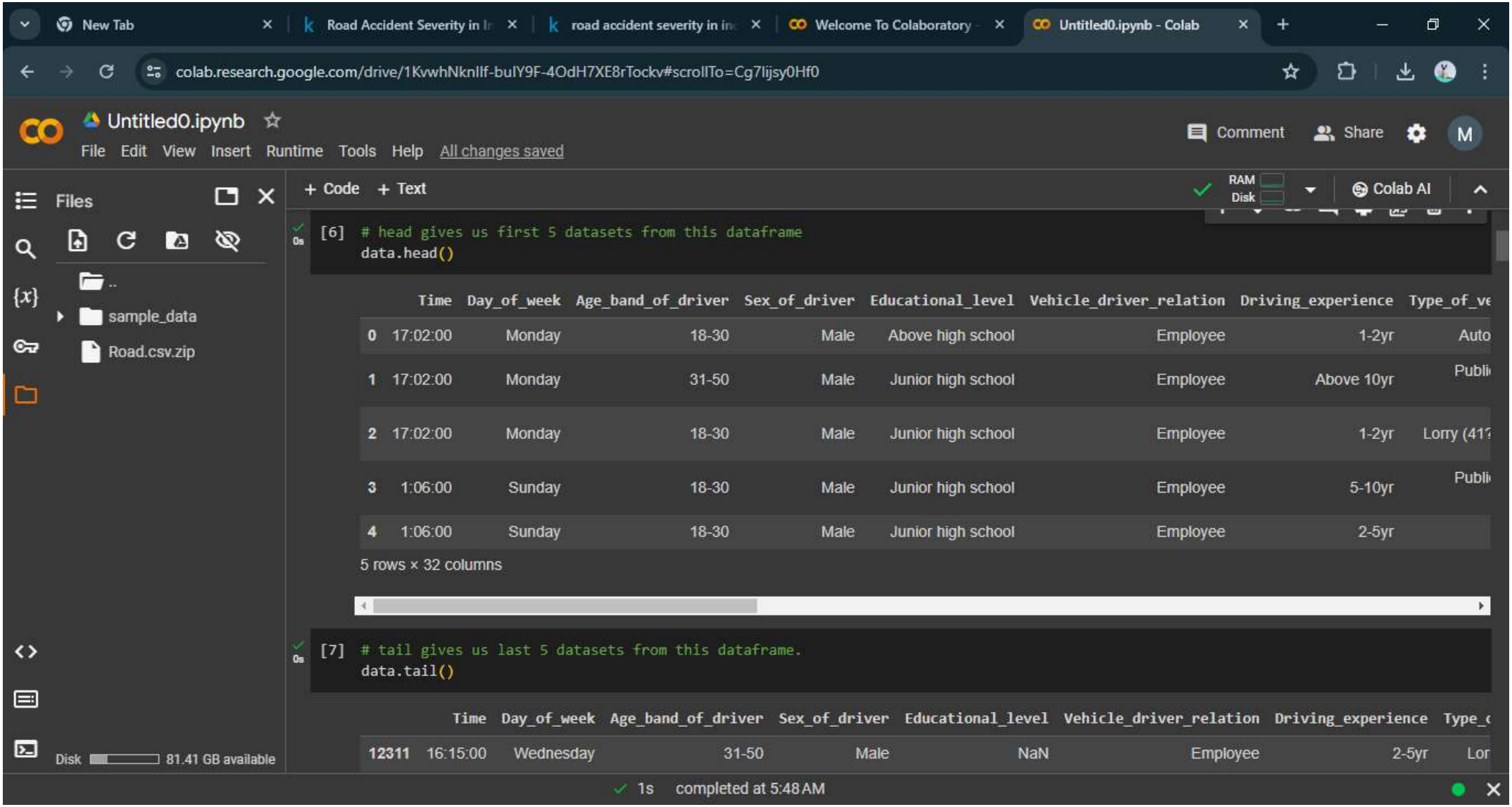
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sample_data
Road.csv.zip
[6] # head gives us first 5 datasets from this dataframe
data.head()
Time Day_of_week Age_band_of_driver Sex_of_driver Educational_level Vehicle_driver_relation Driving_experience Type_of_ve
0 17:02:00 Monday 18-30 Male Above high school Employee 1-2yr Auto
1 17:02:00 Monday 31-50 Male Junior high school Employee Above 10yr Publi
2 17:02:00 Monday 18-30 Male Junior high school Employee 1-2yr Lorry (41
3 1:06:00 Sunday 18-30 Male Junior high school Employee 5-10yr Publi
4 1:06:00 Sunday 18-30 Male Junior high school Employee 2-5yr
5 rows × 32 columns
[7] # tail gives us last 5 datasets from this dataframe.
data.tail()
Time Day_of_week Age_band_of_driver Sex_of_driver Educational_level Vehicle_driver_relation Driving_experience Type_
12311 16:15:00 Wednesday 31-50 Male NaN Employee 2-5yr Lor
Disk 81.41 GB available
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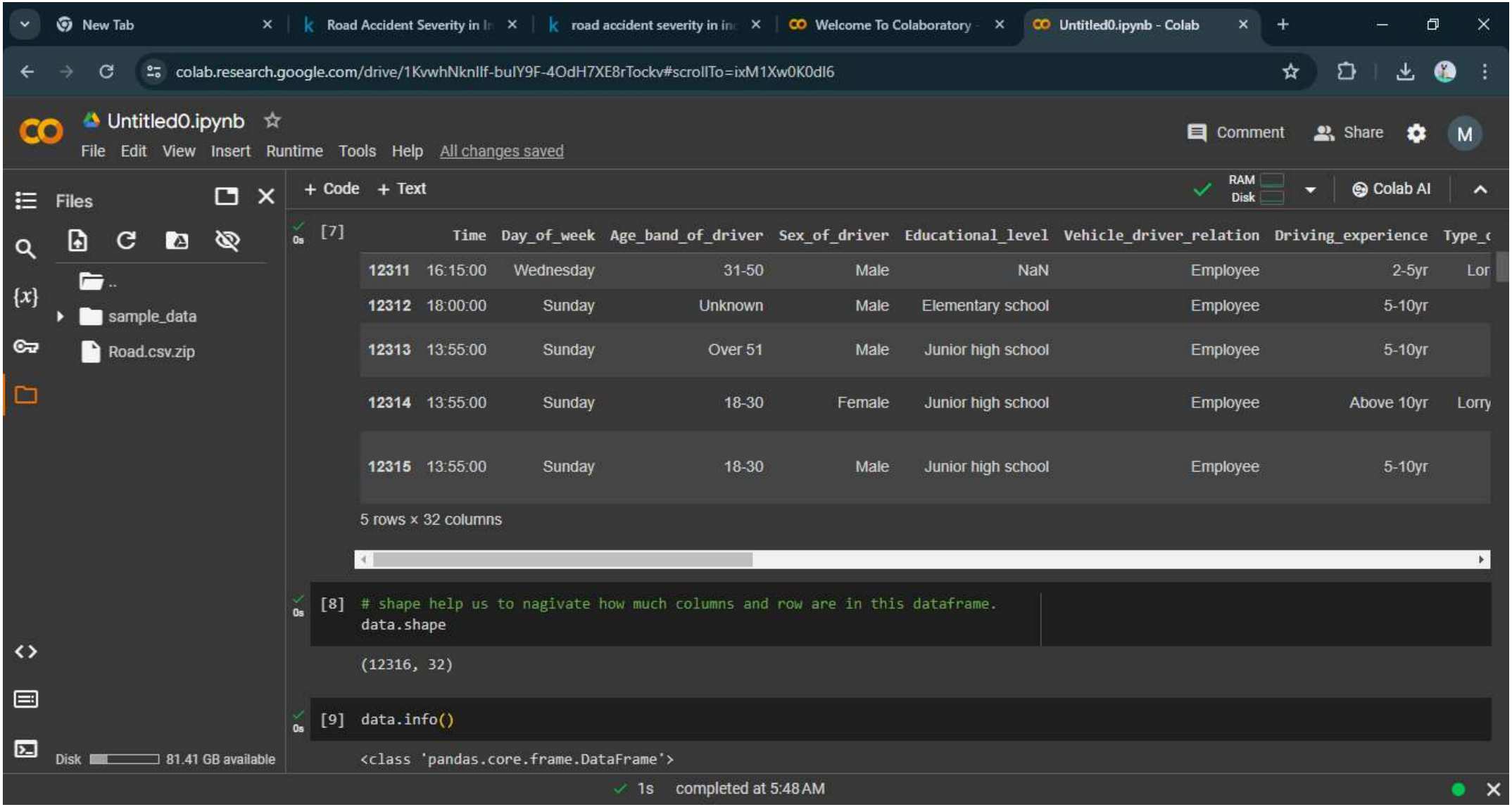
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road accident severity in in
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sample_data
Road.csv.zip
[7]
Time Day_of_week Age_band_of_driver Sex_of_driver Educational_level Vehicle_driver_relation Driving_experience Type_
12311 16:15:00 Wednesday 31-50 Male NaN Employee 2-5yr Lor
12312 18:00:00 Sunday Unknown Male Elementary school Employee 5-10yr
12313 13:55:00 Sunday Over 51 Male Junior high school Employee 5-10yr
12314 13:55:00 Sunday 18-30 Female Junior high school Employee Above 10yr Lorry
12315 13:55:00 Sunday 18-30 Male Junior high school Employee 5-10yr
5 rows × 32 columns
[8] # shape help us to nagivate how much columns and row are in this dataframe.
data.shape
(12316, 32)
[9] data.info()
<class 'pandas.core.frame.DataFrame'>
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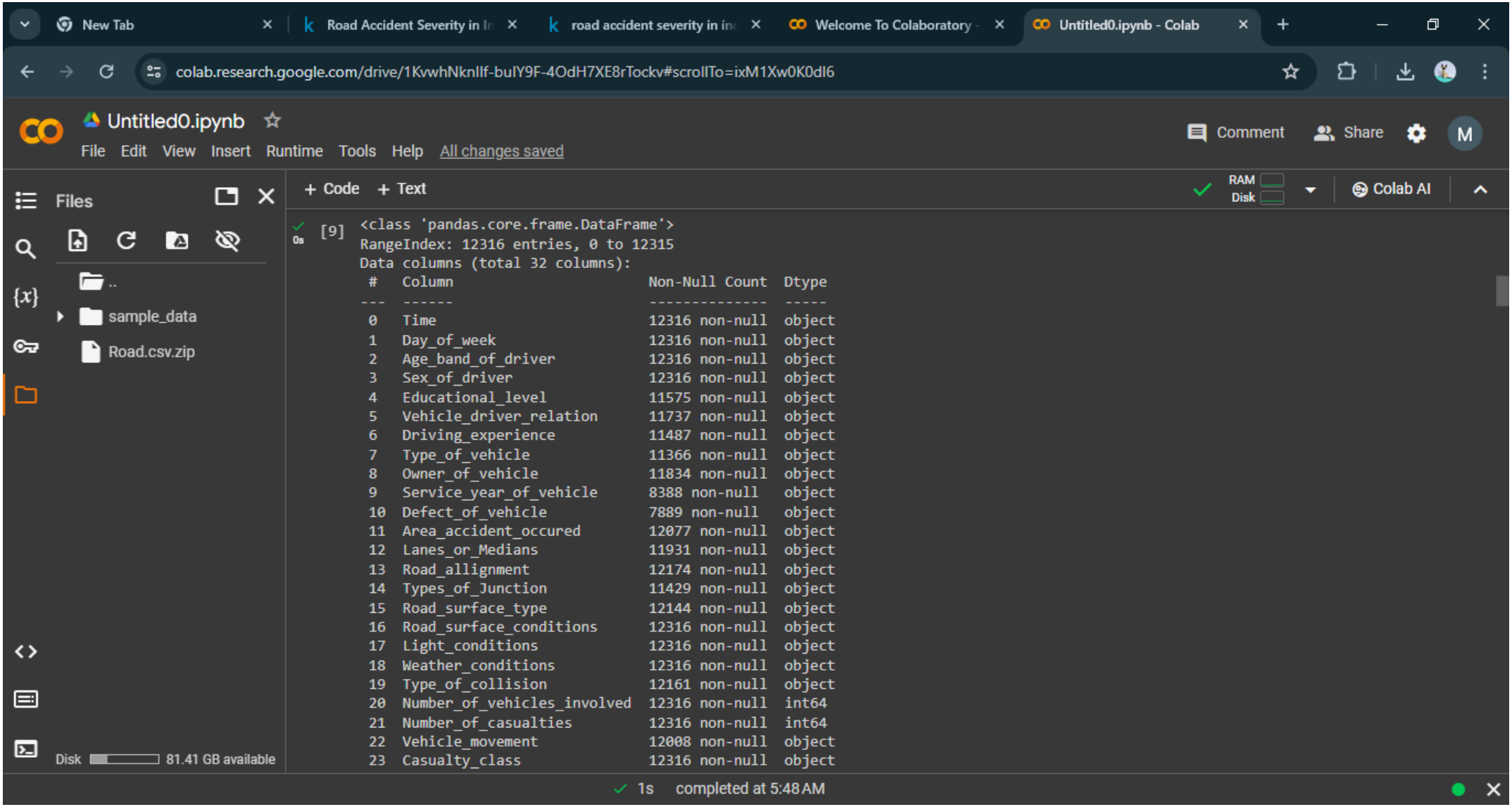
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[9]
0s
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 12316 entries, 0 to 12315
Data columns (total 32 columns):
Column Non-Null Count Dtype
--- ------ -------------- -----
0 Time 12316 non-null object
1 Day_of_week 12316 non-null object
2 Age_band_of_driver 12316 non-null object
3 Sex_of_driver 12316 non-null object
4 Educational_level 11575 non-null object
5 Vehicle_driver_relation 11737 non-null object
6 Driving_experience 11487 non-null object
7 Type_of_vehicle 11366 non-null object
8 Owner_of_vehicle 11834 non-null object
9 Service_year_of_vehicle 8388 non-null object
10 Defect_of_vehicle 7889 non-null object
11 Area_accident_occured 12077 non-null object
12 Lanes_or_Medians 11931 non-null object
13 Road_allignment 12174 non-null object
14 Types_of_Junction 11429 non-null object
15 Road_surface_type 12144 non-null object
16 Road_surface_conditions 12316 non-null object
17 Light_conditions 12316 non-null object
18 Weather_conditions 12316 non-null object
19 Type_of_collision 12161 non-null object
20 Number_of_vehicles_involved 12316 non-null int64
21 Number_of_casualties 12316 non-null int64
22 Vehicle_movement 12008 non-null object
23 Casualty_class 12316 non-null object
sample_data
Road.csv.zip
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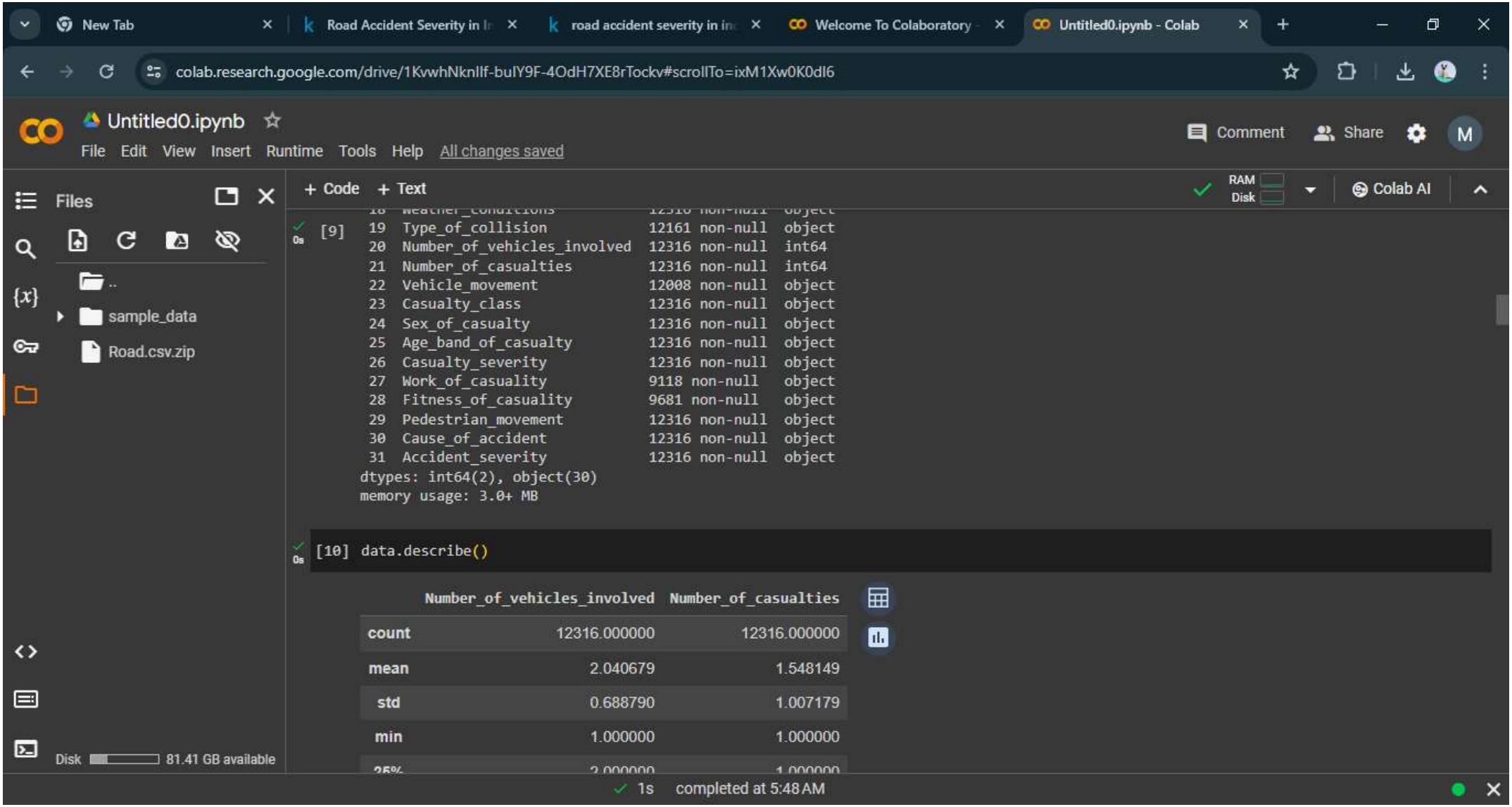
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sample_data
Road.csv.zip
[9]
19 Type_of_collision 12161 non-null object
20 Number_of_vehicles_involved 12316 non-null int64
21 Number_of_casualties 12316 non-null int64
22 Vehicle_movement 12008 non-null object
23 Casualty_class 12316 non-null object
24 Sex_of_casualty 12316 non-null object
25 Age_band_of_casualty 12316 non-null object
26 Casualty_severity 12316 non-null object
27 Work_of_casualty 9118 non-null object
28 Fitness_of_casualty 9681 non-null object
29 Pedestrian_movement 12316 non-null object
30 Cause_of_accident 12316 non-null object
31 Accident_severity 12316 non-null object
dtypes: int64(2), object(30)
memory usage: 3.0+ MB
[10] data.describe()
Number_of_vehicles_involved Number_of_casualties
count 12316.000000 12316.000000
mean 2.040679 1.548149
std 0.688790 1.007179
min 1.000000 1.000000
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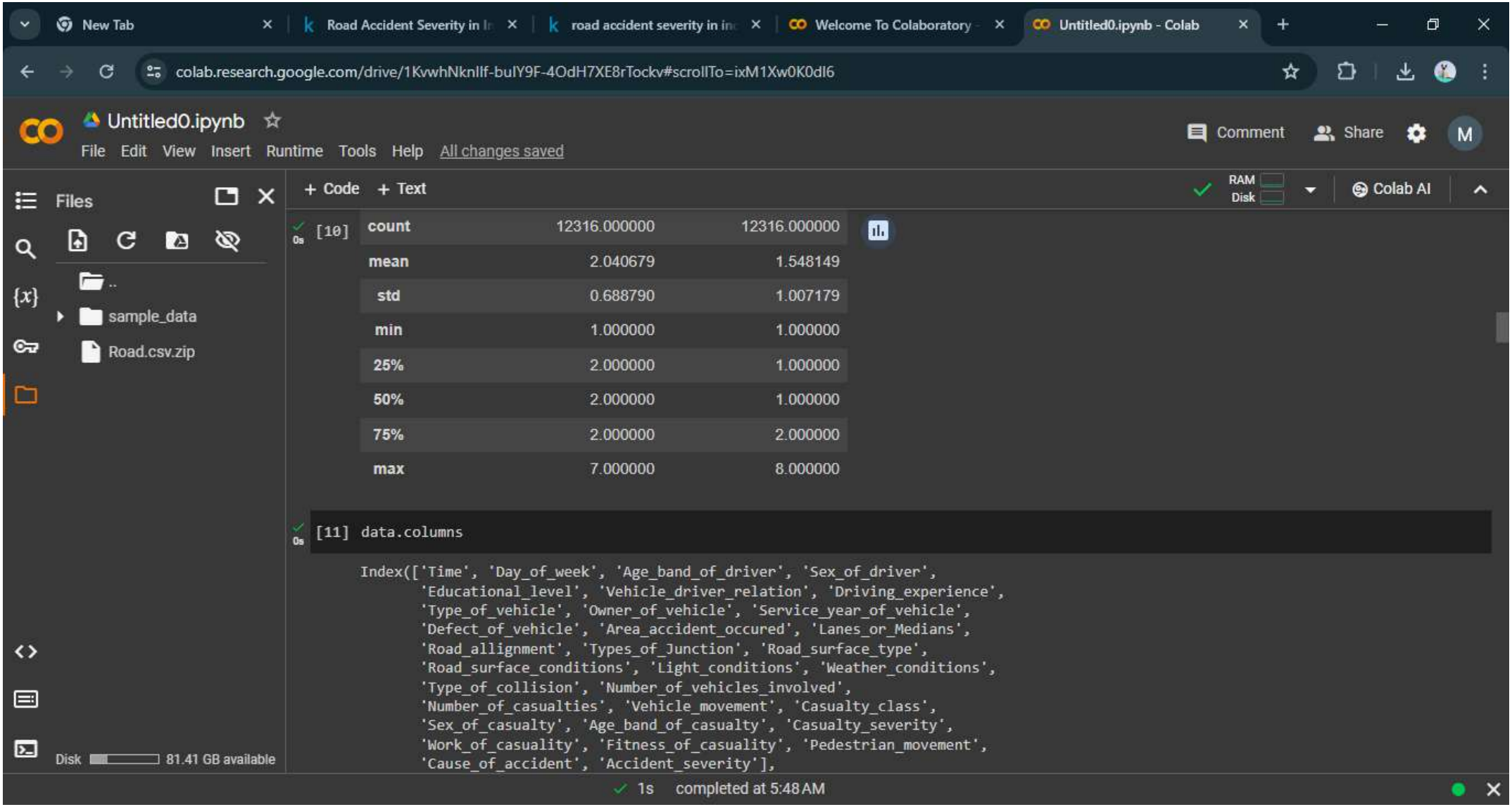
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sample_data
Road.csv.zip
[10]
0s
count 12316.000000 12316.000000
mean 2.040679 1.548149
std 0.688790 1.007179
min 1.000000 1.000000
25% 2.000000 1.000000
50% 2.000000 1.000000
75% 2.000000 2.000000
max 7.000000 8.000000
[11] data.columns
Index(['Time', 'Day_of_week', 'Age_band_of_driver', 'Sex_of_driver',
'Educational_level', 'Vehicle_driver_relation', 'Driving_experience',
'Type_of_vehicle', 'Owner_of_vehicle', 'Service_year_of_vehicle',
'Defect_of_vehicle', 'Area_accident_occured', 'Lanes_or_Medians',
'Road_allignment', 'Types_of_Junction', 'Road_surface_type',
'Road_surface_conditions', 'Light_conditions', 'Weather_conditions',
'Type_of_collision', 'Number_of_vehicles_involved',
'Number_of_casualties', 'Vehicle_movement', 'Casualty_class',
'Sex_of_casualty', 'Age_band_of_casualty', 'Casualty_severity',
'Work_of_casualty', 'Fitness_of_casualty', 'Pedestrian_movement',
'Cause_of_accident', 'Accident_severity'],
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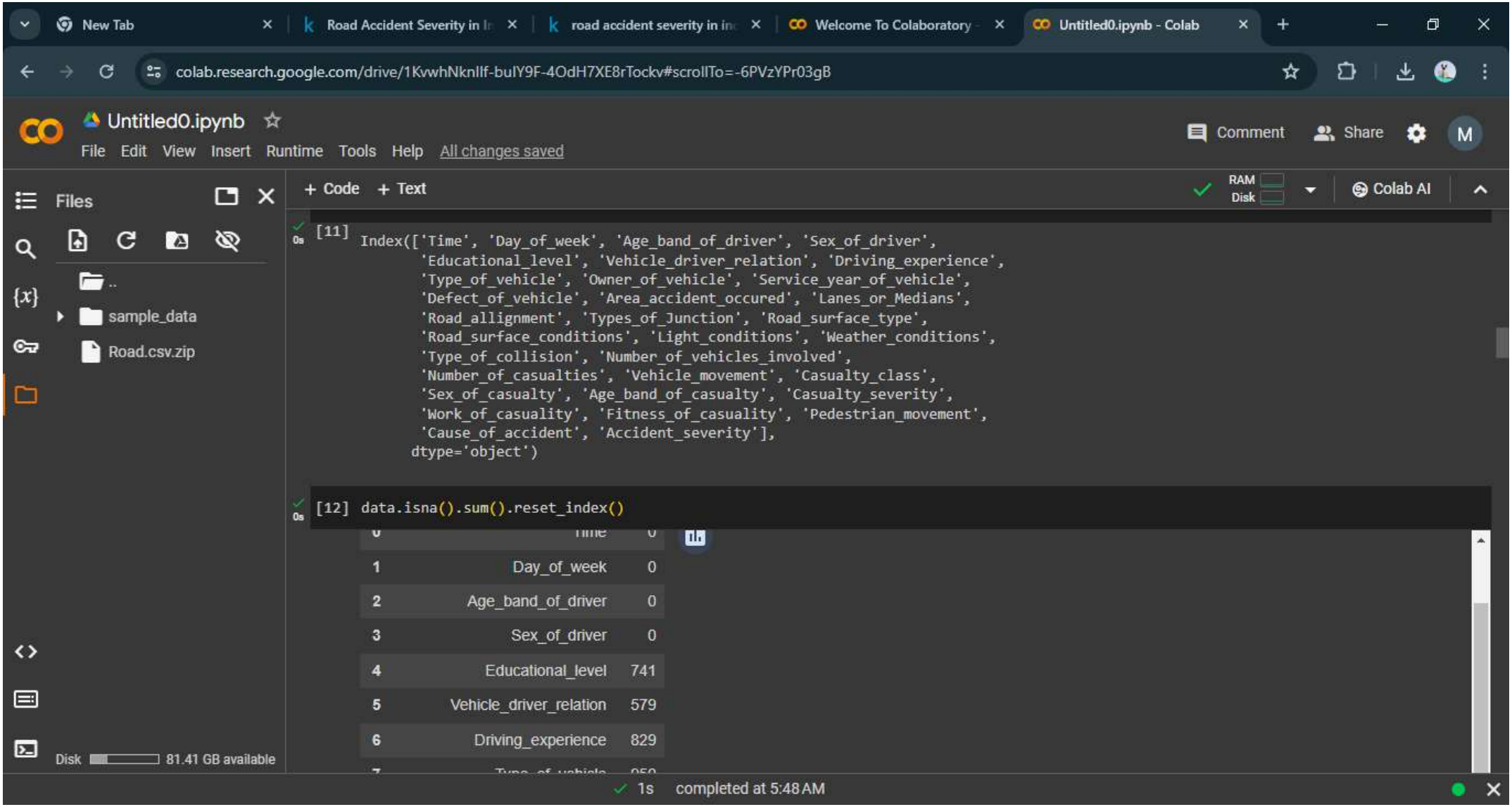
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sample_data
Road.csv.zip
[11]
Index(['Time', 'Day_of_week', 'Age_band_of_driver', 'Sex_of_driver',
'Educational_level', 'Vehicle_driver_relation', 'Driving_experience',
'Type_of_vehicle', 'Owner_of_vehicle', 'Service_year_of_vehicle',
'Defect_of_vehicle', 'Area_accident_occured', 'Lanes_or_Medians',
'Road_allignment', 'Types_of_Junction', 'Road_surface_type',
'Road_surface_conditions', 'Light_conditions', 'Weather_conditions',
'Type_of_collision', 'Number_of_vehicles_involved',
'Number_of_casualties', 'Vehicle_movement', 'Casualty_class',
'Sex_of_casualty', 'Age_band_of_casualty', 'Casualty_severity',
'Work_of_casualty', 'Fitness_of_casualty', 'Pedestrian_movement',
'Cause_of_accident', 'Accident_severity'],
dtype='object')
[12]
data.isna().sum().reset_index()
1 Day_of_week 0
2 Age_band_of_driver 0
3 Sex_of_driver 0
4 Educational_level 741
5 Vehicle_driver_relation 579
6 Driving_experience 829
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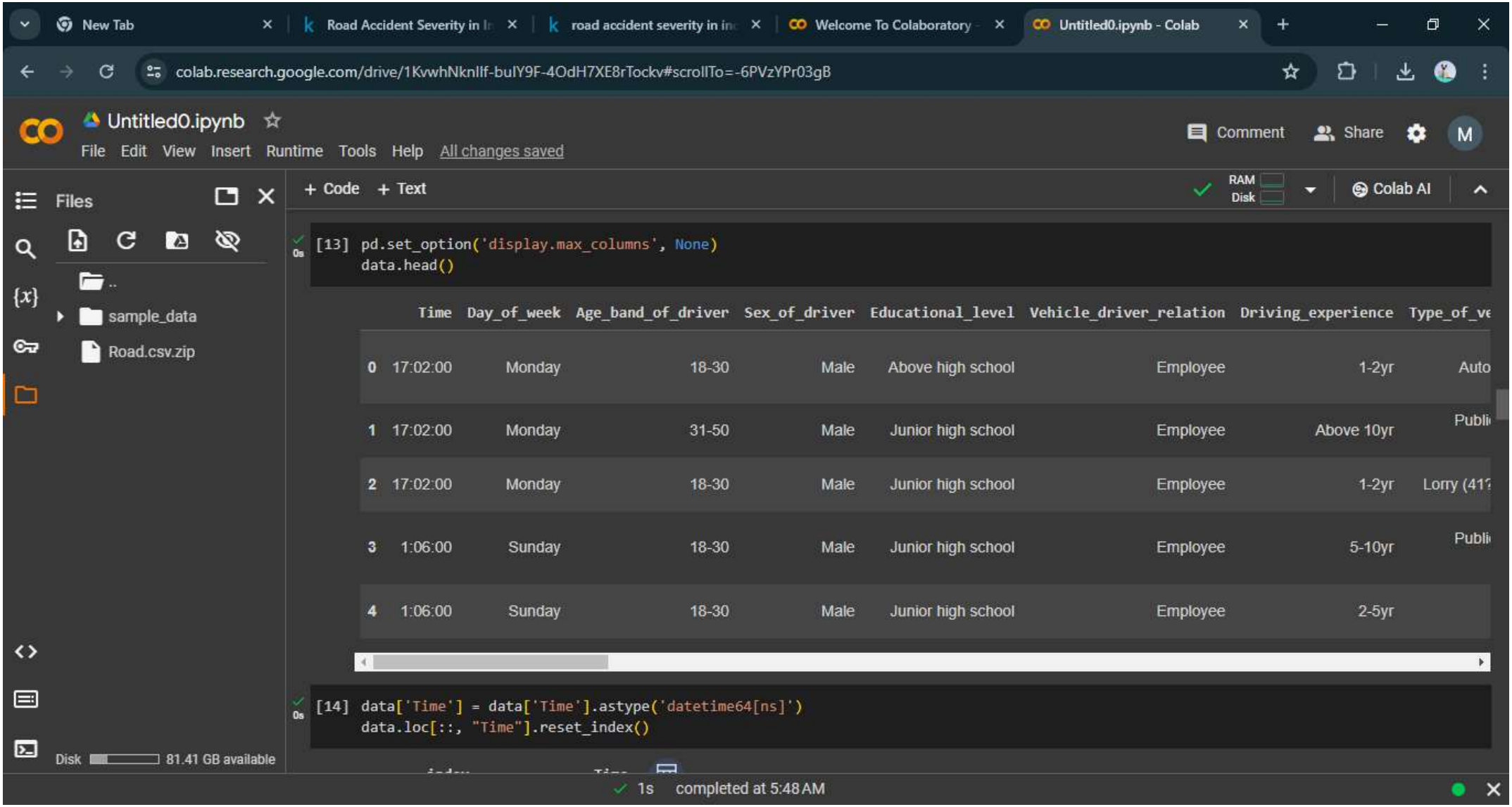
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sample_data
Road.csv.zip
[13] pd.set_option('display.max_columns', None)
data.head()
Time Day_of_week Age_band_of_driver Sex_of_driver Educational_level Vehicle_driver_relation Driving_experience Type_of_ve
0 17:02:00 Monday 18-30 Male Above high school Employee 1-2yr Auto
1 17:02:00 Monday 31-50 Male Junior high school Employee Above 10yr Publi
2 17:02:00 Monday 18-30 Male Junior high school Employee 1-2yr Lorry (41
3 1:06:00 Sunday 18-30 Male Junior high school Employee 5-10yr Publi
4 1:06:00 Sunday 18-30 Male Junior high school Employee 2-5yr
[14] data['Time'] = data['Time'].astype('datetime64[ns]')
data.loc[::, "Time"].reset_index()
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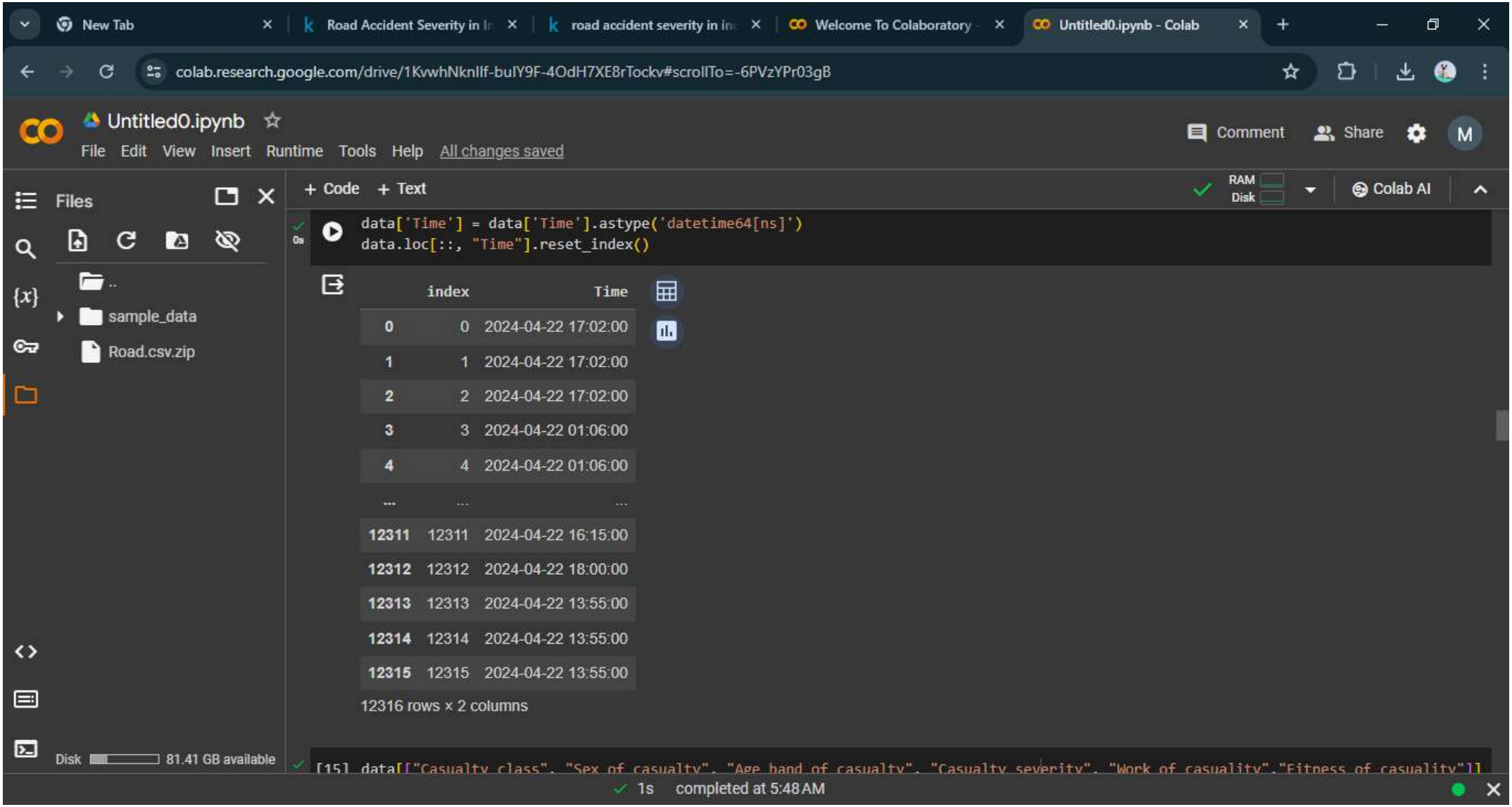
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data['Time'] = data['Time'].astype('datetime64[ns]')
data.loc[::, "Time"].reset_index()
sample_data
Road.csv.zip
index Time
0 0 2024-04-22 17:02:00
1 1 2024-04-22 17:02:00
2 2 2024-04-22 17:02:00
3 3 2024-04-22 01:06:00
4 4 2024-04-22 01:06:00
... ...
12311 12311 2024-04-22 16:15:00
12312 12312 2024-04-22 18:00:00
12313 12313 2024-04-22 13:55:00
12314 12314 2024-04-22 13:55:00
12315 12315 2024-04-22 13:55:00
12316 rows × 2 columns
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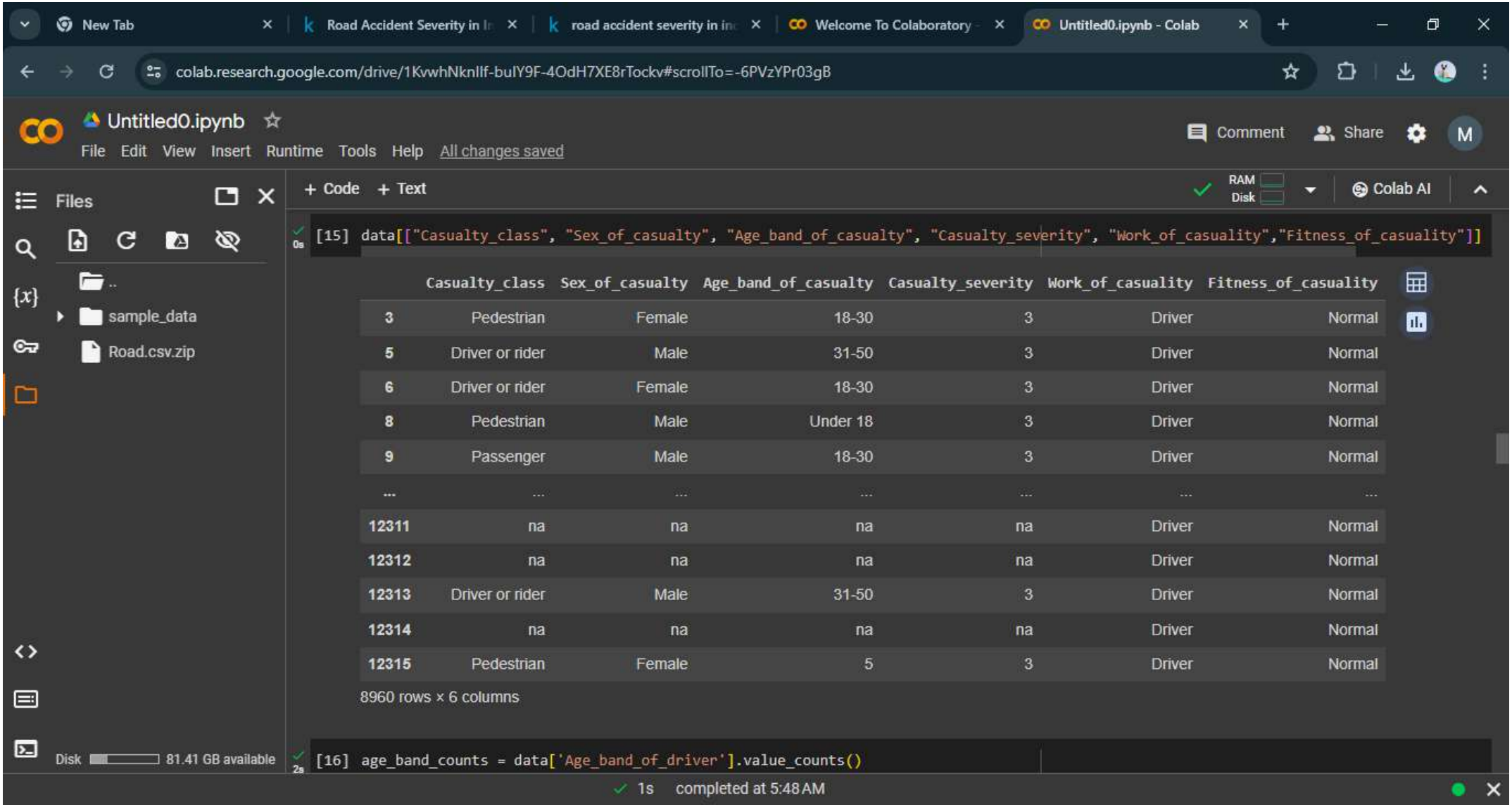
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sample_data
Road.csv.zip
[15] data[["Casualty_class", "Sex_of_casualty", "Age_band_of_casualty", "Casualty_severity", "Work_of_casuality","Fitness_of_casuality"]]
Casualty_class Sex_of_casualty Age_band_of_casualty Casualty_severity Work_of_casuality Fitness_of_casuality
3 Pedestrian Female 18-30 3 Driver Normal
5 Driver or rider Male 31-50 3 Driver Normal
6 Driver or rider Female 18-30 3 Driver Normal
8 Pedestrian Male Under 18 3 Driver Normal
9 Passenger Male 18-30 3 Driver Normal
... ...
12311 na na na na Driver Normal
12312 na na na na Driver Normal
12313 Driver or rider Male 31-50 3 Driver Normal
12314 na na na na Driver Normal
12315 Pedestrian Female 5 3 Driver Normal
8960 rows x 6 columns
[16] age_band_counts = data['Age_band_of_driver'].value_counts()
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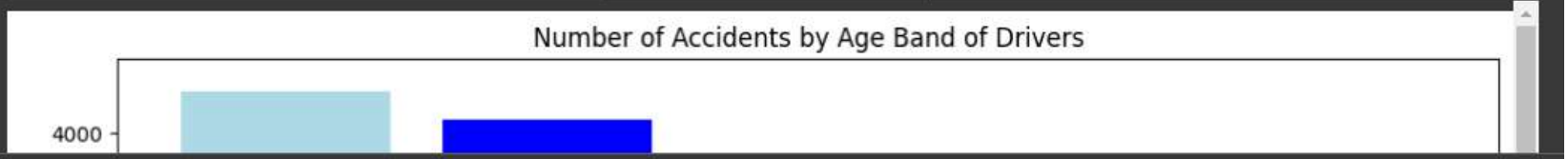
[15] 0s

8960 rows × 6 columns

[16] 2s

```
age_band_counts = data['Age_band_of_driver'].value_counts()
color = ['lightblue', 'blue', 'green', 'red', 'yellow']
plt.figure(figsize=(12, 6)) # This line creates a new Matplotlib figure with a specified size of 12 inches in width and 6 inches in
plt.bar(age_band_counts.index, age_band_counts.values, color=color) #The x-axis values are taken from the index of 'age_band_counts'
plt.title('Number of Accidents by Age Band of Drivers') #This line sets the title of the plot.
plt.xlabel('Age Band of Drivers') #This line sets the label for the x-axis.
plt.ylabel('Number of Accidents') #This line sets the label for the y-axis.
plt.xticks(rotation=45) #This line rotates the x-axis labels by 45 degrees for better readability.
plt.show() # This line displays the plot.
plt.figure(figsize=(12, 6))
sns.barplot(x=age_band_counts.index, y=age_band_counts.values, palette="husl")
# This line uses Seaborn's barplot function to generate a bar chart. The x-axis values are specified by age_band_counts.index (repre
plt.title('Number of Accidents by Age Band of Drivers')
plt.xlabel('Age Band of Drivers')
plt.ylabel('Number of Accidents')
plt.xticks(rotation=45)
plt.show()
```



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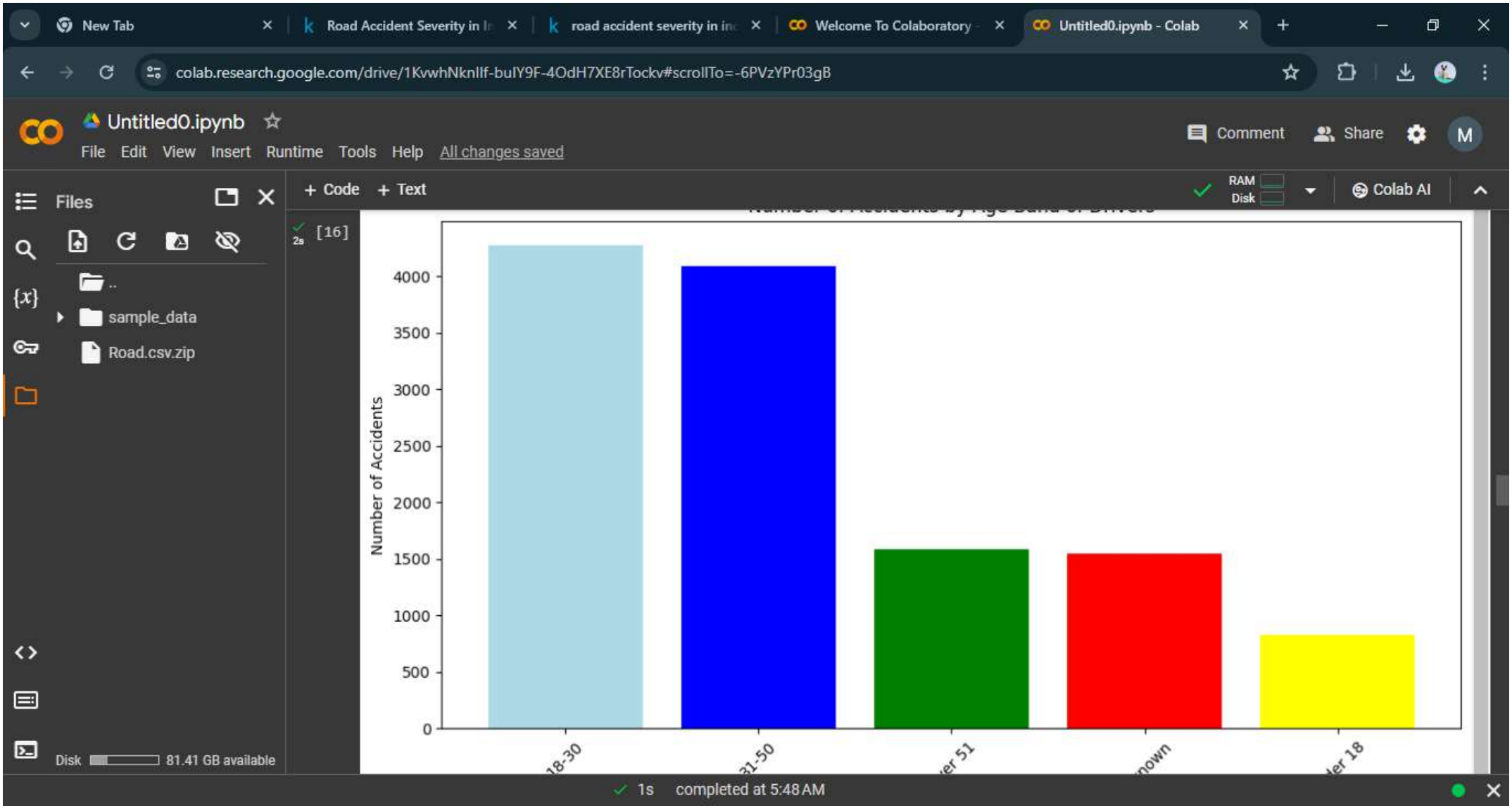
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2s
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sample_data
Road.csv.zip
Number of Accidents
4000
3500
3000
2500
2000
1500
1000
500
0
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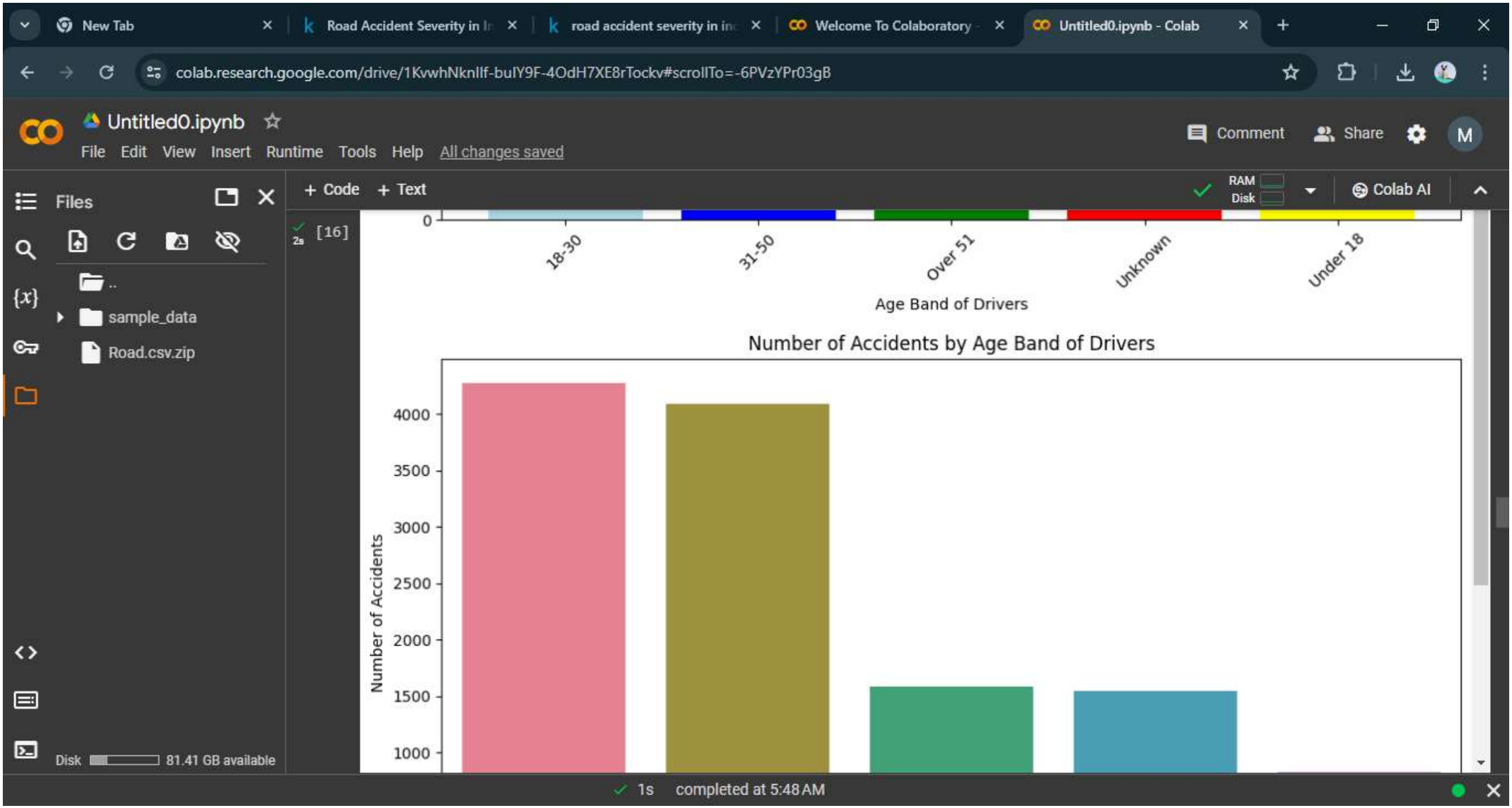
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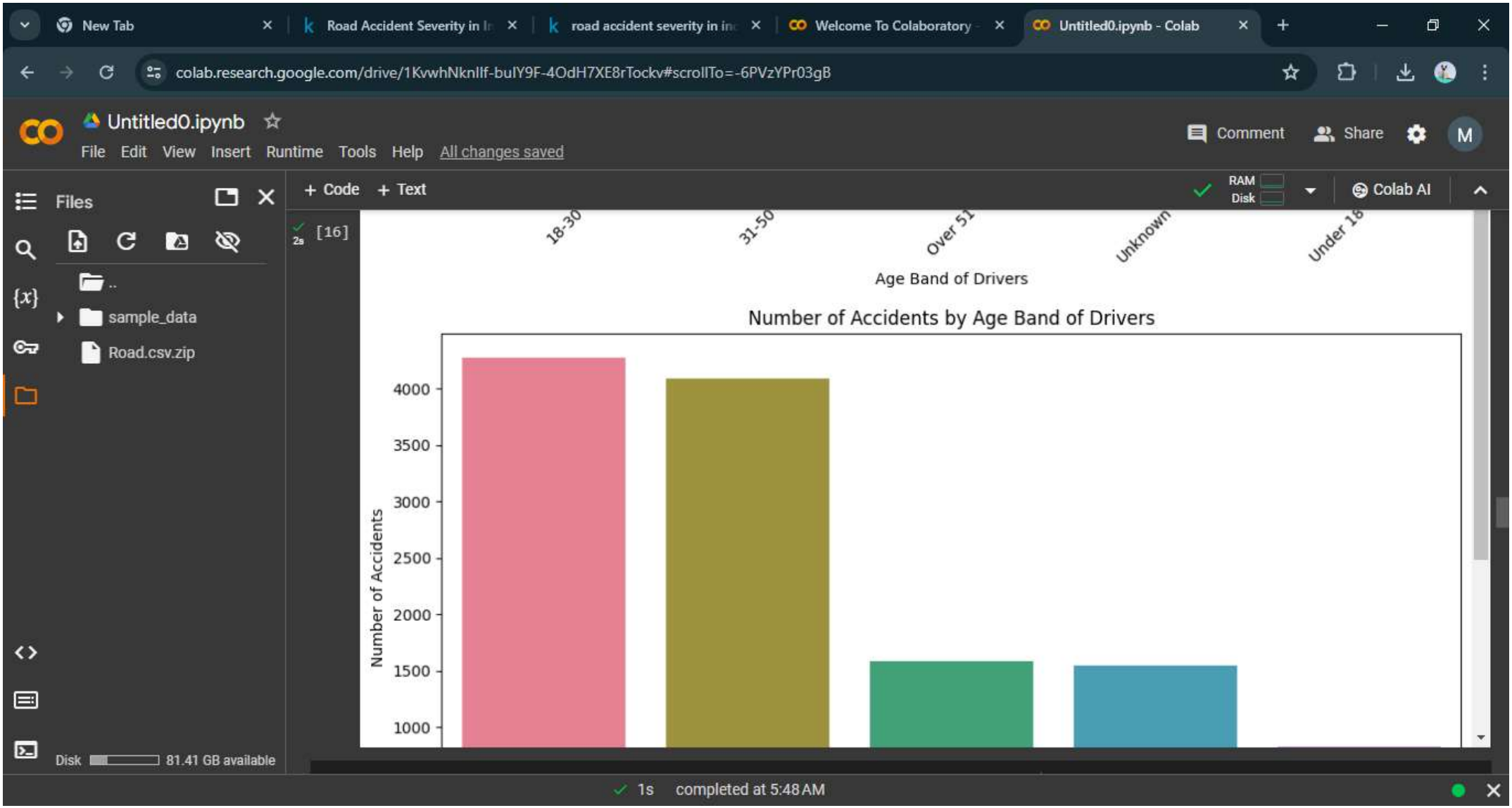
[16]
2s
sample_data
Road.csv.zip
Disk 81.41 GB available
0
18-30
31-50
Over 51
Unknown
Under 18
Age Band of Drivers
Number of Accidents by Age Band of Drivers
Number of Accidents
4000
3500
3000
2500
2000
1500
1000
1s completed at 5:48 AM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[16]
2s
..
sample_data
Road.csv.zip
18-30
31-50
Over 51
Unknown
Under 18
Age Band of Drivers
Number of Accidents by Age Band of Drivers
Number of Accidents
4000
3500
3000
2500
2000
1500
1000
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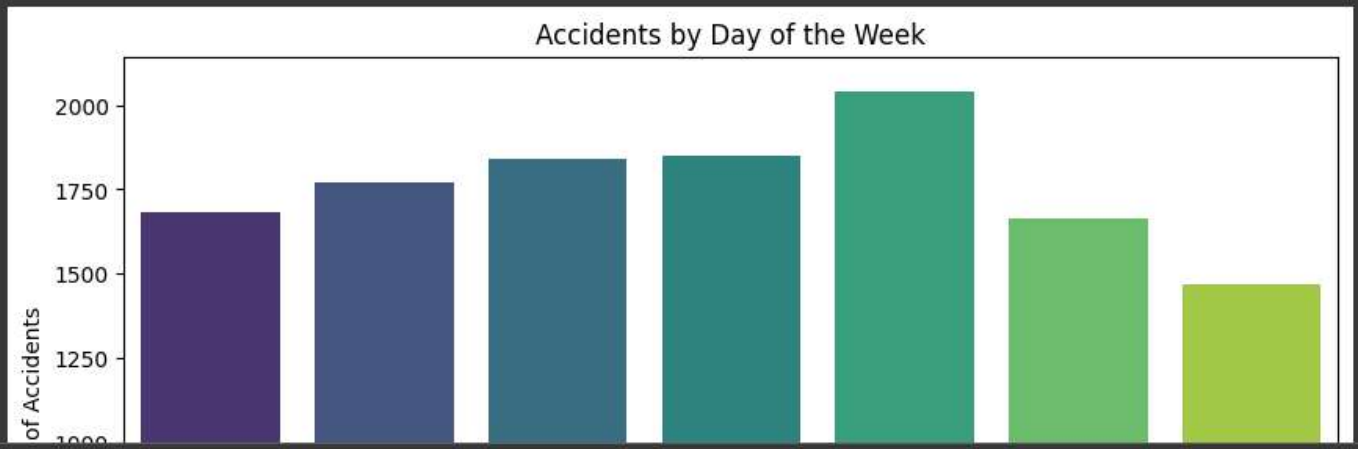
```
day_of_week_counts = data['Day_of_week'].value_counts()
days_order = ['Monday', 'Tuesday', 'Wednesday', 'Thursday', 'Friday', 'Saturday', 'Sunday']
day_of_week_counts = day_of_week_counts.reindex(days_order) # The reindex method in pandas is used to change the order of the elemen
plt.figure(figsize=(10, 6))
sns.barplot(x=day_of_week_counts.index, y=day_of_week_counts, palette='viridis')
plt.title('Accidents by Day of the Week')
plt.xlabel('Day of the Week')
plt.ylabel('Number of Accidents')
plt.show()
```



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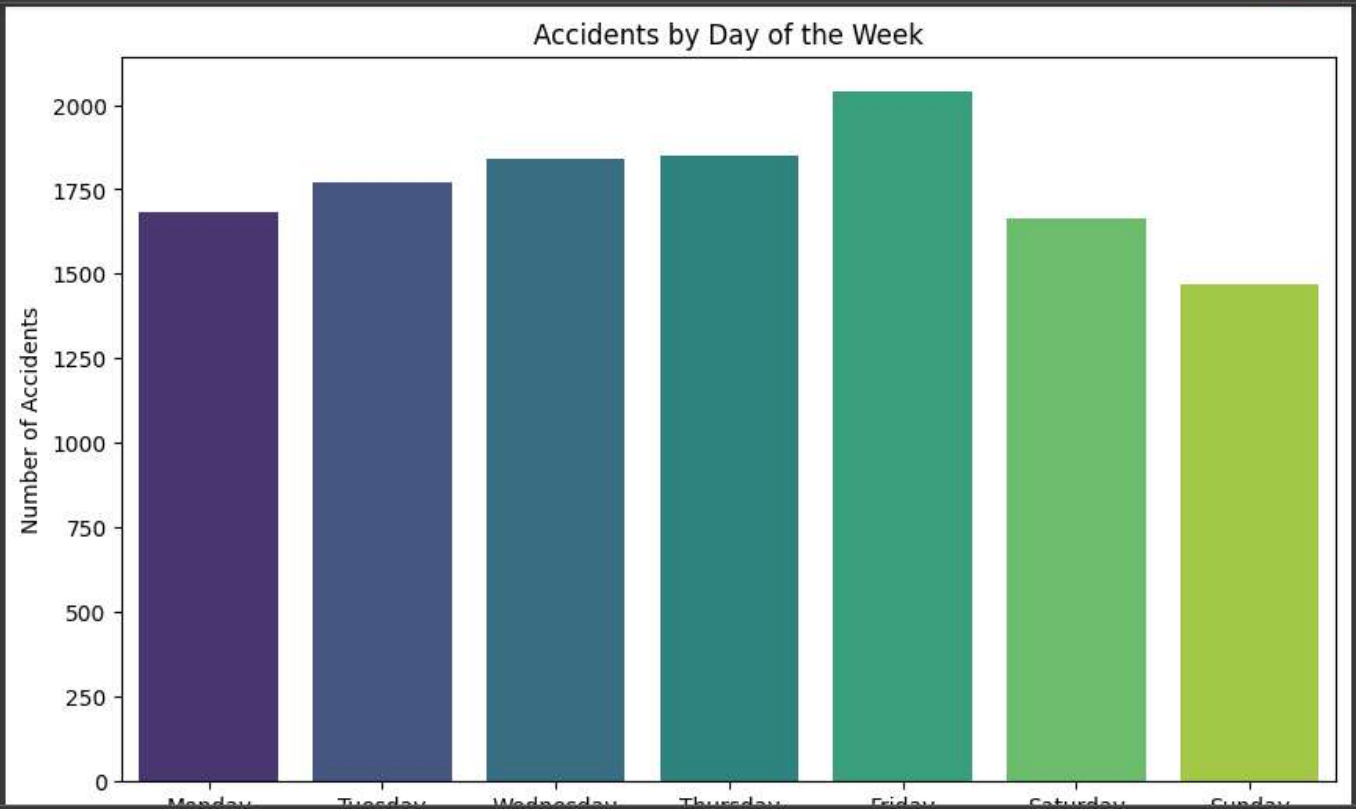

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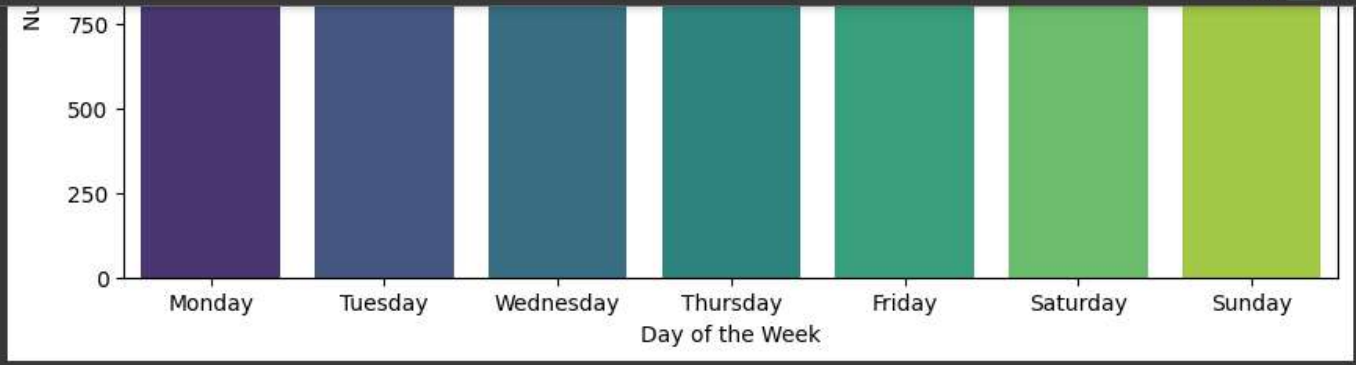

[18]

```
education_counts = data['Educational_level'].value_counts()
most_common_education = education_counts.idxmax() # The idxmax() method in pandas is used to find the index (label) of the first occ
plt.figure(figsize=(10, 6))
sns.countplot(x='Educational_level', data=data, order=data['Educational_level'].value_counts().index)
plt.title('Distribution of Educational Levels among Drivers Involved in Accidents')
plt.xlabel('Educational Level')
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.show()
```

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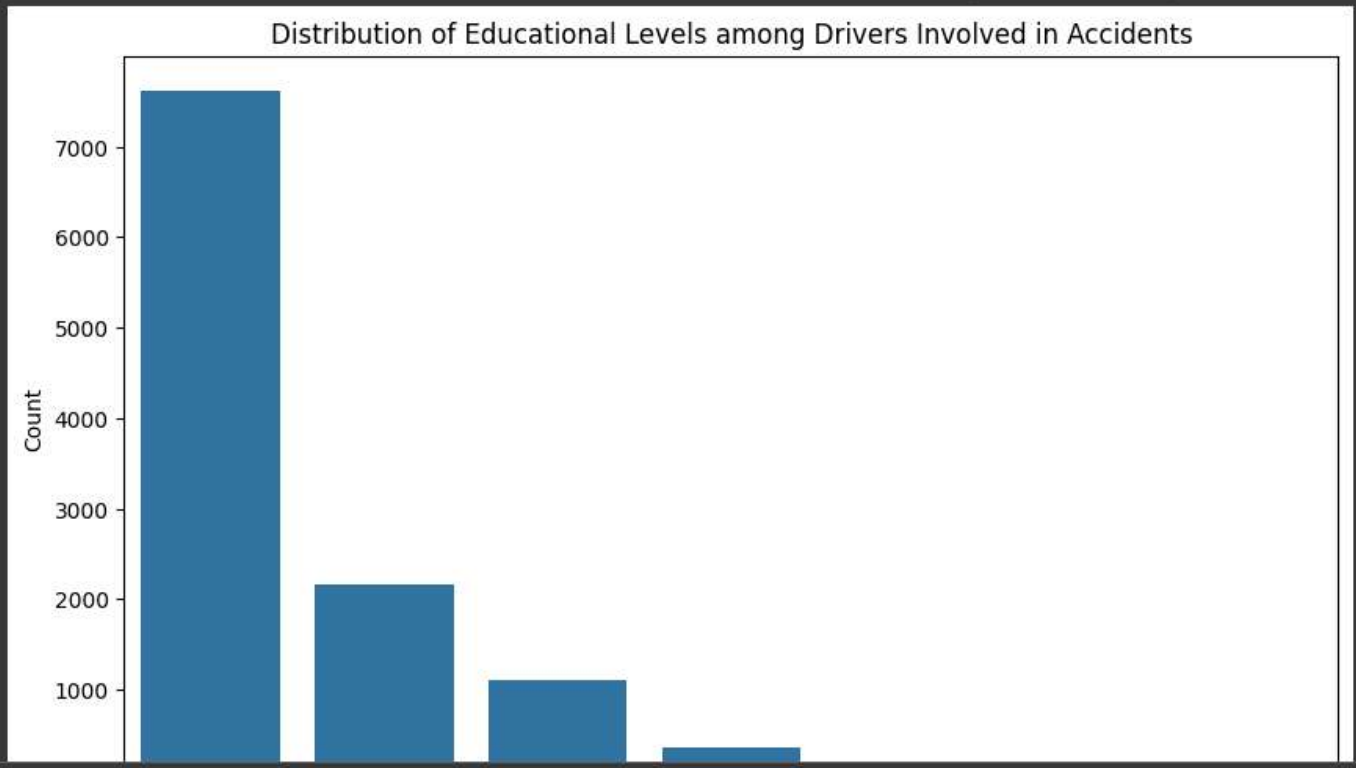

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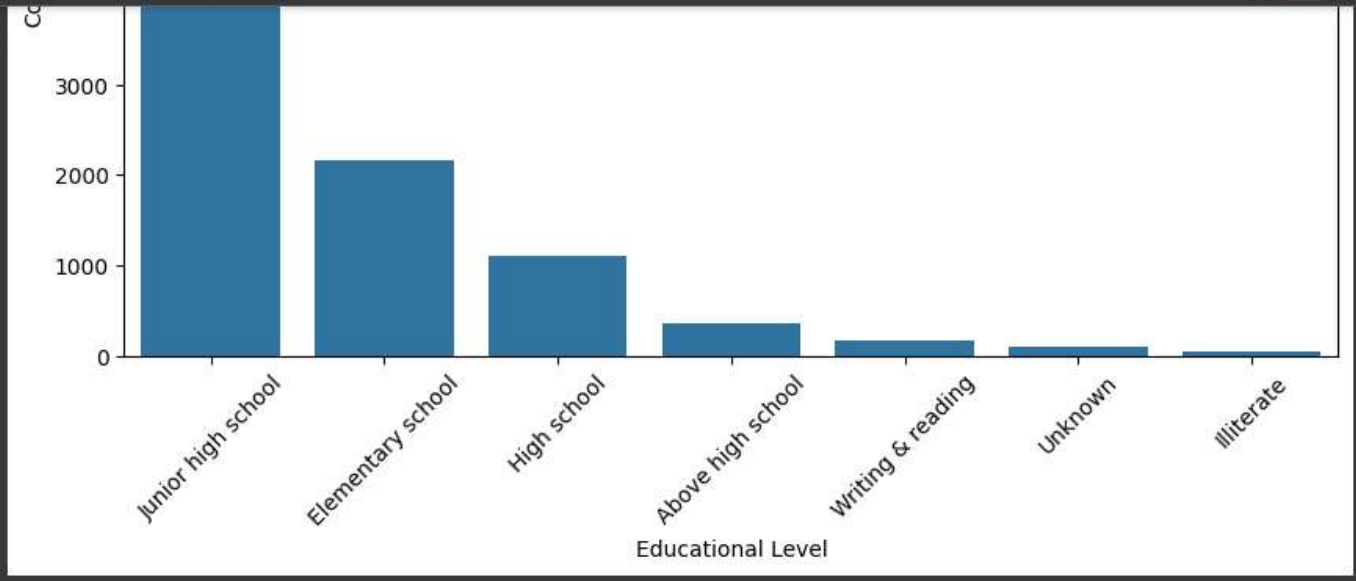

[19]

```
data['Hour'] = data['Time'].dt.hour #  Extracts the hour component from the 'Time' column and creates a new column called 'Hour' in
data['Day_of_week'] = pd.Categorical(data['Day_of_week'], categories=['Monday', 'Tuesday', 'Wednesday', 'Thursday', 'Friday', 'Satur
# Converts the 'Day_of_week' column to a categorical variable with the specified order of categories (days of the week).
plt.figure(figsize=(12, 6))
sns.countplot(x='Hour', data=data, palette='rainbow')
plt.title('Accidents by Hour of the Day')
```

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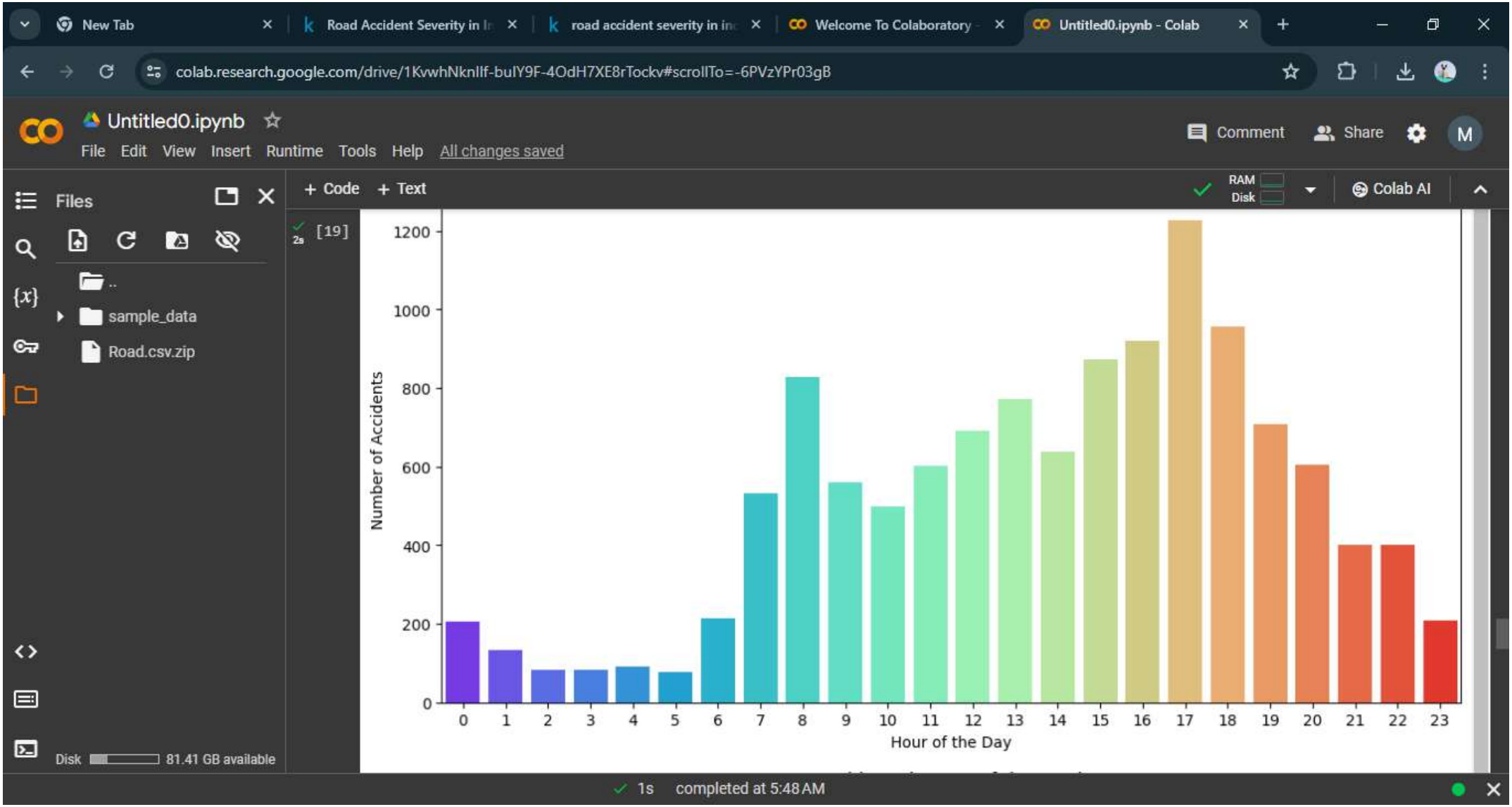
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Road.csv.zip
Number of Accidents
Hour of the Day
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
0 200 400 600 800 1000 1200
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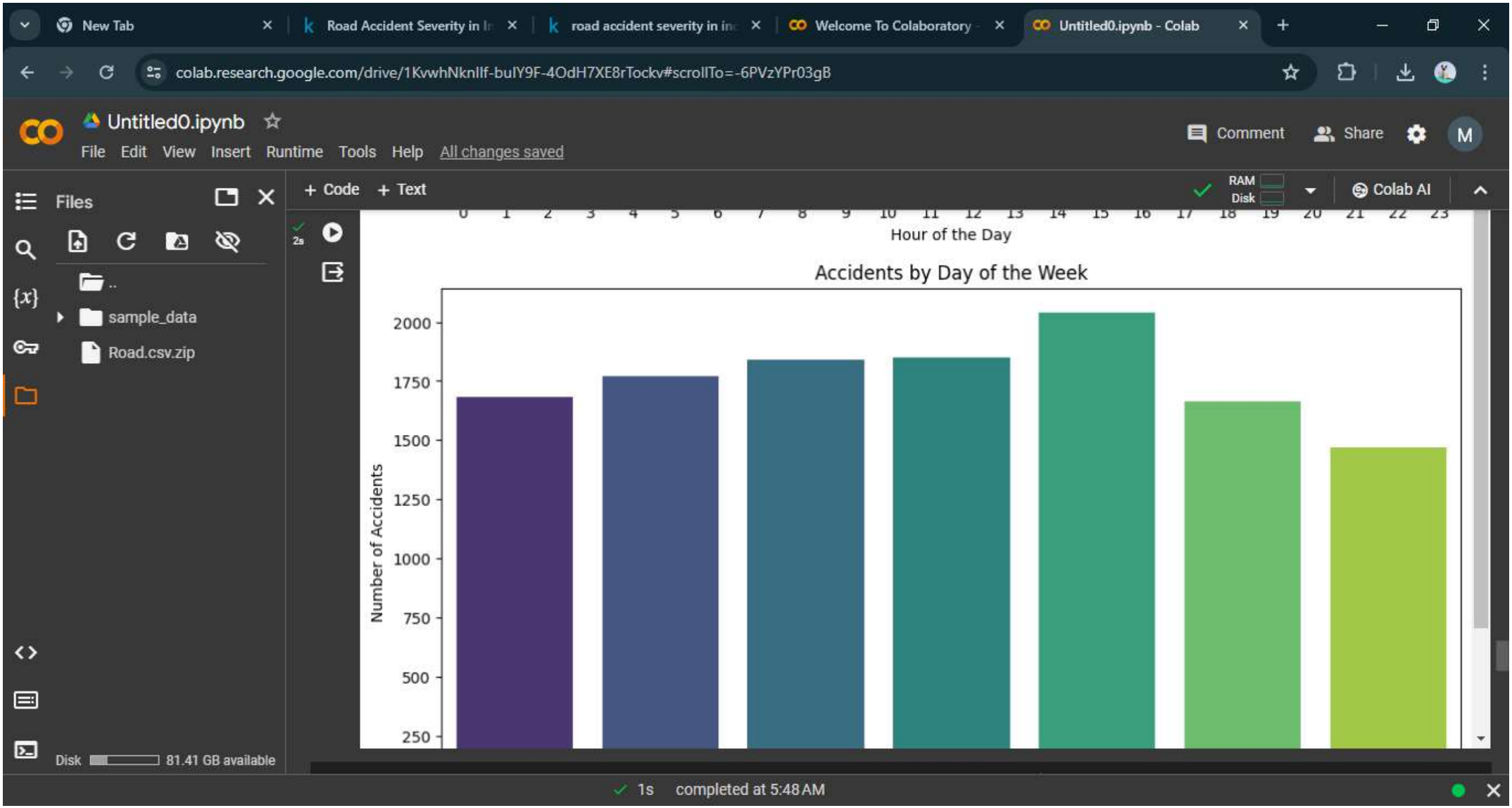
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Road.csv.zip
Hour of the Day
Accidents by Day of the Week
Number of Accidents
2000
1750
1500
1250
1000
750
500
250
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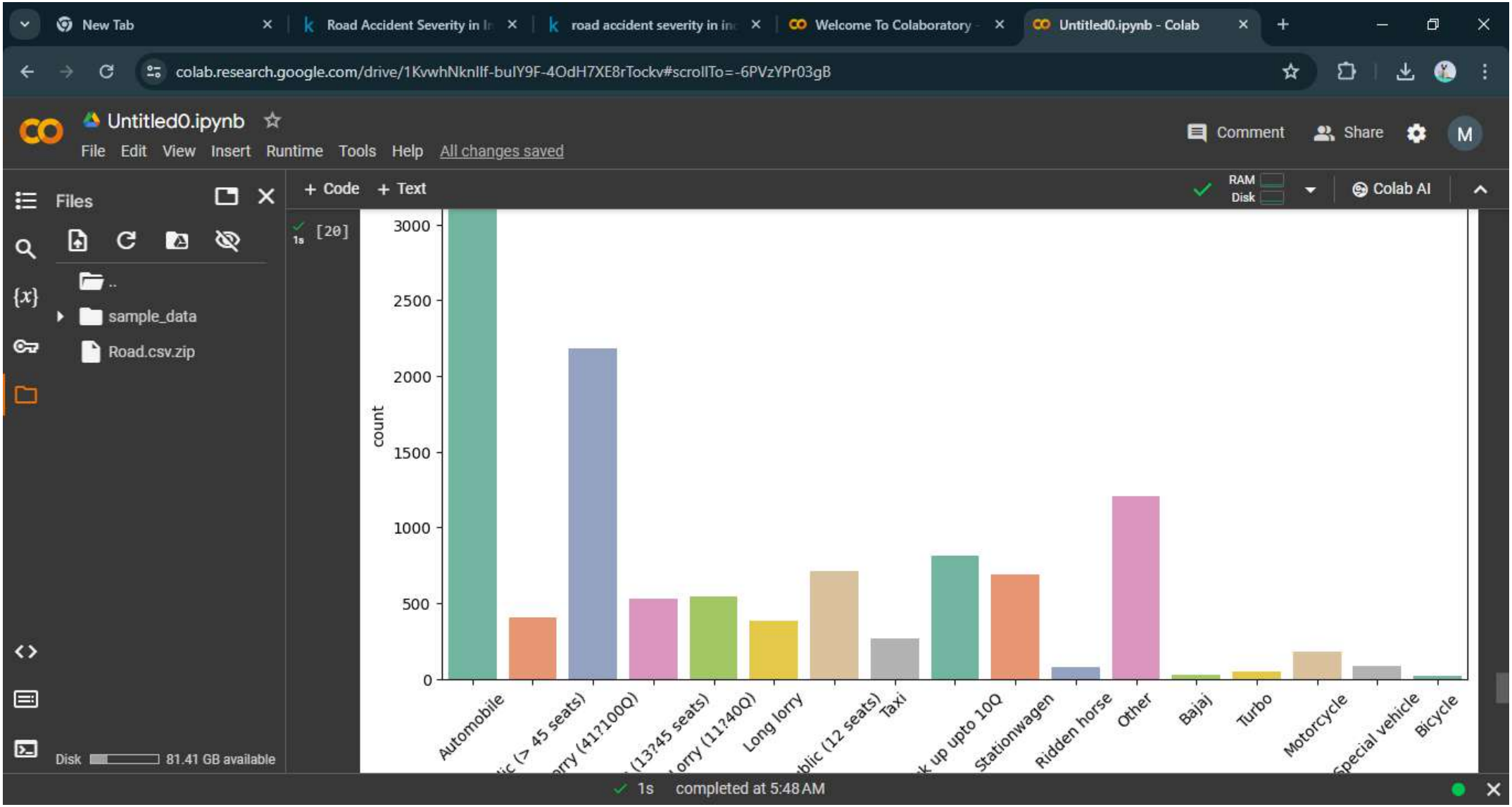
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[20]
1s
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sample_data
Road.csv.zip
count
3000
2500
2000
1500
1000
500
0
Automobile
Taxi
Stationwagen
Ridden horse
Other
Bajaj
Turbo
Motorcycle
Bicycle
Long lorry
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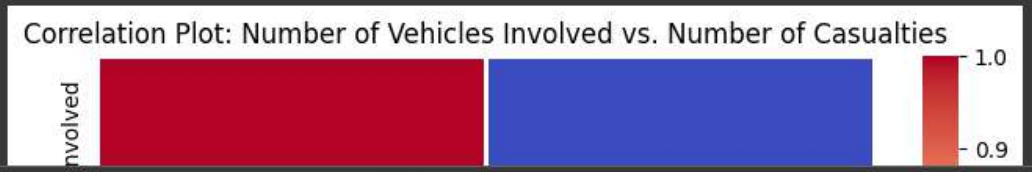
[20]

Type_of_vehicle

[21]
```
data['Weekday'] = data['Day_of_week'].apply(lambda x: 'Weekend' if x in ['Saturday', 'Sunday'] else 'Weekday')
weekday_weekend_counts = data.groupby(['Weekday', 'Accident_severity']).size().unstack().reset_index() #unstack() is used to reshape
print(weekday_weekend_counts)
```

Accident_severity	Weekday	Fatal injury	Serious Injury	Slight Injury
0	Weekday	86	1308	7789
1	Weekend	72	435	2626

[22]
```
find_cor = data[['Number_of_vehicles_involved', 'Number_of_casualties']]
correlation_mat = find_cor.corr()
plt.figure(figsize=(8, 6))
sns.heatmap(data=correlation_mat, annot=True, cmap='coolwarm', fmt='.2f', linewidths=1)
plt.title('Correlation Plot: Number of Vehicles Involved vs. Number of Casualties')
plt.show()
```



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RAM
Disk
Colab AI
sample_data
Road.csv.zip
Correlation Plot: Number of Vehicles Involved vs. Number of Casualties
Number_of_vehicles_involved
Number_of_casualties
1.00
0.21
0.21
1.00
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
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