Transforming Public Transportation for Sustainable Cities

Phase 1: Project Initiation (Months 1- 6)

1. Project Inception (Months 1-2)

• Define the project's mission,goals, and scope.

• Identify key stakeholders, Including government agencies,transit authorities, and community representatives.

• Establish a project team and leadership structure.

2. Needs Assessment (Months 3-4)

• Conduct a comprehensive analysis of the current state of public transportation in the target city or region.

• Identify pain points, including issues like congestion, inadequate coverage, and environmental concerns.

3. Stakeholder Engagement (Months5-6)

• Organize meetings with keystakeholders to gather input and build consensus.

• Create a stakeholder advisory board for ongoing engagement.

Phase 2: Vision and Planning (Months 7-12)

1. Vision and Goals (Months 7-8)

• Develop a clear vision for the transformed public transportation system.

• Set specific, measurable, achievable, relevant, and time- bound (SMART) goals.

2. Feasibility Studies (Months 9-12)

• Conduct feasibility studies for major transformational initiatives, such as electrification, Bus Rapid Transit (BRT), and multi-modal integration.

• Evaluate the costs, benefits, and potential challenges for each initiative.

Phase 3: Data Collection and Analysis (Months 13-18)

1. Data Collection Systems (Months 13-14)

• Implement data colection systems to monitor passenger now, transit performance, and environmental impact.
• Gather information on commuter habits, preferences, and demographics.

2. Passenger Feedback (Months 15-16)

• Launch passenger surveys and public feedback mechanisms to understand the needs and expectations of the community.

• Analyze feedback to inform project planning

3. Financial Strategy (Months 17-18)

• Explore potential funding sources, including government grants, public-private partnerships, and innovative financing mechanisms.

• Develop a financial strategy that aligns with the project's goals and proposed transformations.

Phase 4: Public Engagement and Awareness (Months 19-24)

1. Public Awareness Campaign (Months 19-20)

• Initiate a public awareness campaign to inform residents about the upcoming improvements in public transportation.

• Use various media channels, community events, and social platforms to generate interest and support.

2. Stakeholder Collaboration (Months 21-22)

• Facilitate collaboration between government agencies, transit operators, and private sector stakeholders.

• Encourage dialogue and partnerships to enhance project success.

3. Sustainable Transportation Grants (Months 23-24)

• Seek and secure grants from regional, national, and international organizations that support sustainable transportation initiatives

• Allocate grant funding for specific projects, such as electrification and green infrastructure.

Phase 5: Multi-Modal Integration and Accessibility (Months 25-30)

1. Multi-Modal Integration Planning (Months 25-26)

• Create a comprehensive plan for integrating various modes of transportation, including buses, trains, trams, and cycling.

• Develop transfer hubs and coordinate schedules to enhance passenger convenience.

2. Accessibility Enhancements (Months 27-28)

• Review the design of existing transportation infrastructure to ensure inclusivity for people with disabilities.

• Plan and budget for improvements to enhance accessibility.

3. Environmental Impact Assessment(Months 29-30)

• Conduct an environmental impact assessment to understand the current carbon footprint of public transportation.

• Set targets for emissions reduction and track progress.

4. Green Infrastructure (Months 31-36)

• Identify opportunities for implementing renewable energy sources and eco-friendly transit infrastructure.

• Secure funding and initiate projects to reduce the environmental impact of public transit.

Conclusion

This detailed plan for Part 1 provides a structured approach to transforming public transportation, covering project initiation, planning, data collection, financial strategy, public engagement, and sustainability initiatives.

Public Transport Effectively Analysis phase

[4]:
```
import pandas as pd

data=pd.read_csv("C:/Users/abuba/Downloads/publicTransport.csv")
data
```

```
C:\Users\abuba\AppData\Local\Temp\ipykernel_9260\2646756992.py:3: DtypeWarning:
Columns (1) have mixed types. Specify dtype option on import or set
low_memory=False.
  data=pd.read_csv("C:/Users/abuba/Downloads/publicTransport.csv")
```

[4]:

	TripID	RouteID	StopID	StopName	\
0	23631	100	14156	181 Cross Rd	
1	23631	100	14144	177 Cross Rd	
2	23632	100	14132	175 Cross Rd	
3	23633	100	12266	Zone A Arndale Interchange	
4	23633	100	14147	178 Cross Rd	
…	…	…	…	…	
10857229	13346	W91C	14629	21 Cashel St	
10857230	13346	W91C	14708	22 Cashel St	
10857231	13346	W91C	13709	2 Greenhill Rd	
10857232	13346	W91C	14029	10 East Av	
10857233	13346	W91C	13824	6 Leader St	

	WeekBeginning	NumberOfBoardings
0	2013-06-30 00:00:00	1
1	2013-06-30 00:00:00	1
2	2013-06-30 00:00:00	1
3	2013-06-30 00:00:00	2
4	2013-06-30 00:00:00	1
…	…	…
10857229	2014-07-06 00:00:00	1
10857230	2014-07-06 00:00:00	3
10857231	2014-07-06 00:00:00	1
10857232	2014-07-06 00:00:00	1
10857233	2014-07-06 00:00:00	1

[10857234 rows x 6 columns]

[10]:
```
data.head(10)
```

[10]:
```
   TripID RouteID  StopID                    StopName        WeekBeginning  \
0   23631     100   14156                181 Cross Rd  2013-06-30 00:00:00
1   23631     100   14144                177 Cross Rd  2013-06-30 00:00:00
2   23632     100   14132                175 Cross Rd  2013-06-30 00:00:00
3   23633     100   12266  Zone A Arndale Interchange  2013-06-30 00:00:00
4   23633     100   14147                178 Cross Rd  2013-06-30 00:00:00
5   23634     100   13907               9A  Marion Rd  2013-06-30 00:00:00
6   23634     100   14132                175 Cross Rd  2013-06-30 00:00:00
7   23634     100   13335            9A  Holbrooks Rd  2013-06-30 00:00:00
8   23634     100   13875                9  Marion Rd  2013-06-30 00:00:00
9   23634     100   13045            206 Holbrooks Rd  2013-06-30 00:00:00

   NumberOfBoardings
0                  1
1                  1
2                  1
3                  2
4                  1
5                  1
6                  1
7                  1
8                  1
9                  1
```

[7]:
```
data.shape
```

[7]:
```
(10857234, 6)
```

[8]:
```
data.columns
```

[8]:
```
Index(['TripID', 'RouteID', 'StopID', 'StopName', 'WeekBeginning',
       'NumberOfBoardings'],
      dtype='object')
```

[9]:
```
data.isnull().sum()
```

[9]:
```
TripID              0
RouteID             0
StopID              0
StopName            0
WeekBeginning       0
NumberOfBoardings   0
dtype: int64
```

[11]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10857234 entries, 0 to 10857233
Data columns (total 6 columns):
 #   Column             Dtype
---  ------             -----
 0   TripID             int64
 1   RouteID            object
 2   StopID             int64
 3   StopName           object
 4   WeekBeginning      object
 5   NumberOfBoardings  int64
dtypes: int64(3), object(3)
memory usage: 497.0+ MB
```

[16]:
```
df=data
```

[19]:
```
a=df.TripID.value_counts()
a
```

[19]:
```
57020    2819
57018    2741
27478    2733
57041    2718
57029    2691
         …
59297       1
3061        1
3414        1
3415        1
61163       1
Name: TripID, Length: 39282, dtype: int64
```

[20]:
```
b=df.RouteID.value_counts()
b
```

[20]:
```
G10     358005
B10     332694
M44     331442
H30     326004
300     228373
         …
FX1          1
FX10         1
FX8          1
FX3          1
FX2          1
Name: RouteID, Length: 619, dtype: int64
```

[21]:
```
c=df.StopID.value_counts()
c
```

[21]:
```
13354    44089
13277    43339
13364    43265
13330    36992
13279    33800
         …
17107        1
15420        1
15243        1
17805        1
17807        1
Name: StopID, Length: 7397, dtype: int64
```

[22]:
```
d=df.WeekBeginning.value_counts()
d
```

[22]:
```
2014-03-02 00:00:00    217162
2014-05-18 00:00:00    215932
2014-05-11 00:00:00    214947
2014-06-01 00:00:00    213789
2014-05-04 00:00:00    212681
2014-03-23 00:00:00    212552
2014-03-16 00:00:00    212188
2014-02-23 00:00:00    212103
2013-09-08 00:00:00    211914
2014-04-27 00:00:00    211782
2014-05-25 00:00:00    211534
2014-03-30 00:00:00    211460
2013-09-01 00:00:00    210968
2014-04-06 00:00:00    210557
2013-08-25 00:00:00    209497
2013-11-17 00:00:00    209341
2013-11-24 00:00:00    208881
2013-10-20 00:00:00    208655
2013-12-01 00:00:00    208470
2014-06-15 00:00:00    208457
2014-06-08 00:00:00    208417
2013-09-15 00:00:00    208241
2014-02-16 00:00:00    208178
2013-10-27 00:00:00    207971
2013-09-22 00:00:00    207769
2013-12-08 00:00:00    207353
2013-10-13 00:00:00    207351
2013-08-04 00:00:00    207082
```

```
2013-11-03 00:00:00    206863
2013-11-10 00:00:00    206853
2014-06-29 00:00:00    206138
2013-07-28 00:00:00    205492
2013-08-11 00:00:00    205385
2013-08-18 00:00:00    203852
2013-07-21 00:00:00    201257
2014-06-22 00:00:00    200950
2014-02-09 00:00:00    197978
2014-01-19 00:00:00    196344
2013-10-06 00:00:00    195830
2014-03-09 00:00:00    195200
2013-12-15 00:00:00    194102
2014-02-02 00:00:00    192507
2013-09-29 00:00:00    192023
2013-07-07 00:00:00    190543
2014-04-13 00:00:00    190060
2013-07-14 00:00:00    187192
2014-01-05 00:00:00    186105
2014-04-20 00:00:00    185080
2013-06-30 00:00:00    182229
2014-01-26 00:00:00    180259
2014-01-12 00:00:00    178456
2013-12-29 00:00:00    168771
2013-12-22 00:00:00    163331
2014-07-06 00:00:00    149202
Name: WeekBeginning, dtype: int64
```

[24]:
```
e=df.NumberOfBoardings.value_counts()
e
```

[24]:
```
1      4270812
2      2057245
3      1128820
4       731537
5       502763
        ...
547          1
539          1
443          1
474          1
342          1
Name: NumberOfBoardings, Length: 400, dtype: int64
```

[29]:
```
data['WeekBeginning'] = pd.to_datetime(data['WeekBeginning']).dt.date
data['WeekBeginning'][1]
```

[29]:
```
datetime.date(2013, 6, 30)
```

[38]:
```
grouped = data.groupby(['StopName','WeekBeginning',]).agg({'NumberOfBoardings':
 ↪['sum', 'count','max']})
grouped
```

[38]:

		NumberOfBoardings		
		sum	count	max
StopName	WeekBeginning			
1 Anzac Hwy	2013-06-30	1003	378	51
	2013-07-07	783	360	28
	2013-07-14	843	343	45
	2013-07-21	710	356	28
	2013-07-28	898	379	41
…		…	…	..
Zone I Salisbury Interchange	2014-06-08	822	117	44
	2014-06-15	965	113	39
	2014-06-22	896	111	58
	2014-06-29	1052	113	39
	2014-07-06	534	90	21

[207864 rows x 3 columns]

[40]:
```
st_week_grp = pd.DataFrame(grouped).reset_index()
st_week_grp1 = pd.DataFrame(st_week_grp.groupby('StopName')["WeekBeginning"].
 ↪count()).reset_index()
st_week_grp1.head()
```

[40]:

	StopName	WeekBeginning
0	1 Anzac Hwy	54
1	1 Bartels Rd	54
2	1 Botanic Rd	54
3	1 Frome Rd	54
4	1 Fullarton Rd	54

[49]:
```
stopListName = list(st_week_grp1[st_week_grp1['WeekBeginning'] ==
 ↪54]['StopName'])
stopListName[1:30]
```

[49]:
```
['1 Bartels Rd',
 '1 Botanic Rd',
 '1 Frome Rd',
 '1 Fullarton Rd',
 '1 George St',
 '1 Glen Osmond Rd',
 '1 Goodwood Rd',
 '1 Henley Beach Rd',
```

```
 '1 Kensington Rd',
 '1 King William Rd',
 '1 Port Rd',
 '1 Sir Donald Bradman Dr',
 '1 Sir Edwin Smith Av',
 '1 Unley Rd',
 '10  Holbrooks Rd',
 '10  Marion Rd',
 '10  Portrush Rd',
 '10 Airport Rd',
 '10 Anzac Hwy',
 '10 Ashley St',
 '10 Belair Rd',
 '10 Churchill Rd',
 '10 East Av',
 '10 Fullarton Rd',
 '10 Garden Tce',
 '10 Glen Osmond Rd',
 '10 Goodwood Rd',
 '10 Greenhill Rd',
 '10 Harrow Tce']
```

[59]:
```
stopageName_with_boarding = data.groupby(['StopName']).agg({'NumberOfBoardings':
 ↪ ['sum']}).reset_index()
```

[60]:
```
stopageName_with_boarding.columns = ["stopName","Total_No_of_boardings"]
stopageName_with_boarding.head()
```

[60]:

	stopName	Total_No_of_boardings
0	1 Anzac Hwy	39429
1	1 Bartels Rd	8412
2	1 Botanic Rd	14868
3	1 Frome Rd	67458
4	1 Fullarton Rd	585

[63]:
```
stopageName_with_boarding = stopageName_with_boarding.
 ↪sort_values("Total_No_of_boardings", ascending = False)
#stopage with most no of boarding
stopageName_with_boarding.head(10)
```

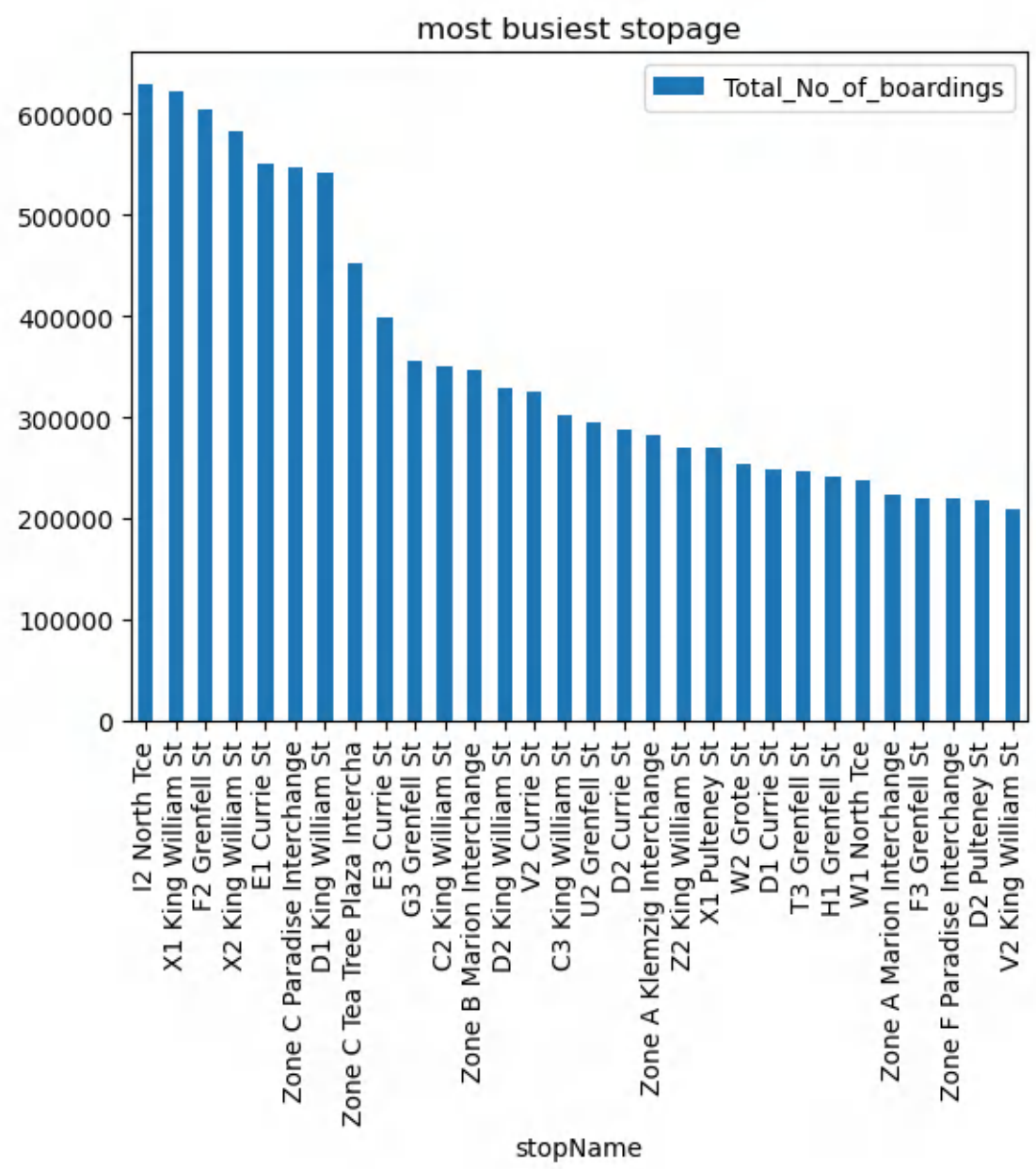
[63]:

	stopName	Total_No_of_boardings
3841	I2 North Tce	628859
4023	X1 King William St	622099
3807	F2 Grenfell St	604149
4029	X2 King William St	583227
3791	E1 Currie St	550396
4120	Zone C Paradise Interchange	547709

```
3784                D1 King William St                541046
4124  Zone C Tea Tree Plaza Intercha                451960
3796                     E3 Currie St                399351
3819                   G3 Grenfell St                356518
```

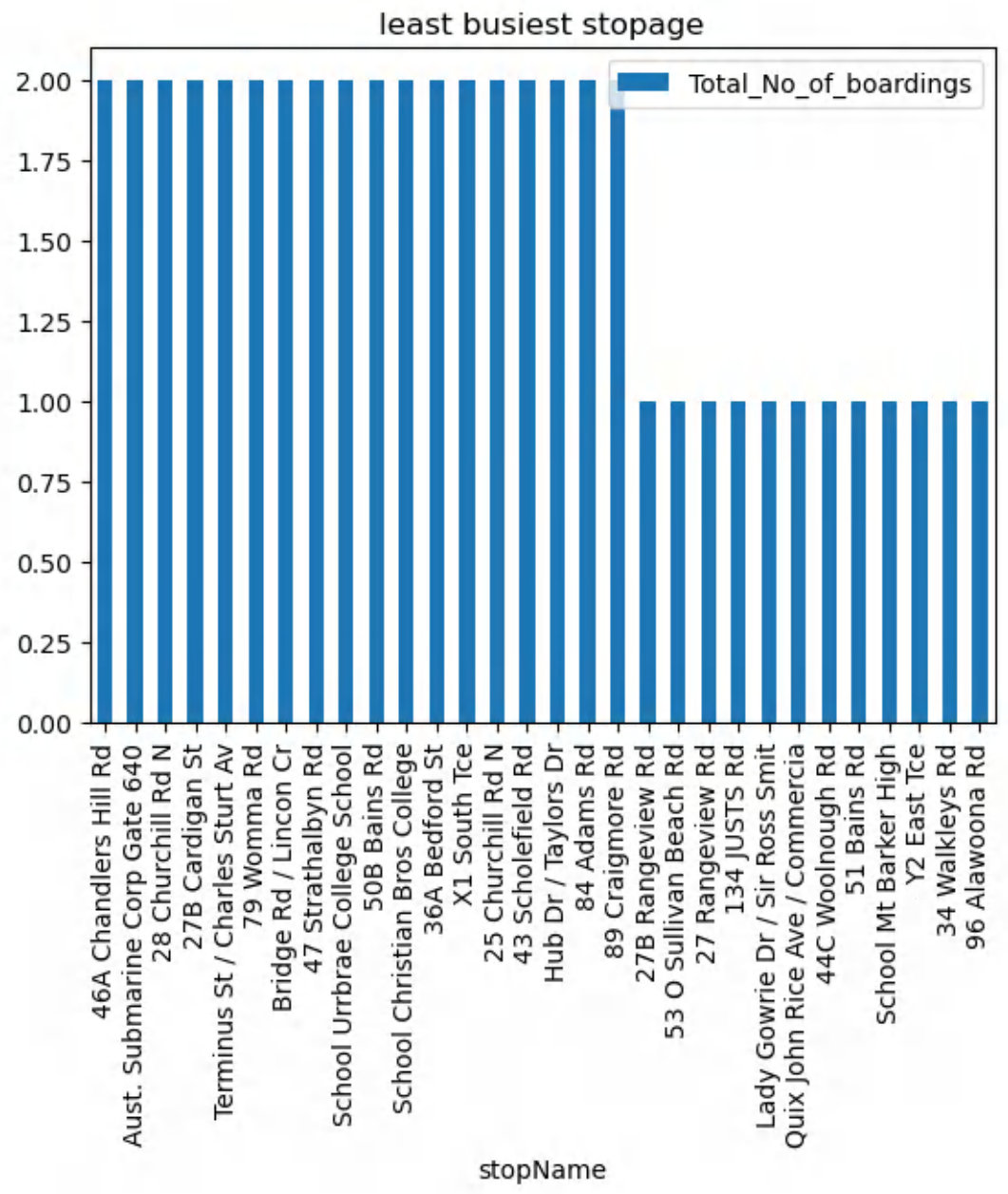
[76]:
```
busiestStop = stopageName_with_boarding.head(30).plot.bar(x="stopName",
  ↪y="Total_No_of_boardings", rot=90)
plt.title("most busiest stopage")
plt.legend()
```

[76]: <matplotlib.legend.Legend at 0x20d92efd310>



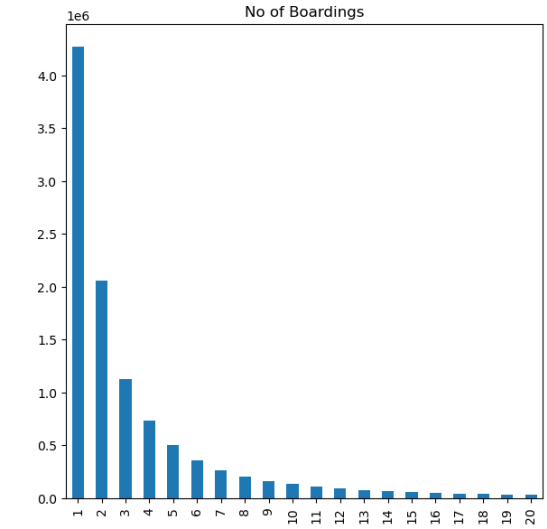
[75]:
```
leastBusiestStop = stopageName_with_boarding.tail(30).plot.bar(x='stopName',␣
↪y='Total_No_of_boardings', rot=90)
plt.title("least busiest stopage")
plt.legend()
```

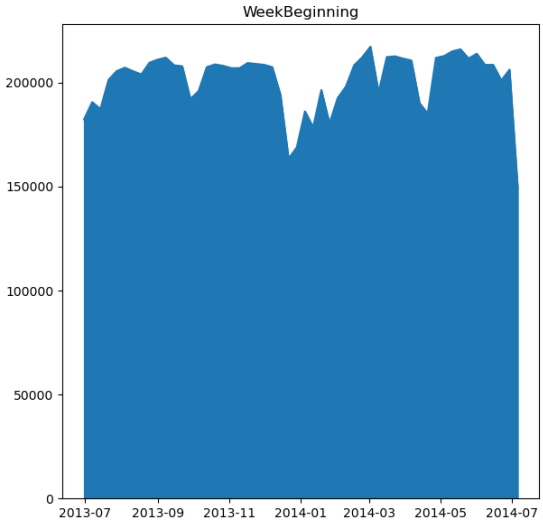
[75]: <matplotlib.legend.Legend at 0x20d92c74850>

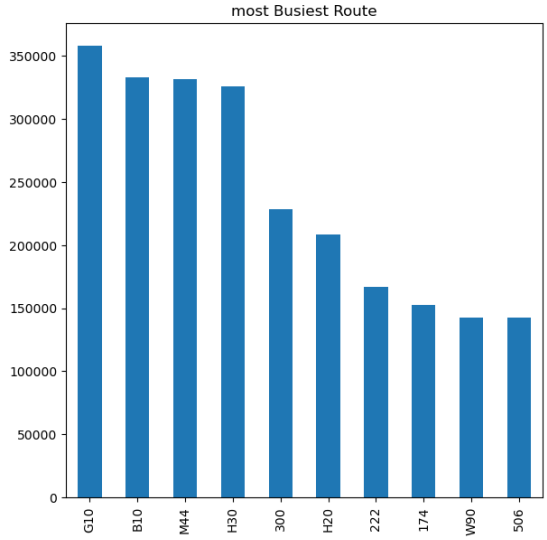


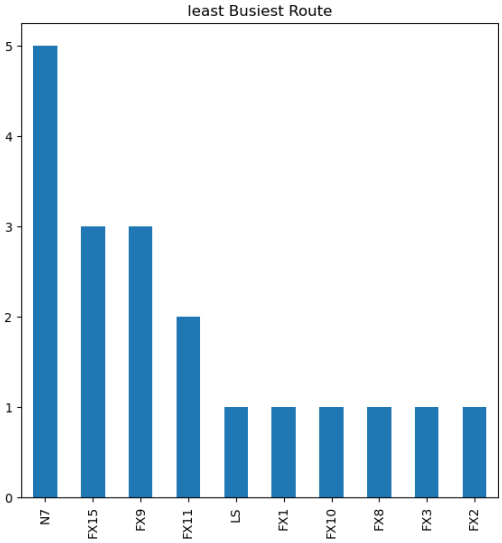
[30]:
```
import matplotlib.pyplot as plt
fig,axrr=plt.subplots(2,2,figsize=(15,15))

ax=axrr[0][0]
ax.set_title("No of Boardings")
data['NumberOfBoardings'].value_counts().sort_index().head(20).plot.
 ↪bar(ax=axrr[0][0])

ax=axrr[0][1]
ax.set_title("WeekBeginning")
data['WeekBeginning'].value_counts().plot.area(ax=axrr[0][1])

ax=axrr[1][0]
ax.set_title("most Busiest Route")
data['RouteID'].value_counts().head(10).plot.bar(ax=axrr[1][0])

ax=axrr[1][1]
ax.set_title("least Busiest Route")
data['RouteID'].value_counts().tail(10).plot.bar(ax=axrr[1][1])
```

[30]:
```
<Axes: title={'center': 'least Busiest Route'}>
```


No of Boardings
1e6
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20


WeekBeginning
200000
150000
100000
50000
0
2013-07
2013-09
2013-11
2014-01
2014-03
2014-05
2014-07


most Busiest Route
350000
300000
250000
200000
150000
100000
50000
0
G10
B10
M44
H30
300
H20
222
174
W90
506


least Busiest Route
5
4
3
2
1
0
N7
FX15
FX9
FX11
LS
FX1
FX10
FX8
FX3
FX2

[ ]: