

```
# Importing necessary libraries
import pandas as pd
import numpy as np
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
from sklearn import metrics
from sklearn.metrics import classification_report, confusion_matrix

df = pd.read_csv("/content/2011-Q1-cabi-trip-history-data.csv")
df.head()
```

	Duration	Start date	End date	Start station	End station	Bike#	Member Type
0	0h 1min. 50sec.	3/31/2011 23:58	4/1/2011 0:00	14th & Harvard St NW (31105)	16th & Harvard St NW (31103)	W00749	Registered
1	0h 16min. 21sec.	3/31/2011 23:52	4/1/2011 0:08	19th & L St NW (31224)	7th & Water St SW / SW Waterfront (31609)	W01048	Casual

Lincoln Park /

Start coding or [generate](#) with AI.

```
df["Duration"] = df['Duration'].str.replace('min', '')
df["Duration"] = df['Duration'].str.replace('sec', '')
df["Duration"] = df['Duration'].str.replace('h', '')
df["Duration"] = df['Duration'].str.replace(' ', '')
df["Duration"] = df['Duration'].str.replace('.', '').astype(float)

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:5: FutureWarning: The default value of regex will change from True to False in a future version.
"""
```

```
address=df['End station'].unique()
print(address)
df = df.dropna()
```

['16th & Harvard St NW (31103)'  
'7th & Water St SW / SW Waterfront (31609)' '13th & H St NE (31611)'  
'Massachusetts Ave & Dupont Circle NW (31200)' '15th & P St NW (31201)'  
'Adams Mill & Columbia Rd NW (31104)' '21st & M St NW (31212)'  
'14th & V St NW (31101)' '7th & T St NW (31109)'  
'Georgia Ave and Fairmont St NW (31207)' '20th & E St NW (31204)'  
'14th St & Spring Rd NW (31401)' '14th & Rhode Island Ave NW (31203)'  
'17th & Corcoran St NW (31214)' '25th St & Pennsylvania Ave NW (31237)'  
'10th & Monroe St NE (31504)' 'C & O Canal & Wisconsin Ave NW (31225)'  
'18th & M St NW (31221)' '11th & Kenyon St NW (31102)'  
'3rd & H St NE (31616)' 'Park Rd & Holmead Pl NW (31602)'  
'Calvert St & Woodley Pl NW (31106)'  
'Georgia & New Hampshire Ave NW (31400)' '10th & U St NW (31111)'  
'Potomac & Pennsylvania Ave SE (31606)'  
'Columbus Circle / Union Station (31623)' 'Florida Ave & R St NW (31503)'  
'14th & D St SE (31607)' 'McPherson Square - 14th & H St NW (31216)'  
'Lincoln Park / 13th & East Capitol St NE (31619)'  
'13th & D St NE (31622)' '21st & I St NW (31205)'  
'16th & U St NW (31229)' '12th & Army Navy Dr (31008)'  
'14th & R St NW (31202)' '5th St & K St NW (31600)'  
'19th St & Pennsylvania Ave NW (31100)'  
'Wisconsin Ave & Macomb St NW (31302)' '4th & East Capitol St NE (31618)'  
'3rd & D St SE (31605)' 'Van Ness Metro / UDC (31300)'  
'Tenleytown / Wisconsin Ave & Albemarle St NW (31303)'  
'1st & M St NE (31603)' '36th & Calvert St NW / Glover Park (31304)'  
'S Glebe & Potomac Ave (31010)' '8th & H St NW (31228)'  
'New York Ave & 15th St NW (31222)' '13th St & New York Ave NW (31227)'  
'Lamont & Mt Pleasant NW (31107)' 'Eckington Pl & Q St NE (31505)'  
'4th St & Massachusetts Ave NW (31604)'  
'Eastern Market / 7th & North Carolina Ave SE (31610)'  
'Convention Center / 7th & M St NW (31223)'  
'M St & New Jersey Ave SE (31208)' 'Kennedy Center (31211)'  
'14th & Harvard St NW (31105)'  
'Connecticut Ave & Newark St NW / Cleveland Park (31305)'  
'17th & K St NW [formerly 17th & L St NW] (31213)'  
'14th & G St NW (31238)' '4th & M St SW (31108)'  
'Eastern Market Metro / Pennsylvania Ave & 7th St SE (31613)'  
'L'Enfant Plaza / 7th & C St SW (31218)' '19th & L St NW (31224)'  
'20th St & Florida Ave NW (31110)'  
'Harvard St & Adams Mill Rd NW (31112)'  
'Ward Circle / American University (31301)'  
'19th St & Constitution Ave NW (31235)'  
'Bladensburg Rd & Benning Rd NE (31617)' '5th & F St NW (31620)'

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'27th & Crystal Dr (31009)' '18th & Hayes St (31004)'
'North Capitol St & F St NW (31624)' 'Good Hope & Naylor Rd SE (31700)'
'15th & Crystal Dr (31003)' '34th St & Wisconsin Ave NW (31226)'
'37th & O St NW / Georgetown University (31236)'
'20th & Crystal Dr (31002)' '18th & Bell St (31007)'
'23rd & Crystal Dr (31011)' 'USDA / 12th & Independence Ave SW (31217)'
'US Dept of State / Virginia Ave & 21st St NW (31220)'
'12th & Newton St NE (31501)' 'S Joyce & Army Navy Dr (31006)'
'12th & Hayes St (31001)' 'John McCormack Dr & Michigan Ave NE (31502)'
'10th St & Constitution Ave NW (31219)'
'Georgetown Harbor / 30th St NW (31215)'
'19th & East Capitol St SE (31601)' '1st & N St SE (31209)'
'19th & E Street NW (31206)' 'Pennsylvania & Minnesota Ave SE (31805)'
'Anacostia Library (31804)' '8th & Eye St SE / Barracks Row (31608)'
'23rd & Fads (31013)' '26th & Crystal Dr (31012)'
```

```
from sklearn.preprocessing import LabelEncoder
gle = LabelEncoder()
address_labels = gle.fit_transform(df['End station'])
address_labels = gle.fit_transform(df['Start station'])
address_mappings = {index: label for index, label in
                    enumerate(gle.classes_)}

address_mappings

48: '37th & O St NW / Georgetown University (31236)',
49: '3rd & D St SE (31605)',
50: '3rd & H St NE (31616)',
51: '4th & Adams St NE (31500)',
52: '4th & East Capitol St NE (31618)',
53: '4th & M St SW (31108)',
54: '4th St & Massachusetts Ave NW (31604)',
55: '5th & F St NW (31620)',
56: '5th St & K St NW (31600)',
57: '7th & T St NW (31109)',
58: '7th & Water St SW / SW Waterfront (31609)',
59: '8th & Eye St SE / Barracks Row (31608)',
60: '8th & H St NW (31228)',
61: 'Adams Mill & Columbia Rd NW (31104)',
62: 'Alta Bicycle Share Demonstration Station (31999)',
63: 'Anacostia Library (31804)',
64: 'Anacostia Metro (31801)',
65: 'Benning Branch Library (31705)',
66: 'Bladensburg Rd & Benning Rd NE (31617)',
67: 'C & O Canal & Wisconsin Ave NW (31225)',
68: 'Calvert St & Woodley Pl NW (31106)',
69: 'Columbus Circle / Union Station (31623)',
70: 'Connecticut Ave & Newark St NW / Cleveland Park (31305)',
71: 'Convention Center / 7th & M St NW (31223)',
72: 'Eastern Market / 7th & North Carolina Ave SE (31610)',
73: 'Eastern Market Metro / Pennsylvania Ave & 7th St SE (31613)',
74: 'Eckington Pl & Q St NE (31505)',
75: 'Florida Ave & R St NW (31503)',
76: 'Georgetown Harbor / 30th St NW (31215)',
77: 'Georgia & New Hampshire Ave NW (31400)',
78: 'Georgia Ave and Fairmont St NW (31207)',
79: 'Good Hope & Naylor Rd SE (31700)',
80: 'Good Hope Rd & MLK Ave SE (31802)',
81: 'Harvard St & Adams Mill Rd NW (31112)',
82: 'John McCormack Dr & Michigan Ave NE (31502)',
83: 'Kennedy Center (31211)',
84: 'L'Enfant Plaza / 7th & C St SW (31218)',
85: 'Lamont & Mt Pleasant NW (31107)',
86: 'Lincoln Park / 13th & East Capitol St NE (31619)',
87: 'M St & New Jersey Ave SE (31208)',
88: 'Massachusetts Ave & Dupont Circle NW (31200)',
89: 'McPherson Square - 14th & H St NW (31216)',
90: 'Minnesota Ave Metro/DOES (31703)',
91: 'Nannie Helen Burroughs & Minnesota Ave NE (31704)',
92: 'New York Ave & 15th St NW (31222)',
93: 'North Capitol St & F St NW (31624)',
94: 'Park Rd & Holmead Pl NW (31602)',
95: 'Pennsylvania & Minnesota Ave SE (31805)',
96: 'Potomac & Pennsylvania Ave SE (31606)',
97: 'Randle Circle & Minnesota Ave NE (31702)',
98: 'S Glebe & Potomac Ave (31010)',
99: 'S Joyce & Army Navy Dr (31006)',
100: 'Tenleytown / Wisconsin Ave & Albemarle St NW (31303)',
101: 'US Dept of State / Virginia Ave & 21st St NW (31220)',
102: 'USDA / 12th & Independence Ave SW (31217)',
103: 'Van Ness Metro / UDC (31300)',
104: 'Ward Circle / American University (31301)',
105: 'Wisconsin Ave & Macomb St NW (31302)'
```

```
df['End station'] = address_labels
```

```

gle = LabelEncoder()
address_labels = gle.fit_transform(df['Start station'])
address_mappings = {index: label for index, label in
                    enumerate(gle.classes_)}

address_mappings

48: '37th & O St NW / Georgetown University (31236)',
49: '3rd & D St SE (31605)',
50: '3rd & H St NE (31616)',
51: '4th & Adams St NE (31500)',
52: '4th & East Capitol St NE (31618)',
53: '4th & M St SW (31108)',
54: '4th St & Massachusetts Ave NW (31604)',
55: '5th & F St NW (31620)',
56: '5th St & K St NW (31600)',
57: '7th & T St NW (31109)',
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73: 'Eastern Market Metro / Pennsylvania Ave & 7th St SE (31613)',
74: 'Eckington Pl & Q St NE (31505)',
75: 'Florida Ave & R St NW (31503)',
76: 'Georgetown Harbor / 30th St NW (31215)',
77: 'Georgia & New Hampshire Ave NW (31400)',
78: 'Georgia Ave and Fairmont St NW (31207)',
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93: 'North Capitol St & F St NW (31624)',
94: 'Park Rd & Holmead Pl NW (31602)',
95: 'Pennsylvania & Minnesota Ave SE (31805)',
96: 'Potomac & Pennsylvania Ave SE (31606)',
97: 'Randle Circle & Minnesota Ave NE (31702)',
98: 'S Glebe & Potomac Ave (31010)',
99: 'S Joyce & Army Navy Dr (31006)',
100: 'Tenleytown / Wisconsin Ave & Albemarle St NW (31303)',
101: 'US Dept of State / Virginia Ave & 21st St NW (31220)',
102: 'USDA / 12th & Independence Ave SW (31217)',
103: 'Van Ness Metro / UDC (31300)',
104: 'Ward Circle / American University (31301)',
105: 'Wisconsin Ave & Macomb St NW (31302)'}

```

```
df['Start station'] = address_labels
```

```
df.head()
```

	Duration	Start date	End date	Start station	End station	Bike#	Member Type
0	150.0	3/31/2011 23:58	4/1/2011 0:00	12	21	W00749	Registered
1	1621.0	3/31/2011 23:52	4/1/2011 0:08	30	58	W01048	Casual
2	319.0	3/31/2011 23:47	3/31/2011 23:50	86	8	W00340	Registered

```

gle = LabelEncoder()
bike_labels = gle.fit_transform(df['Bike#'])
bike_mappings = {index: label for index, label in
                enumerate(gle.classes_)}

bike_mappings

```

```

529: 'W00641',
530: 'W00642',
531: 'W00643',
532: 'W00645',
533: 'W00647',
534: 'W00648',
535: 'W00649',
536: 'W00650',
537: 'W00652',
538: 'W00653',
539: 'W00654',
540: 'W00655',
541: 'W00656',
542: 'W00657',
543: 'W00658',
544: 'W00659',
545: 'W00660',
546: 'W00661',
547: 'W00662',
548: 'W00663',
549: 'W00664',
550: 'W00665',
551: 'W00666',
552: 'W00667',
553: 'W00669',
554: 'W00670',
555: 'W00671',
556: 'W00672',
557: 'W00673',
558: 'W00674',
559: 'W00675',
560: 'W00676',
561: 'W00677',
562: 'W00678',
563: 'W00679',
564: 'W00680',
565: 'W00681',
566: 'W00682',
567: 'W00683',
568: 'W00684',
569: 'W00685',
570: 'W00686',
571: 'W00687',
572: 'W00688',
573: 'W00689',
574: 'W00691',
575: 'W00692',
576: 'W00693',
577: 'W00694',
578: 'W00695',
579: 'W00696',
580: 'W00697',
581: 'W00698',
582: 'W00699',
583: 'W00700',
584: 'W00701',
585: 'W00703',
586: 'W00704',

```

```
df['Bike#'] = bike_labels
```

```
# Assign X and y
X = df.iloc[:,[0,3,5]].values
y = df.iloc[:, -1].values
```

```
print(y)
```

```
['Registered' 'Casual' 'Registered' ... 'Registered' 'Casual' 'Registered']
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.20, random_state=0)
```

```
tree = DecisionTreeClassifier(max_leaf_nodes=3, random_state=0)
tree.fit(X_train, y_train)
y_pred = tree.predict(X_test)
```

```
# Check the Accuracy
score = metrics.accuracy_score(y_test, y_pred)
print("Accuracy of our model is: {:.1f}%".format(score*100))
print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))
```

```
Accuracy of our model is: 88.4%
[[ 1264  3100]
```

[ 379 25269]]				
	precision	recall	f1-score	support
Casual	0.77	0.29	0.42	4364
Registered	0.89	0.99	0.94	25648
accuracy			0.88	30012
macro avg	0.83	0.64	0.68	30012
weighted avg	0.87	0.88	0.86	30012