Importing Python Libraries

```
In [1]:  import numpy as np
         import pandas as pd
         import matplotlib.pyplot as plt
         import seaborn as sns
```

Importing Dataset ¶

```
In [2]:  domestic=pd.read_csv('domestic_visitors_2016.csv')
```

```
In [3]:  dom_17=pd.read_csv('domestic_visitors_2017.csv')
```

```
In [4]:  dom_18=pd.read_csv('domestic_visitors_2018.csv')
```

```
In [5]:  dom_19=pd.read_csv('domestic_visitors_2019.csv')
```

```
In [6]:  foreign=pd.read_csv('foreign_visitors_2016.csv')
```

```
In [7]:  fore_17=pd.read_csv('foreign_visitors_2017.csv')
```

```
In [8]:  fore_18=pd.read_csv('foreign_visitors_2018.csv')
```

```
In [9]:  fore_19=pd.read_csv('foreign_visitors_2019.csv')
```

Data Merging (Domestic)

```
In [10]:  domestic.shape
```

```
Out[10]:  (372, 5)
```

```
In [11]:  domestic=pd.concat([domestic,dom_17,dom_18,dom_19],ignore_index=True)
```

```
In [12]:  domestic.shape
```

```
Out[12]:  (1512, 5)
```

In [13]: `domestic`

Out[13]:

	district	date	month	year	visitors
0	Adilabad	01-01-2016	January	2016	792136
1	Adilabad	01-02-2016	February	2016	937820
2	Adilabad	01-03-2016	March	2016	582946
3	Adilabad	01-04-2016	April	2016	341948
4	Adilabad	01-05-2016	May	2016	252887
...	...	...	...	...	...
1507	Yadadri Bhongir	01-08-2019	August	2019	389010
1508	Yadadri Bhongir	01-09-2019	September	2019	366862
1509	Yadadri Bhongir	01-10-2019	October	2019	381860
1510	Yadadri Bhongir	01-11-2019	November	2019	365990
1511	Yadadri Bhongir	01-12-2019	December	2019	477635

1512 rows × 5 columns

In [14]: `domestic.to_csv("domestic_visitors_16-19.csv")`

Data Merging (Foreign)

In [15]: `foreign.shape`

Out[15]: `(372, 5)`

In [16]: `foreign=pd.concat([foreign,fore_17,fore_18,fore_19],ignore_index=True)`

In [17]: `foreign.shape`

Out[17]: `(1512, 5)`

In [18]:
```
foreign
```

Out[18]:

	district	date	month	year	visitors
0	Adilabad	01-01-2016	January	2016	2
1	Adilabad	01-02-2016	February	2016	0
2	Adilabad	01-03-2016	March	2016	2
3	Adilabad	01-04-2016	April	2016	0
4	Adilabad	01-05-2016	May	2016	0
...	...	...	...	...	...
1507	Yadadri Bhongir	01-08-2019	August	2019	0
1508	Yadadri Bhongir	01-09-2019	September	2019	0
1509	Yadadri Bhongir	01-10-2019	October	2019	0
1510	Yadadri Bhongir	01-11-2019	November	2019	0
1511	Yadadri Bhongir	01-12-2019	December	2019	0

1512 rows × 5 columns

In [19]:
```
foreign.to_csv("foreign_visitors_16-19.csv")
```

Data Cleaning (Domestic)

In [20]:
```
domestic.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1512 entries, 0 to 1511
Data columns (total 5 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   district  1512 non-null   object
 1   date      1512 non-null   object
 2   month     1512 non-null   object
 3   year      1512 non-null   int64
 4   visitors  1482 non-null   object
dtypes: int64(1), object(4)
memory usage: 59.2+ KB
```

In [21]:
```
domestic.isnull().sum()
```

Out[21]:
```
district     0
date         0
month        0
year         0
visitors    30
dtype: int64
```

In [22]:
```
domestic.replace([" ",np.nan], 0, inplace=True)
```

In [23]:
```python
domestic["visitors"] = domestic["visitors"].astype("int64")
```

In [24]:
```python
domestic.duplicated().sum()
```

Out[24]: 0

In [25]:
```python
domestic.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1512 entries, 0 to 1511
Data columns (total 5 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   district  1512 non-null   object
 1   date      1512 non-null   object
 2   month     1512 non-null   object
 3   year      1512 non-null   int64
 4   visitors  1512 non-null   int64
dtypes: int64(2), object(3)
memory usage: 59.2+ KB
```

In [26]:
```python
domestic.shape
```

Out[26]: (1512, 5)

Data Cleaning (Foreign)

In [27]:
```python
foreign.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1512 entries, 0 to 1511
Data columns (total 5 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   district  1512 non-null   object
 1   date      1512 non-null   object
 2   month     1512 non-null   object
 3   year      1512 non-null   int64
 4   visitors  1512 non-null   object
dtypes: int64(1), object(4)
memory usage: 59.2+ KB
```

In [28]:
```python
foreign["visitors"] = foreign["visitors"].replace(" ",0)
```

In [29]:
```python
foreign["visitors"] = foreign["visitors"].astype("int64")
```

In [30]:
```python
foreign.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1512 entries, 0 to 1511
Data columns (total 5 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   district  1512 non-null   object
 1   date      1512 non-null   object
 2   month     1512 non-null   object
 3   year      1512 non-null   int64
 4   visitors  1512 non-null   int64
dtypes: int64(2), object(3)
memory usage: 59.2+ KB
```


In [31]:
```python
df = pd.DataFrame({"foreign":foreign.groupby("district")["visitors"].sum()}
```

In [32]: df

Out[32]:

district	foreign
Adilabad	32
Bhadradri Kothagudem	0
Hyderabad	1044898
Jagtial	0
Jangaon	2
Jayashankar Bhoopalpally	1252
Jogulamba Gadwal	945
Kamareddy	0
Karimnagar	0
Khammam	0
Komaram Bheem Asifabad	0
Mahabubabad	0
Mahbubnagar	2282
Mancherial	10
Medak	0
Medchal	0
Mulugu	575
Nagarkurnool	761
Nalgonda	0
Narayanpet	5
Nirmal	2
Nizamabad	5
Peddapalli	0
Rajanna Sircilla	0
Ranga Reddy	0
Sangareddy	0
Siddipet	0
Suryapet	0
Vikarabad	0
Wanaparthy	0
Warangal (Rural)	306
Warangal (Urban)	8821
Yadadri Bhongir	0

In [33]:
```python
df["domestic"]=domestic.groupby("district")["visitors"].sum()
```

In [34]:
```python
df
```

Out[34]:

district	foreign	domestic
Adilabad	32	7321575.0
Bhadradri Kothagudem	0	21600962.0
Hyderabad	1044898	83900960.0
Jagtial	0	11303514.0
Jangaon	2	826280.0
Jayashankar Bhoopalpally	1252	19632865.0
Jogulamba Gadwal	945	6813340.0
Kamareddy	0	1773.0
Karimnagar	0	9462383.0
Khammam	0	9378315.0
Komaram Bheem Asifabad	0	92734.0
Mahabubabad	0	600697.0
Mahbubnagar	2282	17180118.0
Mancherial	10	867242.0
Medak	0	20542639.0
Medchal	0	0.0
Mulugu	575	1819800.0
Nagarkurnool	761	7424355.0
Nalgonda	0	6401933.0
Narayanpet	5	NaN
Nirmal	2	13315796.0
Nizamabad	5	116147.0
Peddapalli	0	56977.0
Rajanna Sircilla	0	41763276.0
Ranga Reddy	0	0.0
Sangareddy	0	10424510.0
Siddipet	0	5775285.0
Suryapet	0	0.0
Vikarabad	0	0.0
Wanaparthy	0	890078.0
Warangal (Rural)	306	819162.0
Warangal (Urban)	8821	30726603.0
Yadadri Bhongir	0	26893080.0

```
In [35]:  df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 33 entries, Adilabad to Yadadri Bhongir
Data columns (total 2 columns):
 #   Column    Non-Null Count   Dtype
---  ------    --------------   -----
 0   foreign   33 non-null      int64
 1   domestic  32 non-null      float64
dtypes: float64(1), int64(1)
memory usage: 792.0+ bytes
```

```
In [36]:  df.isnull().sum()
```

```
Out[36]:  foreign     0
          domestic    1
          dtype: int64
```

```
In [37]:  df["domestic"] = df["domestic"].replace(np.nan, 0)
```

```
In [38]:  df["domestic"] = df["domestic"].astype("int64")
```

```
In [39]:  df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 33 entries, Adilabad to Yadadri Bhongir
Data columns (total 2 columns):
 #   Column    Non-Null Count   Dtype
---  ------    --------------   -----
 0   foreign   33 non-null      int64
 1   domestic  33 non-null      int64
dtypes: int64(2)
memory usage: 792.0+ bytes
```

```
In [40]:  domestic.to_csv("domestic_visitors.csv")
```

```
In [41]:  foreign.to_csv("foreign_visitors.csv")
```

```
In [42]:  domestic.shape
```

```
Out[42]:  (1512, 5)
```

In [43]: df

Out[43]:

district	foreign	domestic
Adilabad	32	7321575
Bhadradri Kothagudem	0	21600962
Hyderabad	1044898	83900960
Jagtial	0	11303514
Jangaon	2	826280
Jayashankar Bhoopalpally	1252	19632865
Jogulamba Gadwal	945	6813340
Kamareddy	0	1773
Karimnagar	0	9462383
Khammam	0	9378315
Komaram Bheem Asifabad	0	92734
Mahabubabad	0	600697
Mahbubnagar	2282	17180118
Mancherial	10	867242
Medak	0	20542639
Medchal	0	0
Mulugu	575	1819800
Nagarkurnool	761	7424355
Nalgonda	0	6401933
Narayanpet	5	0
Nirmal	2	13315796
Nizamabad	5	116147
Peddapalli	0	56977
Rajanna Sircilla	0	41763276
Ranga Reddy	0	0
Sangareddy	0	10424510
Siddipet	0	5775285
Suryapet	0	0
Vikarabad	0	0
Wanaparthy	0	890078
Warangal (Rural)	306	819162
Warangal (Urban)	8821	30726603
Yadadri Bhongir	0	26893080

Primary Research Questions

Q1.List down the top 10 districts that have the highest number of domestic visitors overall (2016-2019)?

```
In [44]: df['domestic'].sort_values(ascending=False).head(10)
```

```
Out[44]: district
         Hyderabad                    83900960
         Rajanna Sircilla             41763276
         Warangal (Urban)             30726603
         Yadadri Bhongir              26893080
         Bhadradri Kothagudem         21600962
         Medak                        20542639
         Jayashankar Bhoopalpally     19632865
         Mahbubnagar                  17180118
         Nirmal                       13315796
         Jagtial                      11303514
         Name: domestic, dtype: int64
```

Overall top 10 districts

```
In [45]: domestic.shape
```

```
Out[45]: (1512, 5)
```

```
In [46]: foreign.shape
```

```
Out[46]: (1512, 5)
```

```
In [47]: combine=pd.concat([domestic,foreign],ignore_index=True)
```

```
In [48]: combine.shape
```

```
Out[48]: (3024, 5)
```

In [49]: combine

Out[49]:

	district	date	month	year	visitors
0	Adilabad	01-01-2016	January	2016	792136
1	Adilabad	01-02-2016	February	2016	937820
2	Adilabad	01-03-2016	March	2016	582946
3	Adilabad	01-04-2016	April	2016	341948
4	Adilabad	01-05-2016	May	2016	252887
...	...	...	...	...	...
3019	Yadadri Bhongir	01-08-2019	August	2019	0
3020	Yadadri Bhongir	01-09-2019	September	2019	0
3021	Yadadri Bhongir	01-10-2019	October	2019	0
3022	Yadadri Bhongir	01-11-2019	November	2019	0
3023	Yadadri Bhongir	01-12-2019	December	2019	0

3024 rows × 5 columns

In [50]: ```combine.groupby('district')['visitors'].sum().sort_values(ascending=False).```

Out[50]:
```
district
Hyderabad                    84945858
Rajanna Sircilla             41763276
Warangal (Urban)             30735424
Yadadri Bhongir              26893080
Bhadradri Kothagudem         21600962
Medak                        20542639
Jayashankar Bhoopalpally     19634117
Mahbubnagar                  17182400
Nirmal                       13315798
Jagtial                      11303514
Name: visitors, dtype: int64
```
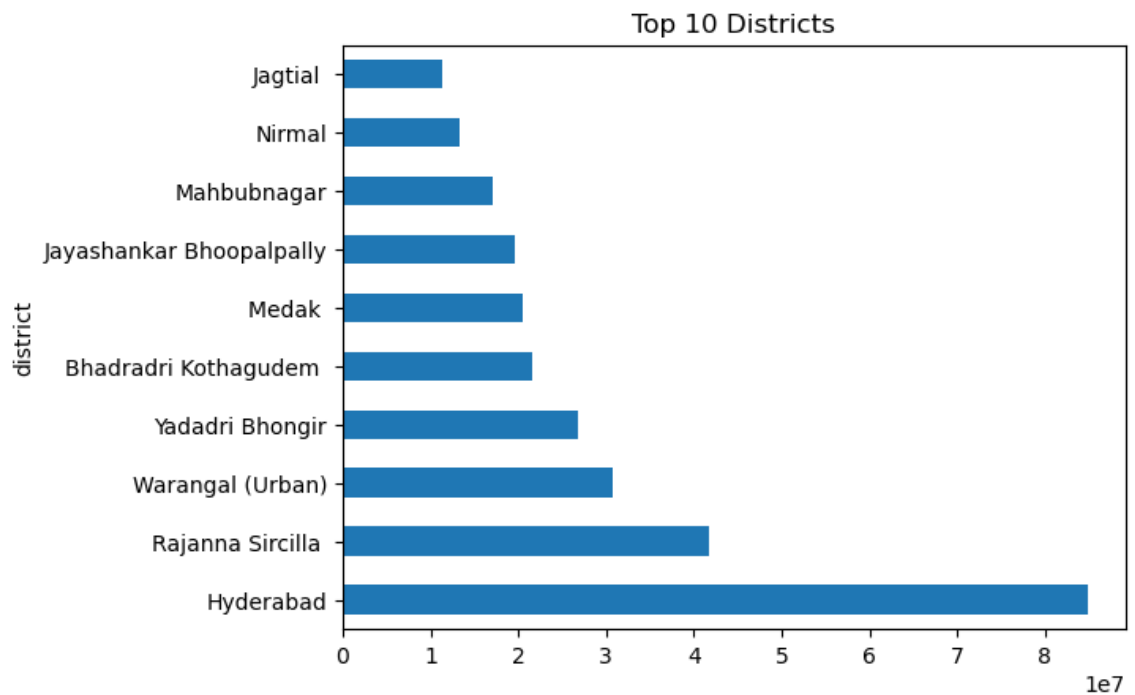
In [51]: `combine.groupby('district')['visitors'].sum().sort_values(ascending=False).`

Out[51]: `<AxesSubplot:title={'center':'Top 10 Districts'}, ylabel='district'>`

Top 10 Districts

In [52]:
```python
# Group by district and sum visitors, then sort in descending order and tak
top_10_districts = combine.groupby('district')['visitors'].sum().sort_value

# Create a horizontal bar plot
plt.figure(figsize=(10, 6))
colors = plt.cm.Paired(range(len(top_10_districts)))  # Use a colormap for

top_10_districts.plot(kind='barh', color=colors)

# Add Labels and title
plt.xlabel('Total Visitors')
plt.ylabel('District')
plt.title('Top 10 Districts by Total Visitors')

# Add data labels on the bars
for i, value in enumerate(top_10_districts):
    plt.text(value, i, f'{value:,}', va='center', fontsize=12, color='black

# Invert the y-axis for better readability (top district at the top)
plt.gca().invert_yaxis()

# Remove the top and right spines
plt.gca().spines['top'].set_visible(False)
plt.gca().spines['right'].set_visible(False)

# Show the plot
plt.show()
```
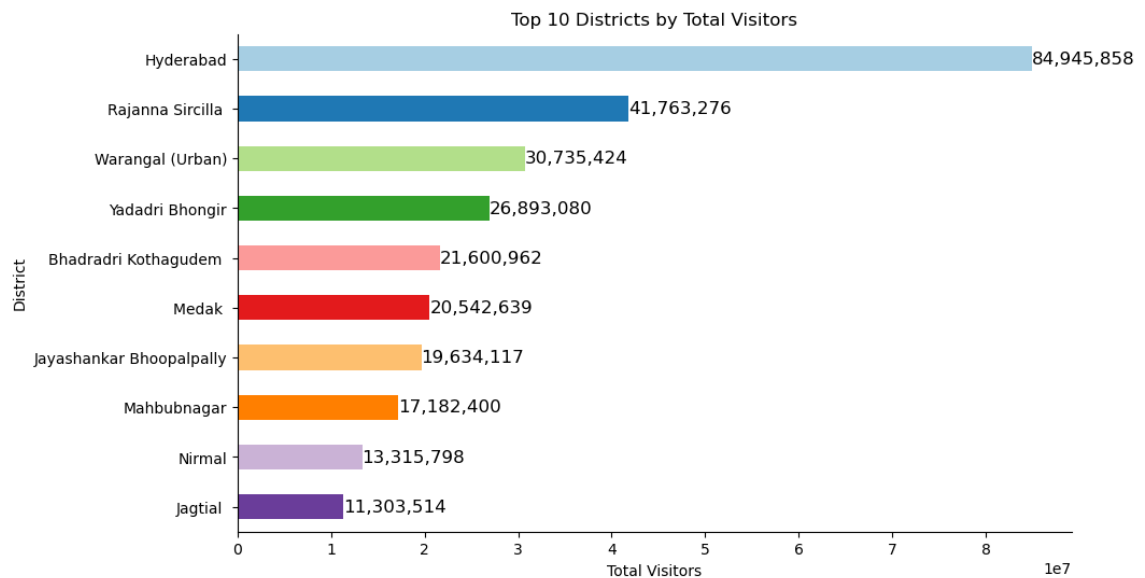

Top 10 Districts by Total Visitors

In [53]:
```python
combine.to_csv("combined.csv")
```

Overall bottom 10 district

In [54]:
```
combine.groupby('district')['visitors'].sum().sort_values(ascending=True).h
```

Out[54]:
```
district
Ranga Reddy                        0
Vikarabad                          0
Suryapet                           0
Medchal                            0
Narayanpet                         5
Kamareddy                       1773
Peddapalli                     56977
Komaram Bheem Asifabad         92734
Nizamabad                     116152
Narayanapet                   389250
Name: visitors, dtype: int64
```
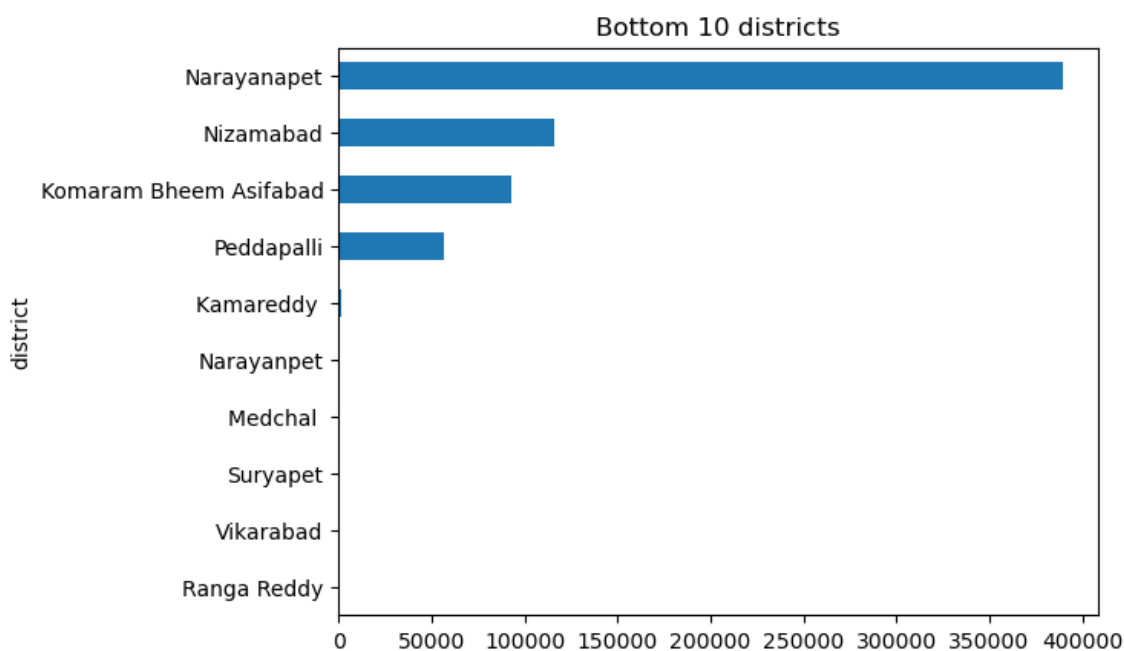
In [55]:
```
combine.groupby('district')['visitors'].sum().sort_values(ascending=True).h
```

Out[55]: `<AxesSubplot:title={'center':'Bottom 10 districts'}, ylabel='district'>`

In [56]:
```python
# Group by district and sum visitors, then sort in descending order and tak
bottom_10_districts = combine.groupby('district')['visitors'].sum().sort_va

# Create a horizontal bar plot
plt.figure(figsize=(10, 6))
colors = plt.cm.Paired(range(len(bottom_10_districts)))  # Use a colormap f

bottom_10_districts.plot(kind='barh', color=colors)

# Add Labels and title
plt.xlabel('Total Visitors')
plt.ylabel('District')
plt.title('Bottom 10 Districts by Total Visitors')

# Add data labels on the bars
for i, value in enumerate(bottom_10_districts):
    plt.text(value, i, f'{value:,}', va='center', fontsize=12, color='black

# Invert the y-axis for better readability (top district at the top)
plt.gca().invert_yaxis()

# Remove the top and right spines
plt.gca().spines['top'].set_visible(False)
plt.gca().spines['right'].set_visible(False)

# Show the plot
plt.show()
```
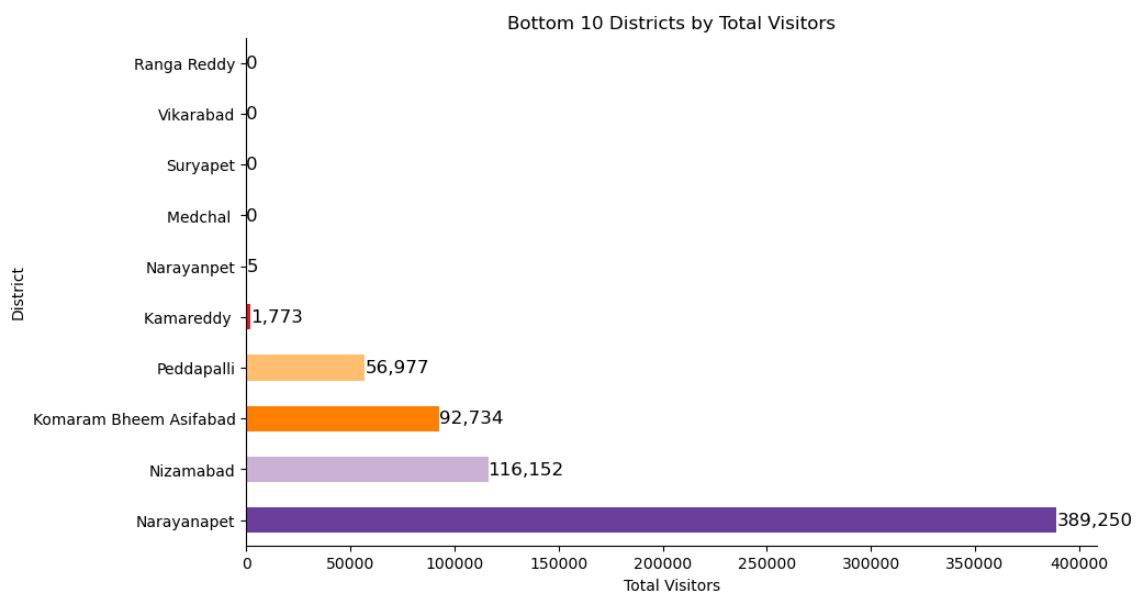

Bottom 10 Districts by Total Visitors

Q2.List down the top 3 districts based on compounded annual growth rate (CAGR) of visitors ?

Q3.List down the Bottom 3 districts based on compounded annual growth rate (CAGR) of visitors ?

Formula

$$CAGR = \left(\frac{V_{final}}{V_{begin}} \right)^{1/t} - 1$$

$CAGR$ = compound annual growth rate

V_{begin} = beginning value

V_{final} = final value

t = time in years

```
In [57]: pd.set_option("display.max_rows", None)
```

```
In [58]: domestic.groupby(['year','district'])['visitors'].sum()
```

```
Out[58]: year   district
         2016   Adilabad                    5075557
                Bhadradri Kothagudem         889030
                Hyderabad                  23394705
                Jagtial                      623077
                Jangaon                       40660
                Jayashankar Bhoopalpally     243400
                Jogulamba Gadwal             523401
                Kamareddy                       127
                Karimnagar                  9167468
                Khammam                     5005031
                Komaram Bheem Asifabad            0
                Mahabubabad                  140002
                Mahbubnagar                 8304766
                Mancherial                     7802
                Medak                       3463200
                Medchal                           0
                Nagarkurnool                 588473
                Nalgonda                    5858461
```

```
In [59]: districts=domestic['district'].unique()
```

In [60]: districts

Out[60]: array(['Adilabad', 'Bhadradri Kothagudem ', 'Hyderabad', 'Jagtial ',
        'Jangaon ', 'Jayashankar Bhoopalpally', 'Jogulamba Gadwal ',
        'Kamareddy ', 'Karimnagar ', 'Khammam', 'Komaram Bheem Asifabad',
        'Mahabubabad ', 'Mahbubnagar', 'Mancherial', 'Medak ', 'Medchal ',
        'Nagarkurnool ', 'Nalgonda', 'Nirmal', 'Nizamabad', 'Peddapalli',
        'Rajanna Sircilla ', 'Ranga Reddy', 'Sangareddy ', 'Siddipet',
        'Suryapet', 'Vikarabad', 'Wanaparthy ', 'Warangal (Rural)',
        'Warangal (Urban)', 'Yadadri Bhongir', 'Mulugu', 'Narayanapet'],
       dtype=object)

In [61]: dom=pd.DataFrame({'district':districts})

In [62]: dom

Out[62]:

	district
0	Adilabad
1	Bhadradri Kothagudem
2	Hyderabad
3	Jagtial
4	Jangaon
5	Jayashankar Bhoopalpally
6	Jogulamba Gadwal
7	Kamareddy
8	Karimnagar
9	Khammam
10	Komaram Bheem Asifabad
11	Mahabubabad
12	Mahbubnagar
13	Mancherial
14	Medak
15	Medchal
16	Nagarkurnool
17	Nalgonda
18	Nirmal
19	Nizamabad
20	Peddapalli
21	Rajanna Sircilla
22	Ranga Reddy
23	Sangareddy
24	Siddipet
25	Suryapet
26	Vikarabad
27	Wanaparthy
28	Warangal (Rural)
29	Warangal (Urban)
30	Yadadri Bhongir
31	Mulugu
32	Narayanapet

In [63]:
```python
dom_2016=[]
for i in districts:
    domestic_2016 = domestic[domestic["year"]==2016]
    domo = domestic_2016[domestic_2016["district"]==i]['visitors'].sum()
    dom_2016.append(domo)
dom["2016"]=dom_2016
```

In [64]: dom

Out[64]:

	district	2016
0	Adilabad	5075557
1	Bhadradri Kothagudem	889030
2	Hyderabad	23394705
3	Jagtial	623077
4	Jangaon	40660
5	Jayashankar Bhoopalpally	243400
6	Jogulamba Gadwal	523401
7	Kamareddy	127
8	Karimnagar	9167468
9	Khammam	5005031
10	Komaram Bheem Asifabad	0
11	Mahabubabad	140002
12	Mahbubnagar	8304766
13	Mancherial	7802
14	Medak	3463200
15	Medchal	0
16	Nagarkurnool	588473
17	Nalgonda	5858461
18	Nirmal	916610
19	Nizamabad	6442
20	Peddapalli	3244
21	Rajanna Sircilla	2176801
22	Ranga Reddy	0
23	Sangareddy	778000
24	Siddipet	358400
25	Suryapet	0
26	Vikarabad	0
27	Wanaparthy	60138
28	Warangal (Rural)	19400
29	Warangal (Urban)	25788035
30	Yadadri Bhongir	1728600
31	Mulugu	0
32	Narayanapet	0

In [65]:
```python
dom_2019=[]
for i in districts:
    domestic_2019 = domestic[domestic["year"]==2019]
    domo = domestic_2019[domestic_2019["district"]==i]['visitors'].sum()
    dom_2019.append(domo)
dom["2019"]=dom_2019
```

In [66]: dom

Out[66]:

	district	2016	2019
0	Adilabad	5075557	775895
1	Bhadradri Kothagudem	889030	12817737
2	Hyderabad	23394705	13802362
3	Jagtial	623077	3086115
4	Jangaon	40660	328890
5	Jayashankar Bhoopalpally	243400	662530
6	Jogulamba Gadwal	523401	2007995
7	Kamareddy	127	534
8	Karimnagar	9167468	77491
9	Khammam	5005031	1413440
10	Komaram Bheem Asifabad	0	19189
11	Mahabubabad	140002	152885
12	Mahbubnagar	8304766	2534815
13	Mancherial	7802	269810
14	Medak	3463200	5452570
15	Medchal	0	0
16	Nagarkurnool	588473	2093312
17	Nalgonda	5858461	140918
18	Nirmal	916610	3816778
19	Nizamabad	6442	46333
20	Peddapalli	3244	16581
21	Rajanna Sircilla	2176801	16832897
22	Ranga Reddy	0	0
23	Sangareddy	778000	4553160
24	Siddipet	358400	2987864
25	Suryapet	0	0
26	Vikarabad	0	0
27	Wanaparthy	60138	298639
28	Warangal (Rural)	19400	353500
29	Warangal (Urban)	25788035	1795230
30	Yadadri Bhongir	1728600	4489374
31	Mulugu	0	1819800
32	Narayanapet	0	389250

In [67]:
```python
CAGR=[]
for i in range(len(districts)):
    vfinal = dom.loc[i,"2019"]
    vbegin = dom.loc[i,"2016"]
    cagr = (((vfinal/vbegin)**(1/3))-1)
    CAGR.append(cagr)
```

```
C:\Users\vishw\AppData\Local\Temp\ipykernel_11340\2400274060.py:5: Runtime
Warning: divide by zero encountered in longlong_scalars
  cagr = (((vfinal/vbegin)**(1/3))-1)
C:\Users\vishw\AppData\Local\Temp\ipykernel_11340\2400274060.py:5: Runtime
Warning: invalid value encountered in longlong_scalars
  cagr = (((vfinal/vbegin)**(1/3))-1)
```

In [68]:
```python
dom["CAGR"]=CAGR
```

In [69]:
```python
dom = dom.replace([np.inf,np.nan],0)
```

In [70]: dom

Out[70]:

	district	2016	2019	CAGR
0	Adilabad	5075557	775895	-0.465305
1	Bhadradri Kothagudem	889030	12817737	1.433875
2	Hyderabad	23394705	13802362	-0.161290
3	Jagtial	623077	3086115	0.704604
4	Jangaon	40660	328890	1.007372
5	Jayashankar Bhoopalpally	243400	662530	0.396245
6	Jogulamba Gadwal	523401	2007995	0.565463
7	Kamareddy	127	534	0.614033
8	Karimnagar	9167468	77491	-0.796296
9	Khammam	5005031	1413440	-0.343920
10	Komaram Bheem Asifabad	0	19189	0.000000
11	Mahabubabad	140002	152885	0.029778
12	Mahbubnagar	8304766	2534815	-0.326704
13	Mancherial	7802	269810	2.257997
14	Medak	3463200	5452570	0.163343
15	Medchal	0	0	0.000000
16	Nagarkurnool	588473	2093312	0.526520
17	Nalgonda	5858461	140918	-0.711335
18	Nirmal	916610	3816778	0.608808
19	Nizamabad	6442	46333	0.930293
20	Peddapalli	3244	16581	0.722569
21	Rajanna Sircilla	2176801	16832897	0.977486
22	Ranga Reddy	0	0	0.000000
23	Sangareddy	778000	4553160	0.802095
24	Siddipet	358400	2987864	1.027672
25	Suryapet	0	0	0.000000
26	Vikarabad	0	0	0.000000
27	Wanaparthy	60138	298639	0.706079
28	Warangal (Rural)	19400	353500	1.631455
29	Warangal (Urban)	25788035	1795230	-0.588629
30	Yadadri Bhongir	1728600	4489374	0.374560
31	Mulugu	0	1819800	0.000000
32	Narayanapet	0	389250	0.000000

Domestic Top 3 CAGR Districts

In [71]:
```
dom_max = dom.sort_values(by="CAGR", ascending=False).head(3)
dom_max
```

Out[71]:

	district	2016	2019	CAGR
13	Mancherial	7802	269810	2.257997
28	Warangal (Rural)	19400	353500	1.631455
1	Bhadradri Kothagudem	889030	12817737	1.433875

In [72]:
```
dom_max = dom_max.reset_index()
dom_max
```

Out[72]:

	index	district	2016	2019	CAGR
0	13	Mancherial	7802	269810	2.257997
1	28	Warangal (Rural)	19400	353500	1.631455
2	1	Bhadradri Kothagudem	889030	12817737	1.433875

In [73]:
```
dom_max.drop("index", axis=1,inplace=True)
dom_max
```

Out[73]:

	district	2016	2019	CAGR
0	Mancherial	7802	269810	2.257997
1	Warangal (Rural)	19400	353500	1.631455
2	Bhadradri Kothagudem	889030	12817737	1.433875

In [74]:
```python
dom_max.plot("district", "CAGR", kind="bar")
```

Out[74]: <AxesSubplot:xlabel='district'>
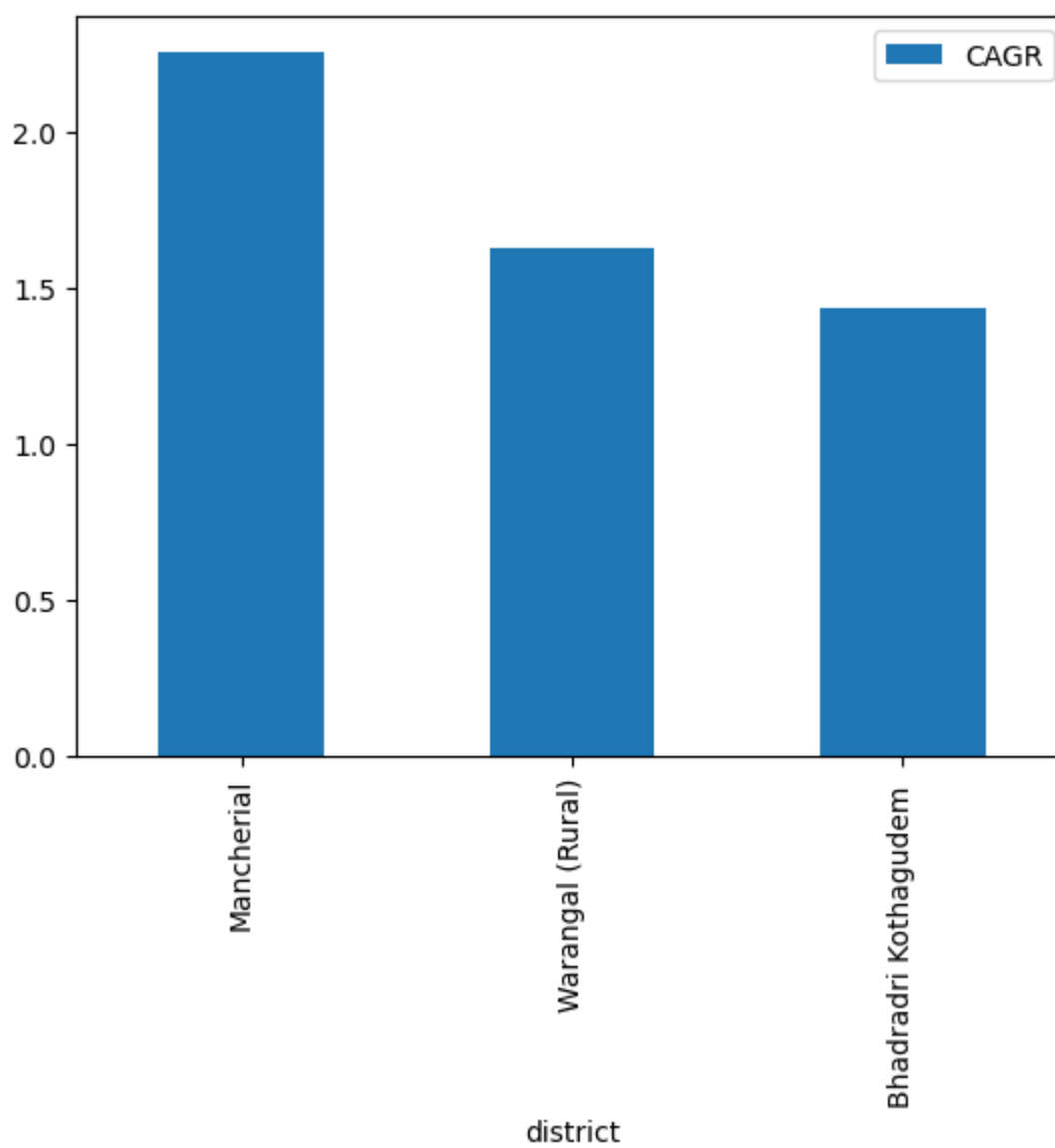
In [75]:
```python
# Sort the DataFrame by CAGR in descending order
dom_max_sorted = dom_max.sort_values(by="CAGR", ascending=False)

# Create a figure and axis
fig, ax = plt.subplots(figsize=(10, 6))

# Create a bar plot
bars = ax.bar(dom_max_sorted["district"], dom_max_sorted["CAGR"], color='sk

# Add data labels on the bars
for bar in bars:
    height = bar.get_height()
    ax.annotate(f'{height:.2f}%', (bar.get_x() + bar.get_width() / 2, heigh
                ha='center', va='bottom', fontsize=12, color='black')

# Add labels and title
ax.set_xlabel('District')
ax.set_ylabel('CAGR (%)')
ax.set_title('Districts with Highest CAGR')

# Rotate x-axis labels for better readability
plt.xticks(rotation=45, ha='right')

# Add grid lines
ax.grid(axis='y', linestyle='--', alpha=0.7)

# Show the plot
plt.tight_layout()
plt.show()
```
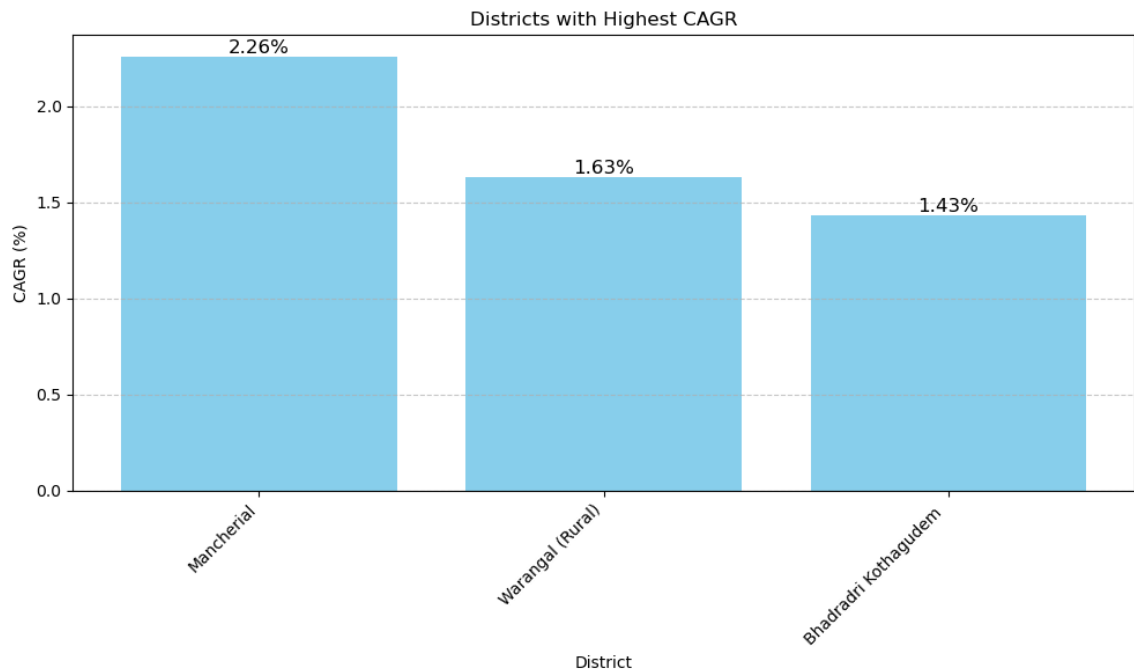
Domestic Bottom 3 CAGR Districts
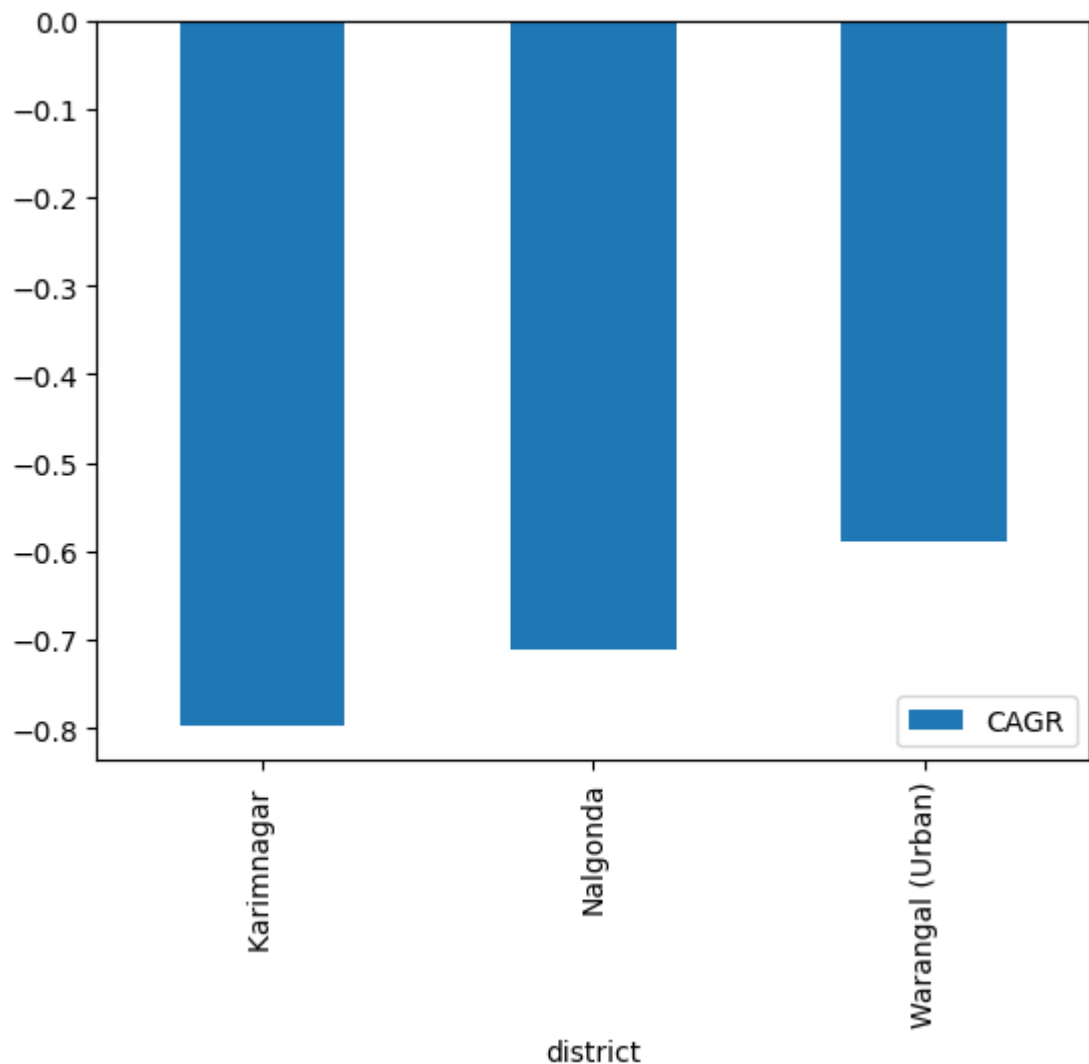
```
In [76]: dom_min = dom.sort_values(by="CAGR", ascending=True).head(3)
         dom_min = dom_min.reset_index()
         dom_min.drop("index", axis=1,inplace=True)
         dom_min
```

Out[76]:

	district	2016	2019	CAGR
0	Karimnagar	9167468	77491	-0.796296
1	Nalgonda	5858461	140918	-0.711335
2	Warangal (Urban)	25788035	1795230	-0.588629

```
In [77]: dom_min.plot("district", "CAGR", kind="bar")
```

Out[77]: <AxesSubplot:xlabel='district'>

```python
In [78]: import matplotlib.pyplot as plt

# Assuming you have a DataFrame called dom_min with "district" and "CAGR" c

# Sort the DataFrame by CAGR in ascending order
dom_min_sorted = dom_min.sort_values(by="CAGR")

# Create a figure and axis
fig, ax = plt.subplots(figsize=(10, 6))

# Create a bar plot
bars = ax.bar(dom_min_sorted["district"], dom_min_sorted["CAGR"], color='li

# Add data labels on the bars
for bar in bars:
    height = bar.get_height()
    ax.annotate(f'{height:.2f}%', (bar.get_x() + bar.get_width() / 2, heigh
                ha='center', va='bottom', fontsize=12, color='black')

# Add labels and title
ax.set_xlabel('District')
ax.set_ylabel('CAGR (%)')
ax.set_title('Districts with Lowest CAGR')

# Rotate x-axis labels for better readability
plt.xticks(rotation=45, ha='right')

# Remove y-axis ticks and spines
ax.yaxis.set_ticks_position('none')
ax.spines['left'].set_visible(False)

# Add grid lines behind the bars for a clean look
ax.grid(axis='y', linestyle='--', alpha=0.7, color='gray', zorder=0)

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()
```
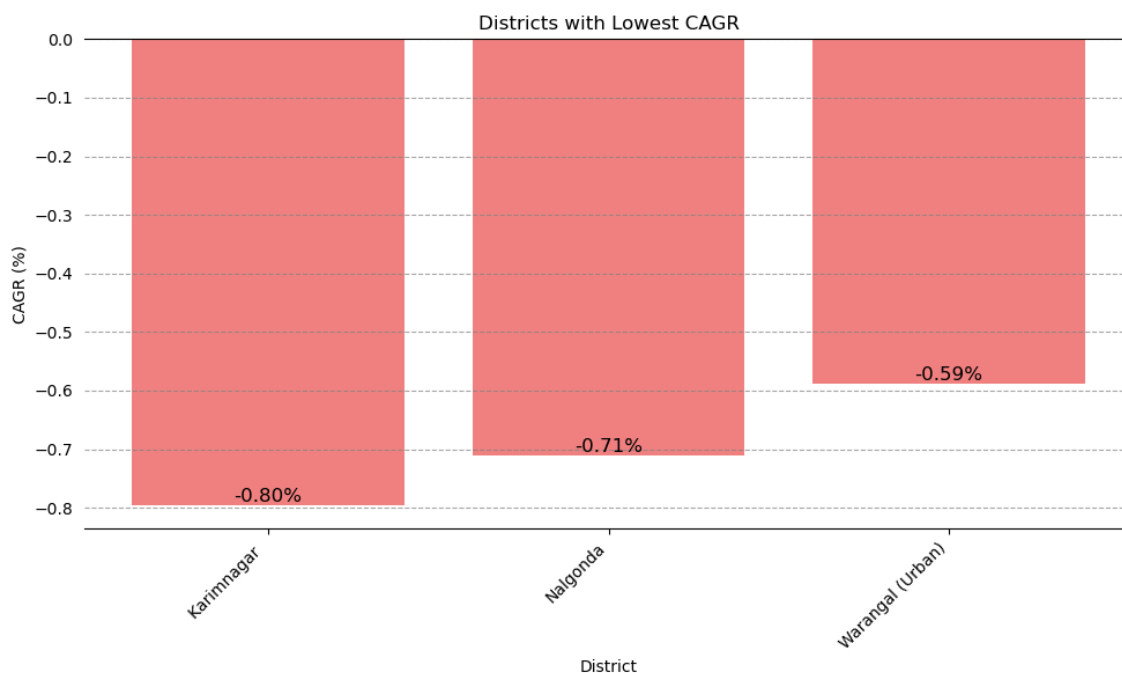
Districts with Lowest CAGR

```
In [79]:  dom.to_csv("Domestic_CAGR.csv")
```

Foreign Top 3 CAGR Districts

```
In [80]:  foreign.groupby(["year","district"])["visitors"].sum()
```

```
Out[80]:  year   district
          2016   Adilabad                     10
                 Bhadradri Kothagudem          0
                 Hyderabad                163631
                 Jagtial                       0
                 Jangaon                       2
                 Jayashankar Bhoopalpally     86
                 Jogulamba Gadwal             45
                 Kamareddy                     0
                 Karimnagar                    0
                 Khammam                       0
                 Komaram Bheem Asifabad        0
                 Mahabubabad                   0
                 Mahbubnagar                 868
                 Mancherial                    0
                 Medak                         0
                 Medchal                       0
                 Nagarkurnool                 29
                 Nalgonda                      0
                 Nirmal                        0
```

```
In [81]:  fore = pd.DataFrame({"district":districts})
```

In [82]:
```python
fore_2016=[]
for i in districts:
    foreign_2016 = foreign[foreign["year"]==2016]
    foreg = foreign_2016[foreign_2016["district"]==i].visitors.sum()
    fore_2016.append(foreg)
fore["2016"]=fore_2016
```

In [83]:
```python
fore_2019=[]
for i in districts:
    foreign_2019 = foreign[foreign["year"]==2019]
    foreg = foreign_2019[foreign_2019["district"]==i].visitors.sum()
    fore_2019.append(foreg)
fore["2019"]=fore_2019
```

In [84]: `fore`

Out[84]:

	district	2016	2019
0	Adilabad	10	6
1	Bhadradri Kothagudem	0	0
2	Hyderabad	163631	319300
3	Jagtial	0	0
4	Jangaon	2	0
5	Jayashankar Bhoopalpally	86	45
6	Jogulamba Gadwal	45	295
7	Kamareddy	0	0
8	Karimnagar	0	0
9	Khammam	0	0
10	Komaram Bheem Asifabad	0	0
11	Mahabubabad	0	0
12	Mahbubnagar	868	440
13	Mancherial	0	10
14	Medak	0	0
15	Medchal	0	0
16	Nagarkurnool	29	199
17	Nalgonda	0	0
18	Nirmal	0	0
19	Nizamabad	0	1
20	Peddapalli	0	0
21	Rajanna Sircilla	0	0
22	Ranga Reddy	0	0
23	Sangareddy	0	0
24	Siddipet	0	0
25	Suryapet	0	0
26	Vikarabad	0	0
27	Wanaparthy	0	0
28	Warangal (Rural)	0	0
29	Warangal (Urban)	1899	2450
30	Yadadri Bhongir	0	0
31	Mulugu	0	575
32	Narayanapet	0	0

In [85]:
```python
CAGR=[]
for i in range(len(districts)):
    vfinal = fore.loc[i,"2019"]
    vbegin = fore.loc[i,"2016"]
    cagr = (((vfinal/vbegin)**(1/3))-1)
    CAGR.append(cagr)
```

```
C:\Users\vishw\AppData\Local\Temp\ipykernel_11340\3495905648.py:5: Runtime
Warning: invalid value encountered in longlong_scalars
  cagr = (((vfinal/vbegin)**(1/3))-1)
C:\Users\vishw\AppData\Local\Temp\ipykernel_11340\3495905648.py:5: Runtime
Warning: divide by zero encountered in longlong_scalars
  cagr = (((vfinal/vbegin)**(1/3))-1)
```

In [86]:
```python
fore["CAGR"]=CAGR
```

In [87]: `fore`

Out[87]:

	district	2016	2019	CAGR
0	Adilabad	10	6	-0.156567
1	Bhadradri Kothagudem	0	0	NaN
2	Hyderabad	163631	319300	0.249619
3	Jagtial	0	0	NaN
4	Jangaon	2	0	-1.000000
5	Jayashankar Bhoopalpally	86	45	-0.194180
6	Jogulamba Gadwal	45	295	0.871557
7	Kamareddy	0	0	NaN
8	Karimnagar	0	0	NaN
9	Khammam	0	0	NaN
10	Komaram Bheem Asifabad	0	0	NaN
11	Mahabubabad	0	0	NaN
12	Mahbubnagar	868	440	-0.202659
13	Mancherial	0	10	inf
14	Medak	0	0	NaN
15	Medchal	0	0	NaN
16	Nagarkurnool	29	199	0.900283
17	Nalgonda	0	0	NaN
18	Nirmal	0	0	NaN
19	Nizamabad	0	1	inf
20	Peddapalli	0	0	NaN
21	Rajanna Sircilla	0	0	NaN
22	Ranga Reddy	0	0	NaN
23	Sangareddy	0	0	NaN
24	Siddipet	0	0	NaN
25	Suryapet	0	0	NaN
26	Vikarabad	0	0	NaN
27	Wanaparthy	0	0	NaN
28	Warangal (Rural)	0	0	NaN
29	Warangal (Urban)	1899	2450	0.088630
30	Yadadri Bhongir	0	0	NaN
31	Mulugu	0	575	inf
32	Narayanapet	0	0	NaN

In [88]: `fore = fore.replace([np.inf,np.nan],0)`

In [89]: fore

Out[89]:

	district	2016	2019	CAGR
0	Adilabad	10	6	-0.156567
1	Bhadradri Kothagudem	0	0	0.000000
2	Hyderabad	163631	319300	0.249619
3	Jagtial	0	0	0.000000
4	Jangaon	2	0	-1.000000
5	Jayashankar Bhoopalpally	86	45	-0.194180
6	Jogulamba Gadwal	45	295	0.871557
7	Kamareddy	0	0	0.000000
8	Karimnagar	0	0	0.000000
9	Khammam	0	0	0.000000
10	Komaram Bheem Asifabad	0	0	0.000000
11	Mahabubabad	0	0	0.000000
12	Mahbubnagar	868	440	-0.202659
13	Mancherial	0	10	0.000000
14	Medak	0	0	0.000000
15	Medchal	0	0	0.000000
16	Nagarkurnool	29	199	0.900283
17	Nalgonda	0	0	0.000000
18	Nirmal	0	0	0.000000
19	Nizamabad	0	1	0.000000
20	Peddapalli	0	0	0.000000
21	Rajanna Sircilla	0	0	0.000000
22	Ranga Reddy	0	0	0.000000
23	Sangareddy	0	0	0.000000
24	Siddipet	0	0	0.000000
25	Suryapet	0	0	0.000000
26	Vikarabad	0	0	0.000000
27	Wanaparthy	0	0	0.000000
28	Warangal (Rural)	0	0	0.000000
29	Warangal (Urban)	1899	2450	0.088630
30	Yadadri Bhongir	0	0	0.000000
31	Mulugu	0	575	0.000000
32	Narayanapet	0	0	0.000000

In [90]:
```python
fore.sort_values(by="CAGR", ascending=False)
```

Out[90]:

	district	2016	2019	CAGR
16	Nagarkurnool	29	199	0.900283
6	Jogulamba Gadwal	45	295	0.871557
2	Hyderabad	163631	319300	0.249619
29	Warangal (Urban)	1899	2450	0.088630
25	Suryapet	0	0	0.000000
20	Peddapalli	0	0	0.000000
21	Rajanna Sircilla	0	0	0.000000
22	Ranga Reddy	0	0	0.000000
23	Sangareddy	0	0	0.000000
24	Siddipet	0	0	0.000000
27	Wanaparthy	0	0	0.000000
26	Vikarabad	0	0	0.000000
18	Nirmal	0	0	0.000000
28	Warangal (Rural)	0	0	0.000000
30	Yadadri Bhongir	0	0	0.000000
31	Mulugu	0	575	0.000000
19	Nizamabad	0	1	0.000000
32	Narayanapet	0	0	0.000000
17	Nalgonda	0	0	0.000000
1	Bhadradri Kothagudem	0	0	0.000000
15	Medchal	0	0	0.000000
14	Medak	0	0	0.000000
13	Mancherial	0	10	0.000000
11	Mahabubabad	0	0	0.000000
10	Komaram Bheem Asifabad	0	0	0.000000
9	Khammam	0	0	0.000000
8	Karimnagar	0	0	0.000000
7	Kamareddy	0	0	0.000000
3	Jagtial	0	0	0.000000
0	Adilabad	10	6	-0.156567
5	Jayashankar Bhoopalpally	86	45	-0.194180
12	Mahbubnagar	868	440	-0.202659
4	Jangaon	2	0	-1.000000

In [91]:
```python
fore_max = fore.sort_values(by="CAGR", ascending=False).head(3)
fore_max = fore_max.reset_index()
fore_max.drop("index", axis=1, inplace=True)
```
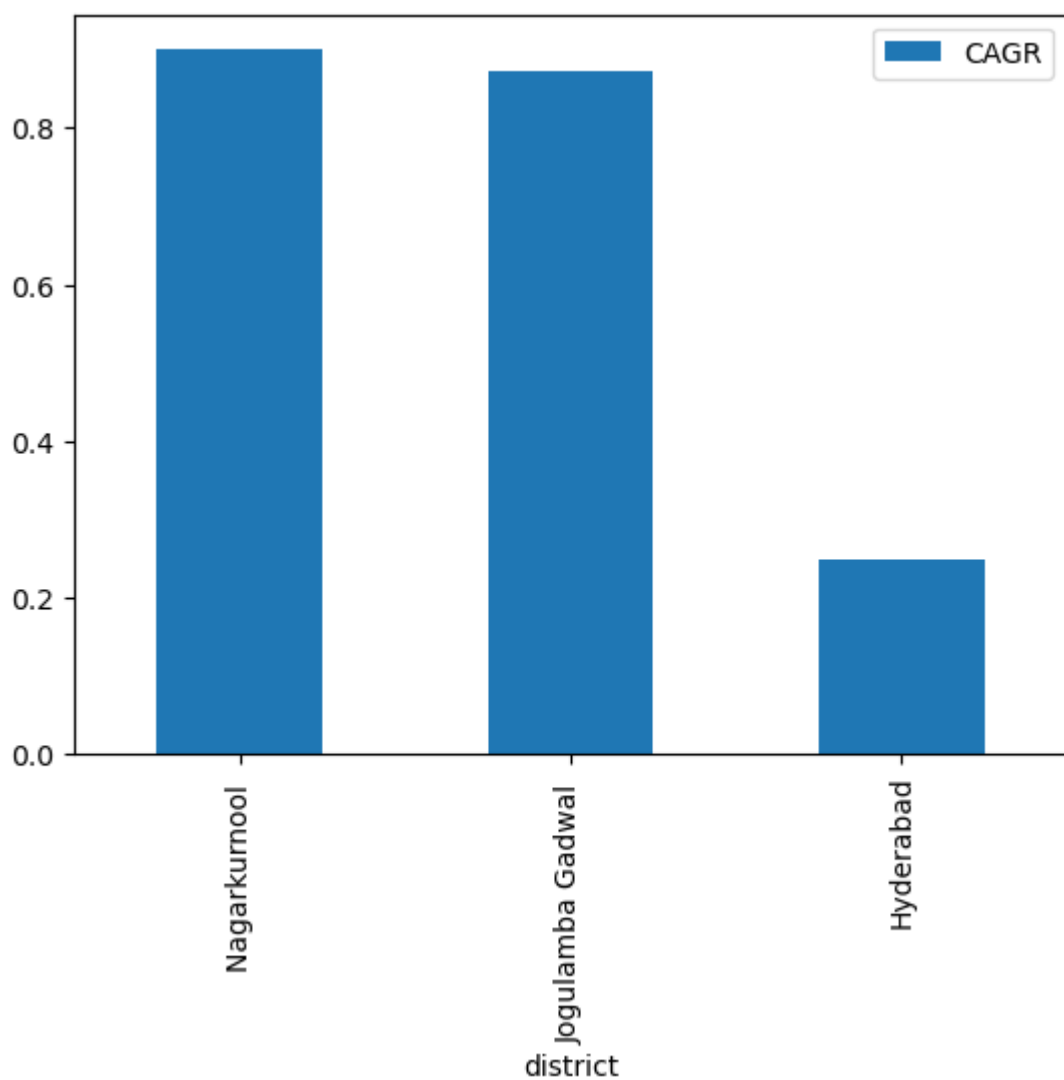
In [92]:
```python
fore_max
```

Out[92]:

	district	2016	2019	CAGR
0	Nagarkurnool	29	199	0.900283
1	Jogulamba Gadwal	45	295	0.871557
2	Hyderabad	163631	319300	0.249619

In [93]:
```python
fore_max.head().plot("district", "CAGR", kind="bar")
```

Out[93]:   <AxesSubplot:xlabel='district'>

In [94]:
```python
import matplotlib.pyplot as plt

# Assuming you have a DataFrame called fore_max with "district" and "CAGR"

# Sort the DataFrame by CAGR in descending order
fore_max_sorted = fore_max.head().sort_values(by="CAGR", ascending=False)

# Create a figure and axis
fig, ax = plt.subplots(figsize=(10, 6))

# Create a bar plot
bars = ax.bar(fore_max_sorted["district"], fore_max_sorted["CAGR"], color='

# Add data labels on the bars
for bar in bars:
    height = bar.get_height()
    ax.annotate(f'{height:.2f}%', (bar.get_x() + bar.get_width() / 2, heigh
                ha='center', va='bottom', fontsize=12, color='black')

# Add labels and title
ax.set_xlabel('District')
ax.set_ylabel('CAGR (%)')
ax.set_title('Top 5 Districts with Highest CAGR')

# Rotate x-axis labels for better readability
plt.xticks(rotation=45, ha='right')

# Remove y-axis ticks and spines
ax.yaxis.set_ticks_position('none')
ax.spines['left'].set_visible(False)

# Add grid lines behind the bars for a clean look
ax.grid(axis='y', linestyle='--', alpha=0.7, color='gray', zorder=0)

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()
```
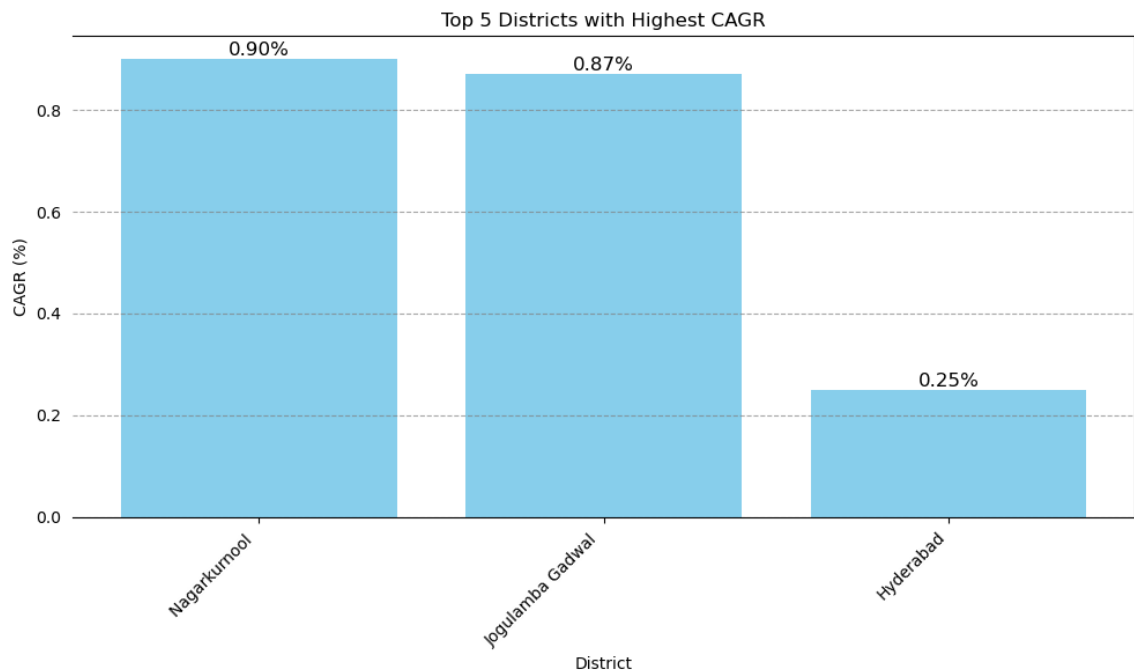
Top 5 Districts with Highest CAGR

Foreign Bottom 3 CAGR Districts

```
In [95]: fore_min = fore.sort_values(by="CAGR", ascending=True).head(3)
         fore_min = fore_min.reset_index()
         fore_min.drop("index", axis=1, inplace=True)
```
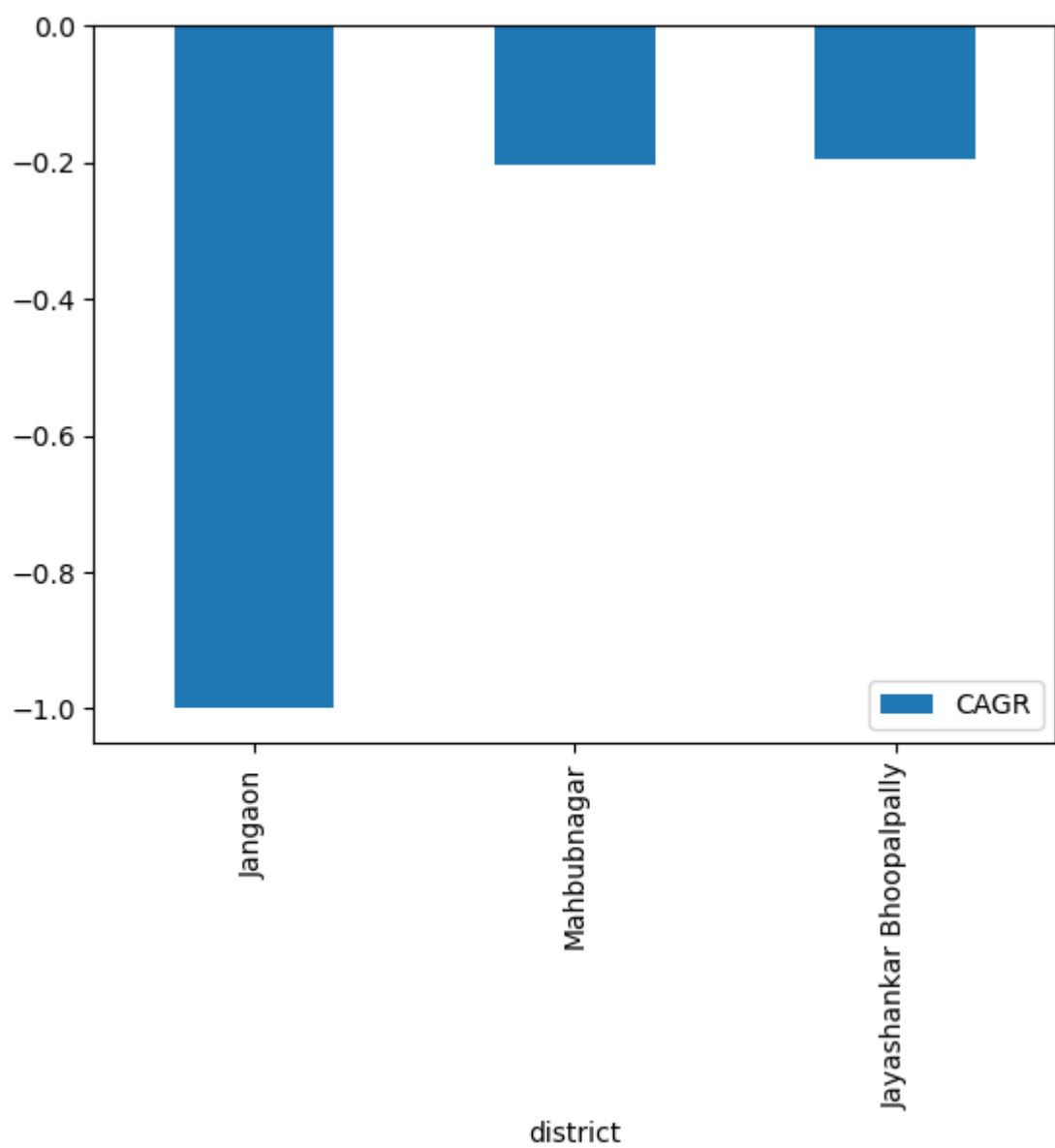
```
In [96]: fore_min
```

Out[96]:

	district	2016	2019	CAGR
0	Jangaon	2	0	-1.000000
1	Mahbubnagar	868	440	-0.202659
2	Jayashankar Bhoopalpally	86	45	-0.194180

In [97]: `fore_min.head().plot("district", "CAGR", kind="bar")`

Out[97]: `<AxesSubplot:xlabel='district'>`

In [98]:
```python
import matplotlib.pyplot as plt

# Assuming you have a DataFrame called fore_min with "district" and "CAGR"

# Sort the DataFrame by CAGR in descending order
fore_min_sorted = fore_min.head().sort_values(by="CAGR", ascending=False)

# Create a figure and axis
fig, ax = plt.subplots(figsize=(10, 6))

# Create a bar plot
bars = ax.bar(fore_min_sorted["district"], fore_min_sorted["CAGR"], color='

# Add data labels on the bars
for bar in bars:
    height = bar.get_height()
    ax.annotate(f'{height:.2f}%', (bar.get_x() + bar.get_width() / 2, heigh
                ha='center', va='bottom', fontsize=12, color='black')

# Add labels and title
ax.set_xlabel('District')
ax.set_ylabel('CAGR (%)')
ax.set_title('Bottom 5 Districts with Highest CAGR')

# Rotate x-axis labels for better readability
plt.xticks(rotation=45, ha='right')

# Remove y-axis ticks and spines
ax.yaxis.set_ticks_position('none')
ax.spines['left'].set_visible(False)

# Add grid lines behind the bars for a clean look
ax.grid(axis='y', linestyle='--', alpha=0.7, color='gray', zorder=0)

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()
```
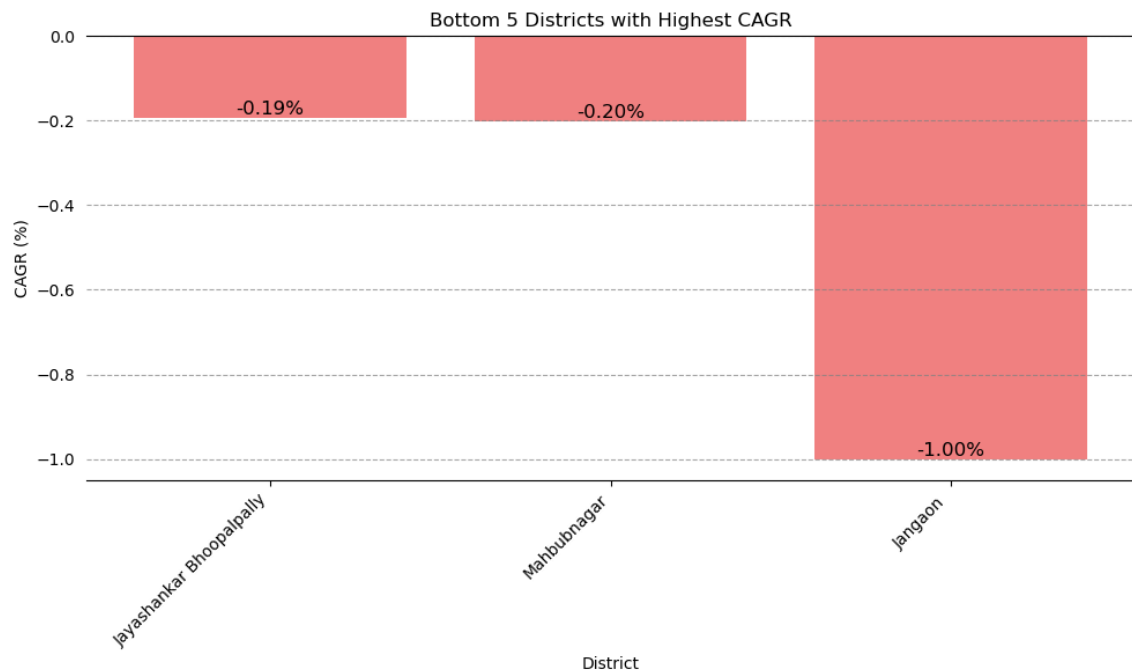
Bottom 5 Districts with Highest CAGR

In [99]: `fore.to_csv("Foreign_CAGR.csv")`

Q4.What are the peak and low season months for Hyderabad based on the data from 2016 to 2019 for Hyderabad district?

In [100]: `hyderabad=domestic[domestic['district']=='Hyderabad']`

In [101]: `hyderabad.groupby('month')['visitors'].sum().sort_values(ascending=False).h`

Out[101]:
```
month
June         16897783
December      9338637
October       6552397
January       6452101
April         6126839
Name: visitors, dtype: int64
```

In [102]: `hyderabad.groupby('month')['visitors'].sum().sort_values(ascending=False).h`

Out[102]: `<AxesSubplot:title={'center':'Peak season months'}, xlabel='month'>`
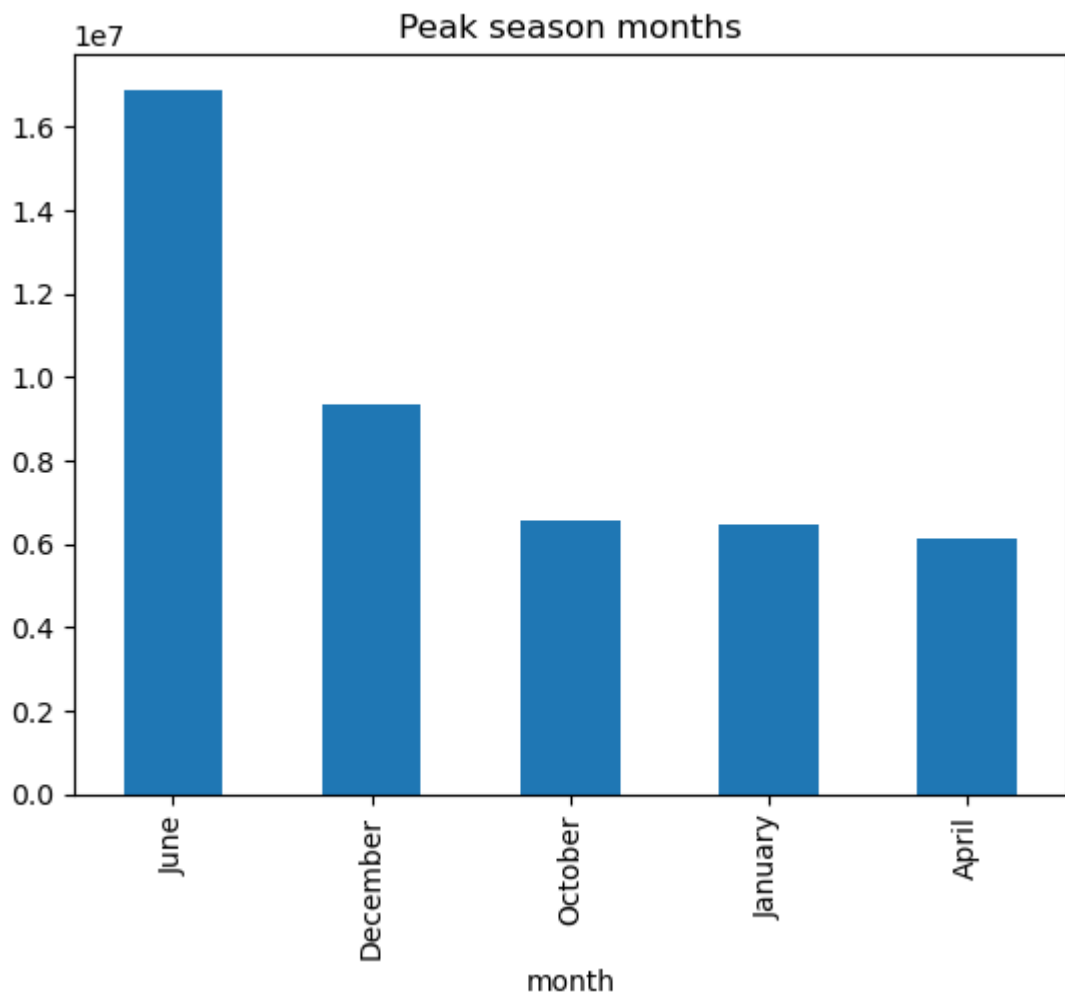
In [103]:

```python
import matplotlib.pyplot as plt

# Assuming you have a DataFrame called hyderabad with "month" and "visitors

# Group by month, sum visitors, then sort in descending order and take the
peak_season_months = hyderabad.groupby('month')['visitors'].sum().sort_valu

# Create a figure and axis
fig, ax = plt.subplots(figsize=(10, 6))

# Create a bar plot
bars = peak_season_months.plot(kind='bar', color='skyblue')

# Add data labels on the bars
for bar in bars.patches:
    height = bar.get_height()
    ax.annotate(f'{height:,}', (bar.get_x() + bar.get_width() / 2, height),
                ha='center', va='bottom', fontsize=12, color='black')

# Add labels and title
ax.set_xlabel('Month')
ax.set_ylabel('Total Visitors')
ax.set_title('Top 5 Peak Season Months')

# Rotate x-axis labels for better readability
plt.xticks(rotation=45)

# Add grid lines
ax.grid(axis='y', linestyle='--', alpha=0.7, color='gray')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()
```
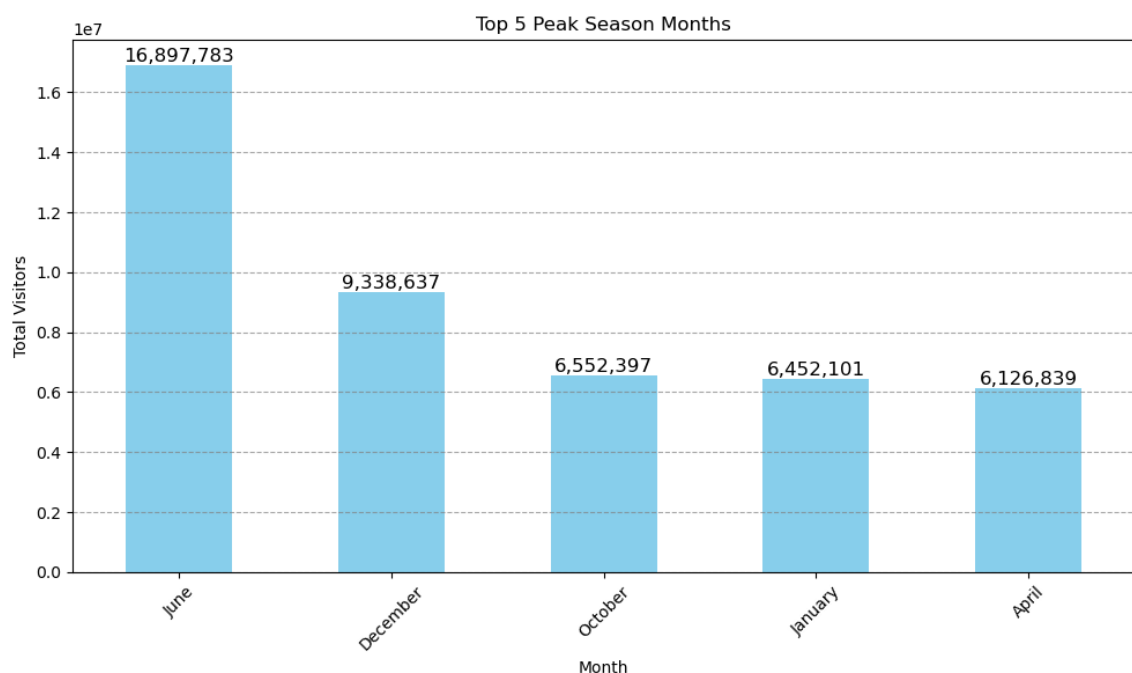
```
In [104]: hyderabad.groupby('month')['visitors'].sum().sort_values(ascending=False).t
```

```
Out[104]: month
          November    5626156
          July        5552527
          September   5312283
          March       5227626
          February    5014430
          Name: visitors, dtype: int64
```

```
In [105]: hyderabad.groupby('month')['visitors'].sum().sort_values(ascending=False).t
```

```
Out[105]: <AxesSubplot:title={'center':'low season months'}, xlabel='month'>
```

In [106]:
```python
import matplotlib.pyplot as plt

# Assuming you have a DataFrame called hyderabad with "month" and "visitors

# Group by month, sum visitors, then sort in descending order and take the
low_season_months = hyderabad.groupby('month')['visitors'].sum().sort_value

# Create a figure and axis
fig, ax = plt.subplots(figsize=(10, 6))

# Create a bar plot
bars = low_season_months.plot(kind='bar', color='lightcoral')

# Add data labels on the bars
for bar in bars.patches:
    height = bar.get_height()
    ax.annotate(f'{height:,}', (bar.get_x() + bar.get_width() / 2, height),
                ha='center', va='bottom', fontsize=12, color='black')

# Add Labels and title
ax.set_xlabel('Month')
ax.set_ylabel('Total Visitors')
ax.set_title('Bottom 5 Low Season Months')

# Rotate x-axis labels for better readability
plt.xticks(rotation=45)

# Remove x-axis ticks and spines
ax.xaxis.set_ticks_position('none')
ax.spines['bottom'].set_visible(False)

# Add grid lines behind the bars for a clean look
ax.grid(axis='y', linestyle='--', alpha=0.7, color='gray', zorder=0)

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()
```

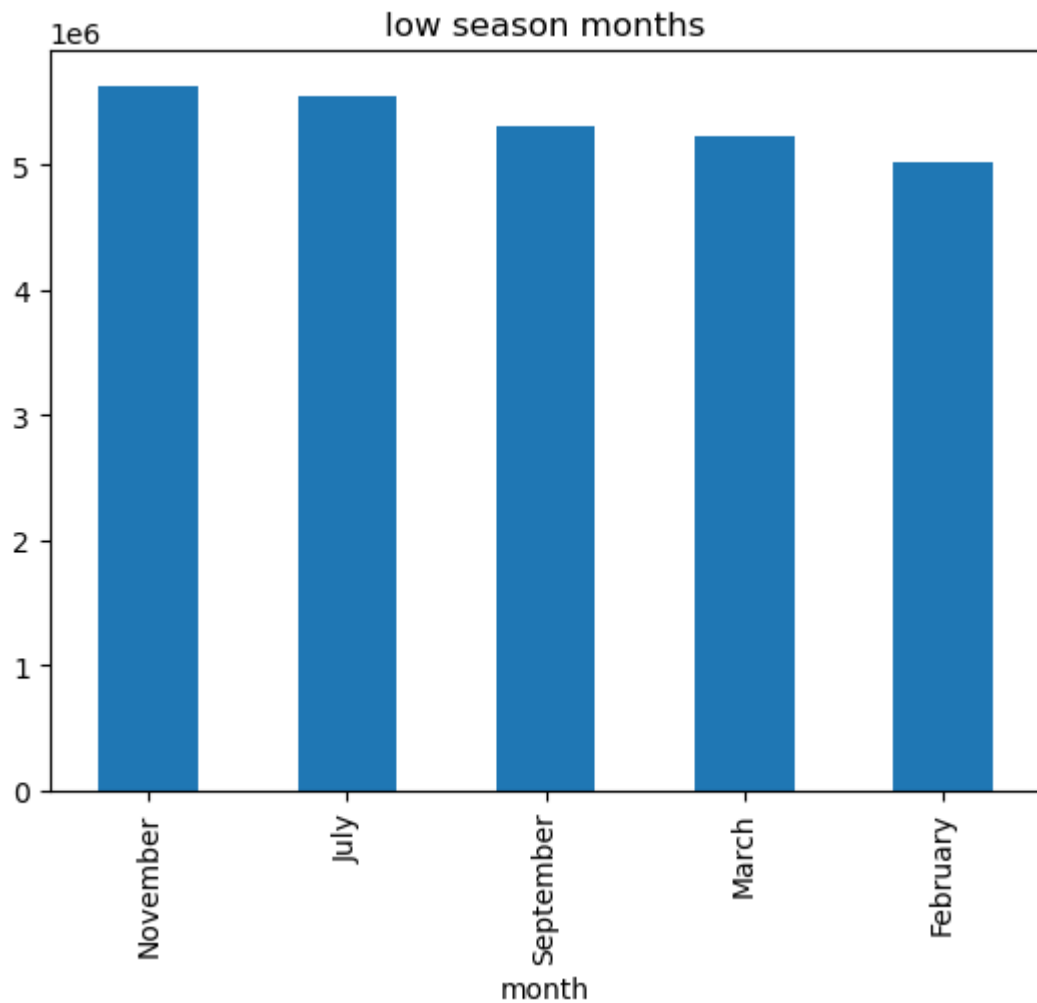Bottom 5 Low Season Months
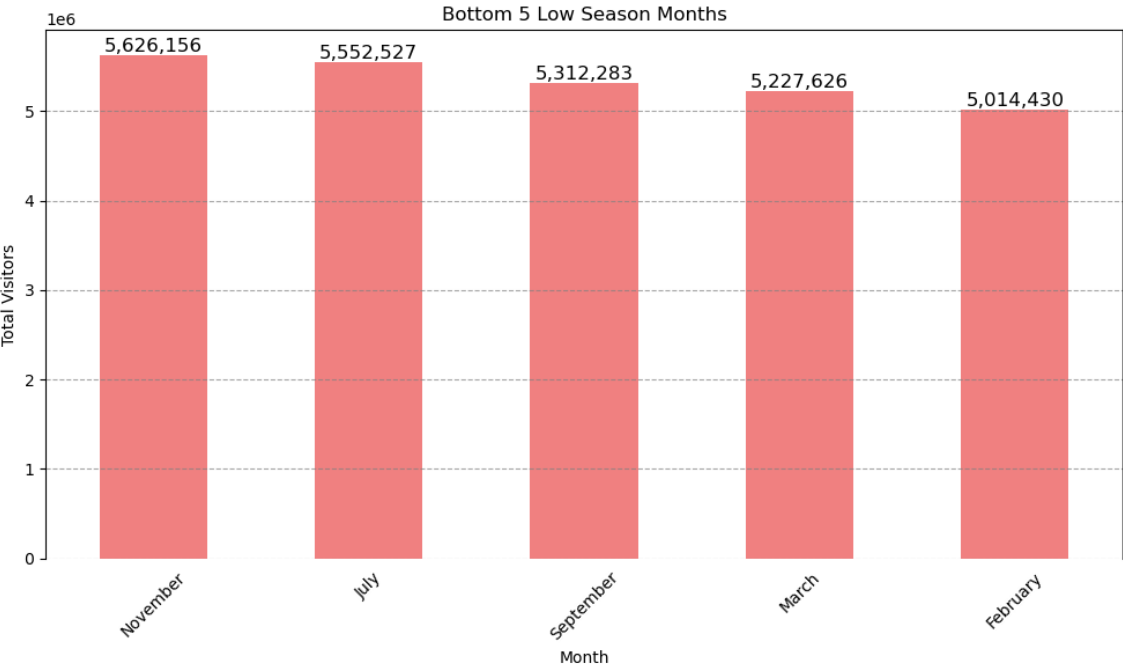
Q5.Show the top & bottom 3 districts with high domestic to foreign tourist ratio?

In [107]:

```
df
```

Out[107]:

district	foreign	domestic
Adilabad	32	7321575
Bhadradri Kothagudem	0	21600962
Hyderabad	1044898	83900960
Jagtial	0	11303514
Jangaon	2	826280
Jayashankar Bhoopalpally	1252	19632865
Jogulamba Gadwal	945	6813340
Kamareddy	0	1773
Karimnagar	0	9462383
Khammam	0	9378315
Komaram Bheem Asifabad	0	92734
Mahabubabad	0	600697
Mahbubnagar	2282	17180118
Mancherial	10	867242
Medak	0	20542639
Medchal	0	0
Mulugu	575	1819800
Nagarkurnool	761	7424355
Nalgonda	0	6401933
Narayanpet	5	0
Nirmal	2	13315796
Nizamabad	5	116147
Peddapalli	0	56977
Rajanna Sircilla	0	41763276
Ranga Reddy	0	0
Sangareddy	0	10424510
Siddipet	0	5775285
Suryapet	0	0
Vikarabad	0	0
Wanaparthy	0	890078
Warangal (Rural)	306	819162
Warangal (Urban)	8821	30726603
Yadadri Bhongir	0	26893080

In [108]:
```python
ratios = []
for i in range(33):
    ratio = df.iloc[i,1]/df.iloc[i,0]
    ratios.append(ratio)
df["Ratio"]=ratios
```

```
C:\Users\vishw\AppData\Local\Temp\ipykernel_11340\1637206168.py:3: Runtime
Warning: divide by zero encountered in longlong_scalars
  ratio = df.iloc[i,1]/df.iloc[i,0]
C:\Users\vishw\AppData\Local\Temp\ipykernel_11340\1637206168.py:3: Runtime
Warning: invalid value encountered in longlong_scalars
  ratio = df.iloc[i,1]/df.iloc[i,0]
```

In [108]:
```python
ratios = []
for i in range(33):
    ratio = df.iloc[i,1]/df.iloc[i,0]
    ratios.append(ratio)
df["Ratio"]=ratios
```

In [109]: df

Out[109]:

district	foreign	domestic	Ratio
Adilabad	32	7321575	2.287992e+05
Bhadradri Kothagudem	0	21600962	inf
Hyderabad	1044898	83900960	8.029584e+01
Jagtial	0	11303514	inf
Jangaon	2	826280	4.131400e+05
Jayashankar Bhoopalpally	1252	19632865	1.568120e+04
Jogulamba Gadwal	945	6813340	7.209884e+03
Kamareddy	0	1773	inf
Karimnagar	0	9462383	inf
Khammam	0	9378315	inf
Komaram Bheem Asifabad	0	92734	inf
Mahabubabad	0	600697	inf
Mahbubnagar	2282	17180118	7.528535e+03
Mancherial	10	867242	8.672420e+04
Medak	0	20542639	inf
Medchal	0	0	NaN
Mulugu	575	1819800	3.164870e+03
Nagarkurnool	761	7424355	9.756051e+03
Nalgonda	0	6401933	inf
Narayanpet	5	0	0.000000e+00
Nirmal	2	13315796	6.657898e+06
Nizamabad	5	116147	2.322940e+04
Peddapalli	0	56977	inf
Rajanna Sircilla	0	41763276	inf
Ranga Reddy	0	0	NaN
Sangareddy	0	10424510	inf
Siddipet	0	5775285	inf
Suryapet	0	0	NaN
Vikarabad	0	0	NaN
Wanaparthy	0	890078	inf
Warangal (Rural)	306	819162	2.677000e+03
Warangal (Urban)	8821	30726603	3.483347e+03
Yadadri Bhongir	0	26893080	inf

In [110]:
```
df.replace([np.nan,np.inf],0)
```

Out[110]:

district	foreign	domestic	Ratio
Adilabad	32	7321575	2.287992e+05
Bhadradri Kothagudem	0	21600962	0.000000e+00
Hyderabad	1044898	83900960	8.029584e+01
Jagtial	0	11303514	0.000000e+00
Jangaon	2	826280	4.131400e+05
Jayashankar Bhoopalpally	1252	19632865	1.568120e+04
Jogulamba Gadwal	945	6813340	7.209884e+03
Kamareddy	0	1773	0.000000e+00
Karimnagar	0	9462383	0.000000e+00
Khammam	0	9378315	0.000000e+00
Komaram Bheem Asifabad	0	92734	0.000000e+00
Mahabubabad	0	600697	0.000000e+00
Mahbubnagar	2282	17180118	7.528535e+03
Mancherial	10	867242	8.672420e+04
Medak	0	20542639	0.000000e+00
Medchal	0	0	0.000000e+00
Mulugu	575	1819800	3.164870e+03
Nagarkurnool	761	7424355	9.756051e+03
Nalgonda	0	6401933	0.000000e+00
Narayanpet	5	0	0.000000e+00
Nirmal	2	13315796	6.657898e+06
Nizamabad	5	116147	2.322940e+04
Peddapalli	0	56977	0.000000e+00
Rajanna Sircilla	0	41763276	0.000000e+00
Ranga Reddy	0	0	0.000000e+00
Sangareddy	0	10424510	0.000000e+00
Siddipet	0	5775285	0.000000e+00
Suryapet	0	0	0.000000e+00
Vikarabad	0	0	0.000000e+00
Wanaparthy	0	890078	0.000000e+00
Warangal (Rural)	306	819162	2.677000e+03
Warangal (Urban)	8821	30726603	3.483347e+03
Yadadri Bhongir	0	26893080	0.000000e+00

In [111]: `df_ratio = df.sort_values(by="Ratio", ascending=False).where(df["foreign"]>`

In [112]: `df_ratio`

Out[112]:

district	foreign	domestic	Ratio
Medak	NaN	NaN	NaN
Komaram Bheem Asifabad	NaN	NaN	NaN
Wanaparthy	NaN	NaN	NaN
Siddipet	NaN	NaN	NaN
Sangareddy	NaN	NaN	NaN
Rajanna Sircilla	NaN	NaN	NaN
Peddapalli	NaN	NaN	NaN
Nalgonda	NaN	NaN	NaN
Bhadradri Kothagudem	NaN	NaN	NaN
Mahabubabad	NaN	NaN	NaN
Yadadri Bhongir	NaN	NaN	NaN
Khammam	NaN	NaN	NaN
Kamareddy	NaN	NaN	NaN
Jagtial	NaN	NaN	NaN
Karimnagar	NaN	NaN	NaN
Nirmal	NaN	NaN	NaN
Jangaon	NaN	NaN	NaN
Adilabad	NaN	NaN	NaN
Mancherial	NaN	NaN	NaN
Nizamabad	NaN	NaN	NaN
Jayashankar Bhoopalpally	1252.0	19632865.0	15681.202077
Nagarkurnool	761.0	7424355.0	9756.051248
Mahbubnagar	2282.0	17180118.0	7528.535495
Jogulamba Gadwal	945.0	6813340.0	7209.883598
Warangal (Urban)	8821.0	30726603.0	3483.346899
Mulugu	575.0	1819800.0	3164.869565
Warangal (Rural)	306.0	819162.0	2677.000000
Hyderabad	1044898.0	83900960.0	80.295837
Narayanpet	NaN	NaN	NaN
Medchal	NaN	NaN	NaN
Ranga Reddy	NaN	NaN	NaN
Suryapet	NaN	NaN	NaN
Vikarabad	NaN	NaN	NaN

In [113]:
```python
df_ratio = df_ratio.dropna()
```

In [114]:
```python
df_ratio.sort_values(by="Ratio", ascending=True, inplace=True)
```

```
C:\Users\vishw\AppData\Local\Temp\ipykernel_11340\3006729634.py:1: Setting
WithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-doc
s/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://
pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-
view-versus-a-copy)
  df_ratio.sort_values(by="Ratio", ascending=True, inplace=True)
```

In [115]:
```python
df_ratio = df_ratio.reset_index()
```

In [116]:
```python
df_ratio.head()
```

Out[116]:

	district	foreign	domestic	Ratio
0	Hyderabad	1044898.0	83900960.0	80.295837
1	Warangal (Rural)	306.0	819162.0	2677.000000
2	Mulugu	575.0	1819800.0	3164.869565
3	Warangal (Urban)	8821.0	30726603.0	3483.346899
4	Jogulamba Gadwal	945.0	6813340.0	7209.883598

In [117]: `df_ratio.head().plot("district", "Ratio", kind="bar")`

Out[117]: `<AxesSubplot:xlabel='district'>`
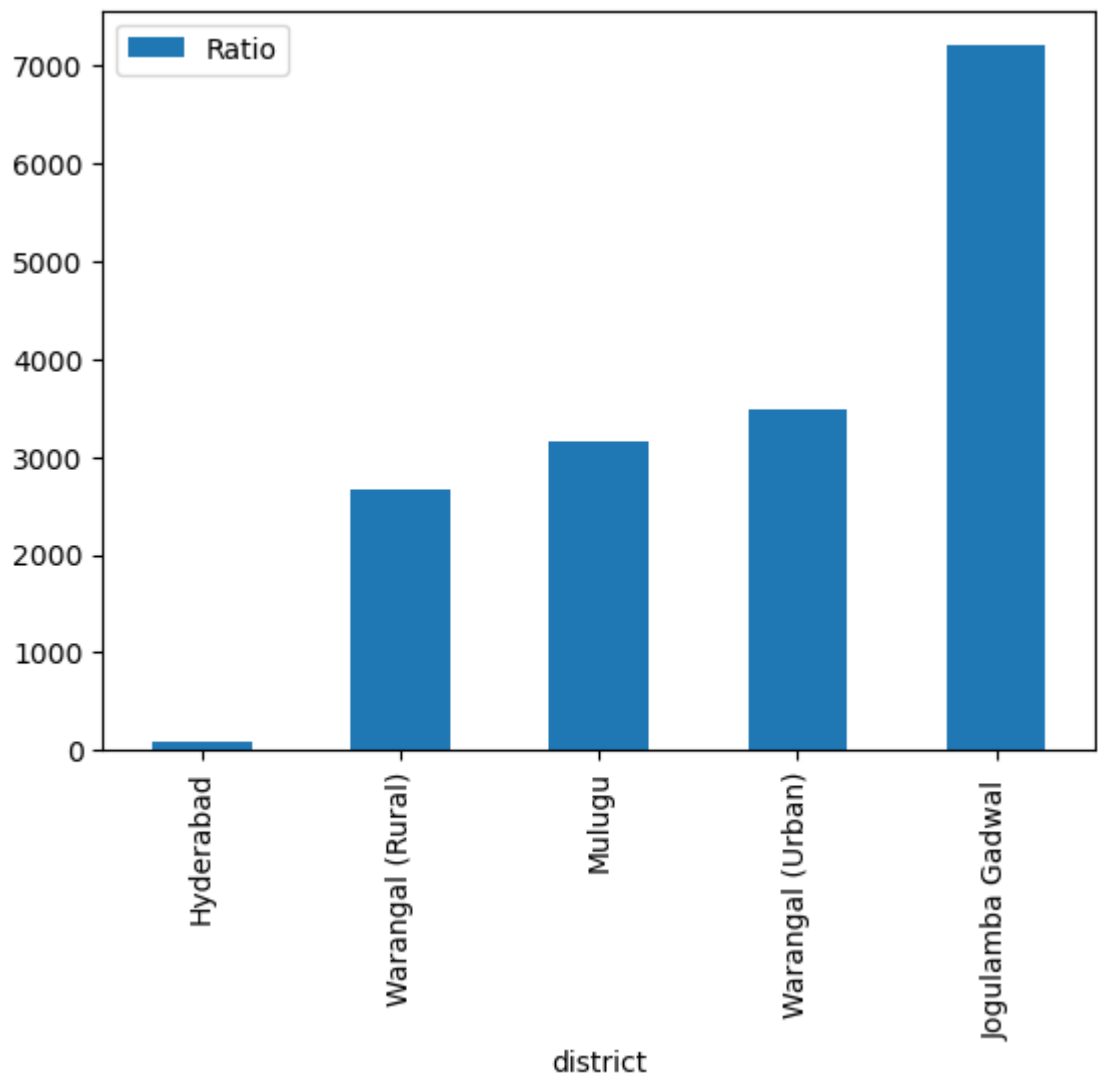
In [118]:
```python
import matplotlib.pyplot as plt


# Select the top 5 rows for plotting
top5_districts = df_ratio.head()

# Create a bar chart
plt.figure(figsize=(10, 6))  # Adjust the figure size as needed
plt.bar(top5_districts["district"], top5_districts["Ratio"], color='skyblue

# Adding labels and titles
plt.xlabel("District")
plt.ylabel("Ratio")
plt.title("Top 5 Districts by Ratio")

# Rotating x-axis labels for better readability if needed
plt.xticks(rotation=45)

# Display the chart
plt.tight_layout()
plt.show()
```
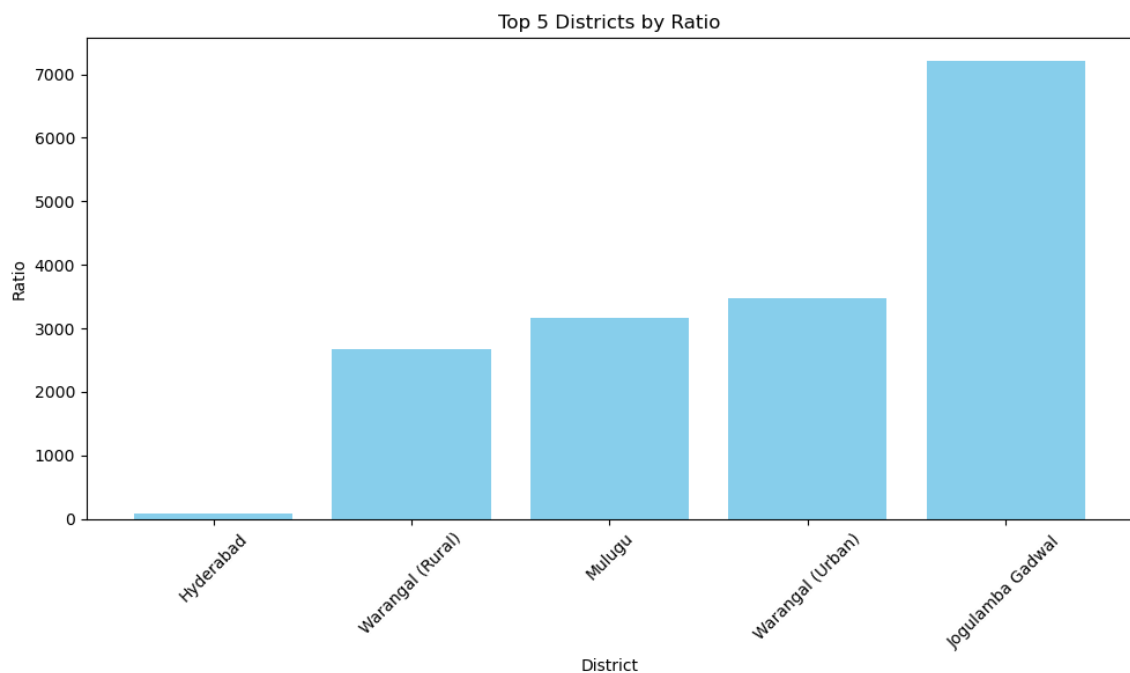

In [119]:
```python
df_ratio.tail().sort_values(by="Ratio", ascending=False, inplace=True)
```

```
C:\Users\vishw\AppData\Local\Temp\ipykernel_11340\2971362504.py:1: Setting
WithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-doc
s/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://
pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-
view-versus-a-copy)
  df_ratio.tail().sort_values(by="Ratio", ascending=False, inplace=True)
```

In [120]: `df_ratio.tail()`

Out[120]:

	district	foreign	domestic	Ratio
3	Warangal (Urban)	8821.0	30726603.0	3483.346899
4	Jogulamba Gadwal	945.0	6813340.0	7209.883598
5	Mahbubnagar	2282.0	17180118.0	7528.535495
6	Nagarkurnool	761.0	7424355.0	9756.051248
7	Jayashankar Bhoopalpally	1252.0	19632865.0	15681.202077

In [121]: `df_ratio.tail().plot("district", "Ratio", kind="bar")`

Out[121]: `<AxesSubplot:xlabel='district'>`
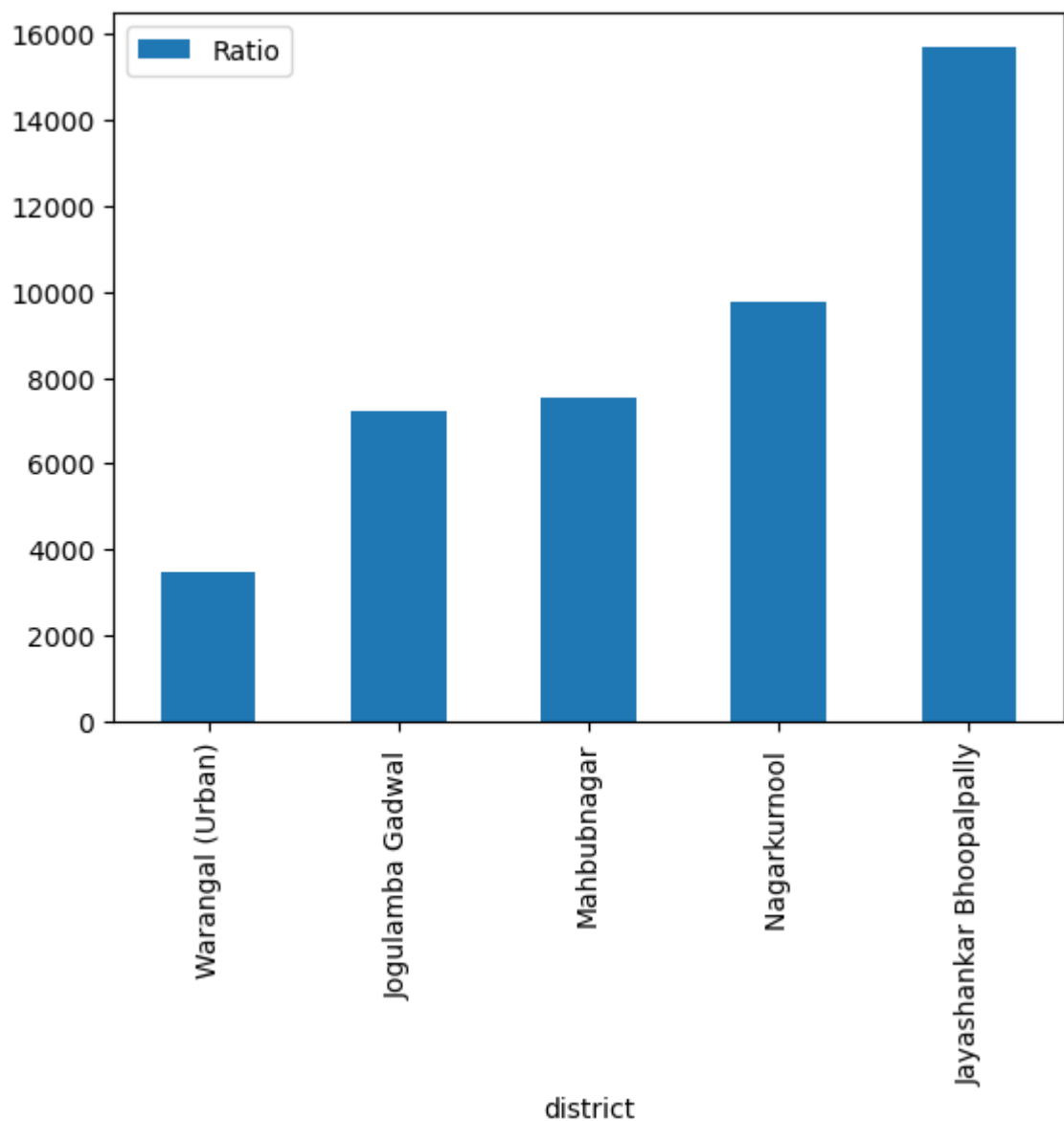
In [122]:
```python
import matplotlib.pyplot as plt


# Select the bottom 5 rows for plotting
tail5_districts = df_ratio.tail()

# Create a bar chart
plt.figure(figsize=(10, 6))  # Adjust the figure size as needed
plt.bar(tail5_districts["district"], tail5_districts["Ratio"], color='salmo

# Adding labels and titles
plt.xlabel("District")
plt.ylabel("Ratio")
plt.title("Bottom 5 Districts by Ratio")

# Rotating x-axis labels for better readability if needed
plt.xticks(rotation=45)

# Display the chart
plt.tight_layout()
plt.show()
```
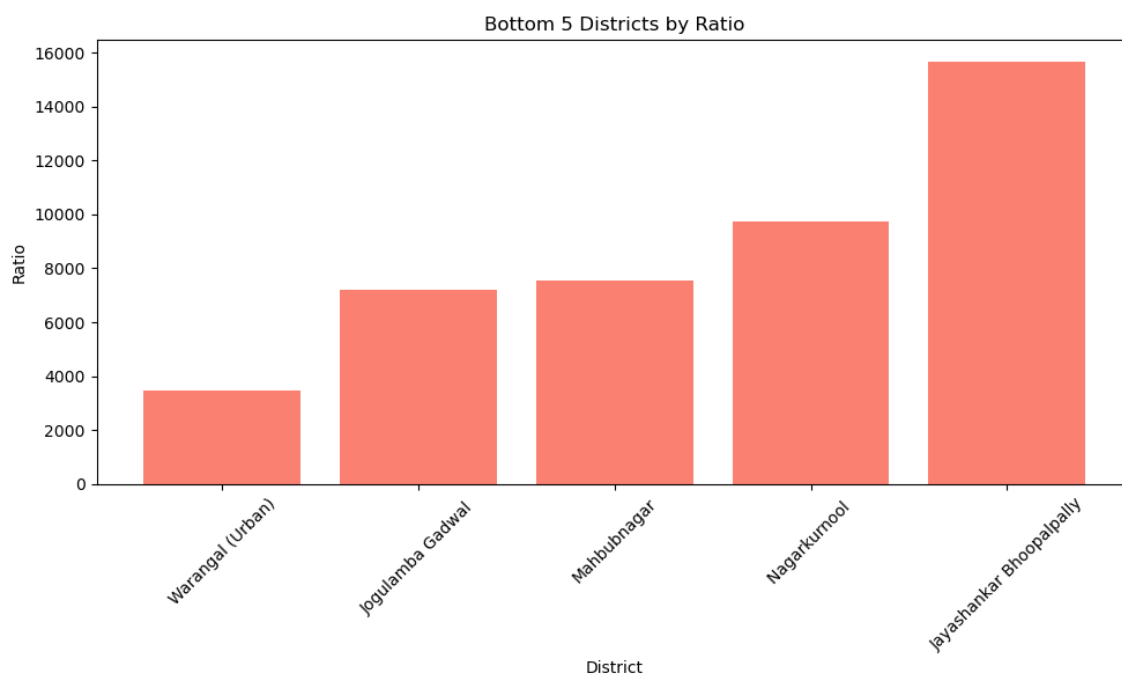

In [123]:
```python
df_ratio.to_csv("df_ratio.csv")
```

In [124]:
```python
df_ratio.shape
```

Out[124]: (8, 4)

Q6.List the top & bottom 5 districts based on 'population to tourist footfall ratio' ratio in 2019?

In [125]: `# import data from 'https://www.indiacensus.net/states/telangana' site usin`

In [126]:
```python
pop=pd.read_csv('tel_district_pop.csv')
```

In [127]: pop

Out[127]:

	S.No.	District Name	As per 2011 census	Estimated Population in 2023	2019
0	1	Adilabad	708972	768667	748769
1	2	Bhadradri Kothagudem	1069261	1159293	1129283
2	3	Hyderabad	3943323	4275351	4164675
3	4	Jagitial	985417	1068389	1040732
4	5	Jangaon	566376	614065	598169
5	6	Jayashankar Bhupalpally	416763	451854	440157
6	7	Jogulamba Gadwal	609990	661351	644231
7	8	Kamareddy	972625	1054520	1027222
8	9	Karimnagar	1005711	1090392	1062165
9	10	Khammam	1401639	1519657	1480318
10	11	Komaram Bheem	515812	559243	544766
11	12	Mahabubabad	774549	839766	818027
12	13	Mahabubnagar	919903	997359	971541
13	14	Mancherial	807037	874990	852339
14	15	Medak	767428	832045	810506
15	16	Medchal–Malkajgiri	2440073	2645527	2577043
16	17	Mulugu	257744	279446	272212
17	18	Nagarkurnool	893308	968525	943453
18	19	Nalgonda	1618416	1754687	1709264
19	20	Narayanpet	566874	614605	598695
20	21	Nirmal	709418	769151	749240
21	22	Nizamabad	1571022	1703302	1659209
22	23	Peddapalli	795332	862299	839977
23	24	Rajanna Sircilla	552037	598519	583025
24	25	Ranga Reddy	2446265	2652241	2583583
25	26	Sangareddy	1527628	1656254	1613379
26	27	Siddipet	1012065	1097281	1068876
27	28	Suryapet	1099560	1192143	1161282
28	29	Vikarabad	927140	1005205	979184
29	30	Wanaparthy	577758	626405	610190
30	31	Warangal Rural	718537	779038	758871
31	32	Warangal Urban	1080858	1171866	1141530
32	33	Yadadri Bhuvanagiri	739448	801710	780956

In [128]:
```python
pop.drop("S.No.", axis=1, inplace=True)
```

In [129]:
```python
pop
```

Out[129]:

	District Name	As per 2011 census	Estimated Population in 2023	2019
0	Adilabad	708972	768667	748769
1	Bhadradri Kothagudem	1069261	1159293	1129283
2	Hyderabad	3943323	4275351	4164675
3	Jagitial	985417	1068389	1040732
4	Jangaon	566376	614065	598169
5	Jayashankar Bhupalpally	416763	451854	440157
6	Jogulamba Gadwal	609990	661351	644231
7	Kamareddy	972625	1054520	1027222
8	Karimnagar	1005711	1090392	1062165
9	Khammam	1401639	1519657	1480318
10	Komaram Bheem	515812	559243	544766
11	Mahabubabad	774549	839766	818027
12	Mahabubnagar	919903	997359	971541
13	Mancherial	807037	874990	852339
14	Medak	767428	832045	810506
15	Medchal–Malkajgiri	2440073	2645527	2577043
16	Mulugu	257744	279446	272212
17	Nagarkurnool	893308	968525	943453
18	Nalgonda	1618416	1754687	1709264
19	Narayanpet	566874	614605	598695
20	Nirmal	709418	769151	749240
21	Nizamabad	1571022	1703302	1659209
22	Peddapalli	795332	862299	839977
23	Rajanna Sircilla	552037	598519	583025
24	Ranga Reddy	2446265	2652241	2583583
25	Sangareddy	1527628	1656254	1613379
26	Siddipet	1012065	1097281	1068876
27	Suryapet	1099560	1192143	1161282
28	Vikarabad	927140	1005205	979184
29	Wanaparthy	577758	626405	610190
30	Warangal Rural	718537	779038	758871
31	Warangal Urban	1080858	1171866	1141530
32	Yadadri Bhuvanagiri	739448	801710	780956

In [130]:
```
pop.sort_values(by="District Name", inplace=True)
```

In [131]:
```
pop
```

Out[131]:

	District Name	As per 2011 census	Estimated Population in 2023	2019
0	Adilabad	708972	768667	748769
1	Bhadradri Kothagudem	1069261	1159293	1129283
2	Hyderabad	3943323	4275351	4164675
3	Jagitial	985417	1068389	1040732
4	Jangaon	566376	614065	598169
5	Jayashankar Bhupalpally	416763	451854	440157
6	Jogulamba Gadwal	609990	661351	644231
7	Kamareddy	972625	1054520	1027222
8	Karimnagar	1005711	1090392	1062165
9	Khammam	1401639	1519657	1480318
10	Komaram Bheem	515812	559243	544766
11	Mahabubabad	774549	839766	818027
12	Mahabubnagar	919903	997359	971541
13	Mancherial	807037	874990	852339
14	Medak	767428	832045	810506
15	Medchal–Malkajgiri	2440073	2645527	2577043
16	Mulugu	257744	279446	272212
17	Nagarkurnool	893308	968525	943453
18	Nalgonda	1618416	1754687	1709264
19	Narayanpet	566874	614605	598695
20	Nirmal	709418	769151	749240
21	Nizamabad	1571022	1703302	1659209
22	Peddapalli	795332	862299	839977
23	Rajanna Sircilla	552037	598519	583025
24	Ranga Reddy	2446265	2652241	2583583
25	Sangareddy	1527628	1656254	1613379
26	Siddipet	1012065	1097281	1068876
27	Suryapet	1099560	1192143	1161282
28	Vikarabad	927140	1005205	979184
29	Wanaparthy	577758	626405	610190
30	Warangal Rural	718537	779038	758871
31	Warangal Urban	1080858	1171866	1141530
32	Yadadri Bhuvanagiri	739448	801710	780956

In [132]: `dom`

Out[132]:

	district	2016	2019	CAGR
0	Adilabad	5075557	775895	-0.465305
1	Bhadradri Kothagudem	889030	12817737	1.433875
2	Hyderabad	23394705	13802362	-0.161290
3	Jagtial	623077	3086115	0.704604
4	Jangaon	40660	328890	1.007372
5	Jayashankar Bhoopalpally	243400	662530	0.396245
6	Jogulamba Gadwal	523401	2007995	0.565463
7	Kamareddy	127	534	0.614033
8	Karimnagar	9167468	77491	-0.796296
9	Khammam	5005031	1413440	-0.343920
10	Komaram Bheem Asifabad	0	19189	0.000000
11	Mahabubabad	140002	152885	0.029778
12	Mahbubnagar	8304766	2534815	-0.326704
13	Mancherial	7802	269810	2.257997
14	Medak	3463200	5452570	0.163343
15	Medchal	0	0	0.000000
16	Nagarkurnool	588473	2093312	0.526520
17	Nalgonda	5858461	140918	-0.711335
18	Nirmal	916610	3816778	0.608808
19	Nizamabad	6442	46333	0.930293
20	Peddapalli	3244	16581	0.722569
21	Rajanna Sircilla	2176801	16832897	0.977486
22	Ranga Reddy	0	0	0.000000
23	Sangareddy	778000	4553160	0.802095
24	Siddipet	358400	2987864	1.027672
25	Suryapet	0	0	0.000000
26	Vikarabad	0	0	0.000000
27	Wanaparthy	60138	298639	0.706079
28	Warangal (Rural)	19400	353500	1.631455
29	Warangal (Urban)	25788035	1795230	-0.588629
30	Yadadri Bhongir	1728600	4489374	0.374560
31	Mulugu	0	1819800	0.000000
32	Narayanapet	0	389250	0.000000

In [133]:
```python
dom = dom.sort_values(by="district")
```

In [134]: dom

Out[134]:

	district	2016	2019	CAGR
0	Adilabad	5075557	775895	-0.465305
1	Bhadradri Kothagudem	889030	12817737	1.433875
2	Hyderabad	23394705	13802362	-0.161290
3	Jagtial	623077	3086115	0.704604
4	Jangaon	40660	328890	1.007372
5	Jayashankar Bhoopalpally	243400	662530	0.396245
6	Jogulamba Gadwal	523401	2007995	0.565463
7	Kamareddy	127	534	0.614033
8	Karimnagar	9167468	77491	-0.796296
9	Khammam	5005031	1413440	-0.343920
10	Komaram Bheem Asifabad	0	19189	0.000000
11	Mahabubabad	140002	152885	0.029778
12	Mahbubnagar	8304766	2534815	-0.326704
13	Mancherial	7802	269810	2.257997
14	Medak	3463200	5452570	0.163343
15	Medchal	0	0	0.000000
31	Mulugu	0	1819800	0.000000
16	Nagarkurnool	588473	2093312	0.526520
17	Nalgonda	5858461	140918	-0.711335
32	Narayanapet	0	389250	0.000000
18	Nirmal	916610	3816778	0.608808
19	Nizamabad	6442	46333	0.930293
20	Peddapalli	3244	16581	0.722569
21	Rajanna Sircilla	2176801	16832897	0.977486
22	Ranga Reddy	0	0	0.000000
23	Sangareddy	778000	4553160	0.802095
24	Siddipet	358400	2987864	1.027672
25	Suryapet	0	0	0.000000
26	Vikarabad	0	0	0.000000
27	Wanaparthy	60138	298639	0.706079
28	Warangal (Rural)	19400	353500	1.631455
29	Warangal (Urban)	25788035	1795230	-0.588629
30	Yadadri Bhongir	1728600	4489374	0.374560

```python
In [135]: dom.reset_index(inplace=True)
          dom.drop("index", axis=1, inplace=True)
```

```python
In [136]: pop["dom_visitors"] = dom["2019"]
```

In [137]: pop

Out[137]:

	District Name	As per 2011 census	Estimated Population in 2023	2019	dom_visitors
0	Adilabad	708972	768667	748769	775895
1	Bhadradri Kothagudem	1069261	1159293	1129283	12817737
2	Hyderabad	3943323	4275351	4164675	13802362
3	Jagitial	985417	1068389	1040732	3086115
4	Jangaon	566376	614065	598169	328890
5	Jayashankar Bhupalpally	416763	451854	440157	662530
6	Jogulamba Gadwal	609990	661351	644231	2007995
7	Kamareddy	972625	1054520	1027222	534
8	Karimnagar	1005711	1090392	1062165	77491
9	Khammam	1401639	1519657	1480318	1413440
10	Komaram Bheem	515812	559243	544766	19189
11	Mahabubabad	774549	839766	818027	152885
12	Mahabubnagar	919903	997359	971541	2534815
13	Mancherial	807037	874990	852339	269810
14	Medak	767428	832045	810506	5452570
15	Medchal–Malkajgiri	2440073	2645527	2577043	0
16	Mulugu	257744	279446	272212	1819800
17	Nagarkurnool	893308	968525	943453	2093312
18	Nalgonda	1618416	1754687	1709264	140918
19	Narayanpet	566874	614605	598695	389250
20	Nirmal	709418	769151	749240	3816778
21	Nizamabad	1571022	1703302	1659209	46333
22	Peddapalli	795332	862299	839977	16581
23	Rajanna Sircilla	552037	598519	583025	16832897
24	Ranga Reddy	2446265	2652241	2583583	0
25	Sangareddy	1527628	1656254	1613379	4553160
26	Siddipet	1012065	1097281	1068876	2987864
27	Suryapet	1099560	1192143	1161282	0
28	Vikarabad	927140	1005205	979184	0
29	Wanaparthy	577758	626405	610190	298639
30	Warangal Rural	718537	779038	758871	353500
31	Warangal Urban	1080858	1171866	1141530	1795230
32	Yadadri Bhuvanagiri	739448	801710	780956	4489374

```
In [138]: foreign_v = pd.DataFrame({"district":districts})
```

```
In [139]: foreign.groupby(["year","district"])["visitors"].sum()
```

```
Out[139]: year   district
          2016   Adilabad                        10
                 Bhadradri Kothagudem             0
                 Hyderabad                   163631
                 Jagtial                          0
                 Jangaon                          2
                 Jayashankar Bhoopalpally        86
                 Jogulamba Gadwal                45
                 Kamareddy                        0
                 Karimnagar                       0
                 Khammam                          0
                 Komaram Bheem Asifabad           0
                 Mahabubabad                      0
                 Mahbubnagar                    868
                 Mancherial                       0
                 Medak                            0
                 Medchal                          0
                 Nagarkurnool                    29
                 Nalgonda                         0
```

```
In [140]: for_2019=[]
          for i in districts:
              foreign_2019 = foreign[foreign["year"]==2019]
              fore = foreign_2019[foreign_2019["district"]==i].visitors.sum()
              for_2019.append(fore)
          foreign_v["2019"]=for_2019
```

In [141]: `foreign_v`

Out[141]:

	district	2019
0	Adilabad	6
1	Bhadradri Kothagudem	0
2	Hyderabad	319300
3	Jagtial	0
4	Jangaon	0
5	Jayashankar Bhoopalpally	45
6	Jogulamba Gadwal	295
7	Kamareddy	0
8	Karimnagar	0
9	Khammam	0
10	Komaram Bheem Asifabad	0
11	Mahabubabad	0
12	Mahbubnagar	440
13	Mancherial	10
14	Medak	0
15	Medchal	0
16	Nagarkurnool	199
17	Nalgonda	0
18	Nirmal	0
19	Nizamabad	1
20	Peddapalli	0
21	Rajanna Sircilla	0
22	Ranga Reddy	0
23	Sangareddy	0
24	Siddipet	0
25	Suryapet	0
26	Vikarabad	0
27	Wanaparthy	0
28	Warangal (Rural)	0
29	Warangal (Urban)	2450
30	Yadadri Bhongir	0
31	Mulugu	575
32	Narayanapet	0

In [142]: `foreign_v = foreign_v.sort_values(by="district")`

In [143]:
```python
foreign_v = foreign_v.reset_index()
foreign_v.drop("index", axis=1, inplace=True)
```

In [144]:
```python
pop["for_visitors"] = foreign_v["2019"]
```

In [145]: pop

Out[145]:

	District Name	As per 2011 census	Estimated Population in 2023	2019	dom_visitors	for_visitors
0	Adilabad	708972	768667	748769	775895	6
1	Bhadradri Kothagudem	1069261	1159293	1129283	12817737	0
2	Hyderabad	3943323	4275351	4164675	13802362	319300
3	Jagitial	985417	1068389	1040732	3086115	0
4	Jangaon	566376	614065	598169	328890	0
5	Jayashankar Bhupalpally	416763	451854	440157	662530	45
6	Jogulamba Gadwal	609990	661351	644231	2007995	295
7	Kamareddy	972625	1054520	1027222	534	0
8	Karimnagar	1005711	1090392	1062165	77491	0
9	Khammam	1401639	1519657	1480318	1413440	0
10	Komaram Bheem	515812	559243	544766	19189	0
11	Mahabubabad	774549	839766	818027	152885	0
12	Mahabubnagar	919903	997359	971541	2534815	440
13	Mancherial	807037	874990	852339	269810	10
14	Medak	767428	832045	810506	5452570	0
15	Medchal–Malkajgiri	2440073	2645527	2577043	0	0
16	Mulugu	257744	279446	272212	1819800	575
17	Nagarkurnool	893308	968525	943453	2093312	199
18	Nalgonda	1618416	1754687	1709264	140918	0
19	Narayanpet	566874	614605	598695	389250	0
20	Nirmal	709418	769151	749240	3816778	0
21	Nizamabad	1571022	1703302	1659209	46333	1
22	Peddapalli	795332	862299	839977	16581	0
23	Rajanna Sircilla	552037	598519	583025	16832897	0
24	Ranga Reddy	2446265	2652241	2583583	0	0
25	Sangareddy	1527628	1656254	1613379	4553160	0
26	Siddipet	1012065	1097281	1068876	2987864	0
27	Suryapet	1099560	1192143	1161282	0	0
28	Vikarabad	927140	1005205	979184	0	0
29	Wanaparthy	577758	626405	610190	298639	0
30	Warangal Rural	718537	779038	758871	353500	0
31	Warangal Urban	1080858	1171866	1141530	1795230	2450
32	Yadadri Bhuvanagiri	739448	801710	780956	4489374	0

```python
In [146]: total=[]
          for i in range(len(pop)):
              sum = pop.iloc[i,4] + pop.iloc[i,5]
              total.append(sum)
```

```python
In [147]: pop["Total_Visitors"] = total
```

In [148]: pop

Out[148]:

	District Name	As per 2011 census	Estimated Population in 2023	2019	dom_visitors	for_visitors	Total_Visitors
0	Adilabad	708972	768667	748769	775895	6	775901
1	Bhadradri Kothagudem	1069261	1159293	1129283	12817737	0	12817737
2	Hyderabad	3943323	4275351	4164675	13802362	319300	14121662
3	Jagitial	985417	1068389	1040732	3086115	0	3086115
4	Jangaon	566376	614065	598169	328890	0	328890
5	Jayashankar Bhupalpally	416763	451854	440157	662530	45	662575
6	Jogulamba Gadwal	609990	661351	644231	2007995	295	2008290
7	Kamareddy	972625	1054520	1027222	534	0	534
8	Karimnagar	1005711	1090392	1062165	77491	0	77491
9	Khammam	1401639	1519657	1480318	1413440	0	1413440
10	Komaram Bheem	515812	559243	544766	19189	0	19189
11	Mahabubabad	774549	839766	818027	152885	0	152885
12	Mahabubnagar	919903	997359	971541	2534815	440	2535255
13	Mancherial	807037	874990	852339	269810	10	269820
14	Medak	767428	832045	810506	5452570	0	5452570
15	Medchal–Malkajgiri	2440073	2645527	2577043	0	0	0
16	Mulugu	257744	279446	272212	1819800	575	1820375
17	Nagarkurnool	893308	968525	943453	2093312	199	2093511
18	Nalgonda	1618416	1754687	1709264	140918	0	140918
19	Narayanpet	566874	614605	598695	389250	0	389250
20	Nirmal	709418	769151	749240	3816778	0	3816778
21	Nizamabad	1571022	1703302	1659209	46333	1	46334
22	Peddapalli	795332	862299	839977	16581	0	16581
23	Rajanna Sircilla	552037	598519	583025	16832897	0	16832897
24	Ranga Reddy	2446265	2652241	2583583	0	0	0
25	Sangareddy	1527628	1656254	1613379	4553160	0	4553160
26	Siddipet	1012065	1097281	1068876	2987864	0	2987864
27	Suryapet	1099560	1192143	1161282	0	0	0
28	Vikarabad	927140	1005205	979184	0	0	0
29	Wanaparthy	577758	626405	610190	298639	0	298639
30	Warangal Rural	718537	779038	758871	353500	0	353500
31	Warangal Urban	1080858	1171866	1141530	1795230	2450	1797680

	District Name	As per 2011 census	Estimated Population in 2023	2019	dom_visitors	for_visitors	Total_Visitors
32	Yadadri Bhuvanagiri	739448	801710	780956	4489374	0	4489374

In [149]:
```python
pt_footfall_ratio = []
for i in range(len(df)):
    r = pop.iloc[i,6]/pop.iloc[i,3]
    pt_footfall_ratio.append(r)
```

In [150]:
```python
pop["pt_ratio"] = pt_footfall_ratio
```

In [151]:
```python
pop["pt_ratio"] = pop["pt_ratio"].round(decimals=2)
```

In [152]: pop

Out[152]:

	District Name	As per 2011 census	Estimated Population in 2023	2019	dom_visitors	for_visitors	Total_Visitors	p
0	Adilabad	708972	768667	748769	775895	6	775901	
1	Bhadradri Kothagudem	1069261	1159293	1129283	12817737	0	12817737	
2	Hyderabad	3943323	4275351	4164675	13802362	319300	14121662	
3	Jagitial	985417	1068389	1040732	3086115	0	3086115	
4	Jangaon	566376	614065	598169	328890	0	328890	
5	Jayashankar Bhupalpally	416763	451854	440157	662530	45	662575	
6	Jogulamba Gadwal	609990	661351	644231	2007995	295	2008290	
7	Kamareddy	972625	1054520	1027222	534	0	534	
8	Karimnagar	1005711	1090392	1062165	77491	0	77491	
9	Khammam	1401639	1519657	1480318	1413440	0	1413440	
10	Komaram Bheem	515812	559243	544766	19189	0	19189	
11	Mahabubabad	774549	839766	818027	152885	0	152885	
12	Mahabubnagar	919903	997359	971541	2534815	440	2535255	
13	Mancherial	807037	874990	852339	269810	10	269820	
14	Medak	767428	832045	810506	5452570	0	5452570	
15	Medchal–Malkajgiri	2440073	2645527	2577043	0	0	0	
16	Mulugu	257744	279446	272212	1819800	575	1820375	
17	Nagarkurnool	893308	968525	943453	2093312	199	2093511	
18	Nalgonda	1618416	1754687	1709264	140918	0	140918	
19	Narayanpet	566874	614605	598695	389250	0	389250	
20	Nirmal	709418	769151	749240	3816778	0	3816778	
21	Nizamabad	1571022	1703302	1659209	46333	1	46334	
22	Peddapalli	795332	862299	839977	16581	0	16581	
23	Rajanna Sircilla	552037	598519	583025	16832897	0	16832897	
24	Ranga Reddy	2446265	2652241	2583583	0	0	0	
25	Sangareddy	1527628	1656254	1613379	4553160	0	4553160	
26	Siddipet	1012065	1097281	1068876	2987864	0	2987864	
27	Suryapet	1099560	1192143	1161282	0	0	0	
28	Vikarabad	927140	1005205	979184	0	0	0	
29	Wanaparthy	577758	626405	610190	298639	0	298639	
30	Warangal Rural	718537	779038	758871	353500	0	353500	
31	Warangal Urban	1080858	1171866	1141530	1795230	2450	1797680	

	District Name	As per 2011 census	Estimated Population in 2023	2019	dom_visitors	for_visitors	Total_Visitors	p
32	Yadadri Bhuvanagiri	739448	801710	780956	4489374	0	4489374	

In [153]: `pop.to_csv("population tourist footfall ratio (2019)")`

In [154]: `pop.sort_values(by="pt_ratio", ascending=False, inplace=True)`

In [155]: `pop.head()`

Out[155]:

	District Name	As per 2011 census	Estimated Population in 2023	2019	dom_visitors	for_visitors	Total_Visitors	pt_r
23	Rajanna Sircilla	552037	598519	583025	16832897	0	16832897	2
1	Bhadradri Kothagudem	1069261	1159293	1129283	12817737	0	12817737	1
14	Medak	767428	832045	810506	5452570	0	5452570	
16	Mulugu	257744	279446	272212	1819800	575	1820375	
32	Yadadri Bhuvanagiri	739448	801710	780956	4489374	0	4489374	

In [156]: `pop.head().plot("District Name","pt_ratio", kind="bar")`

Out[156]: `<AxesSubplot:xlabel='District Name'>`
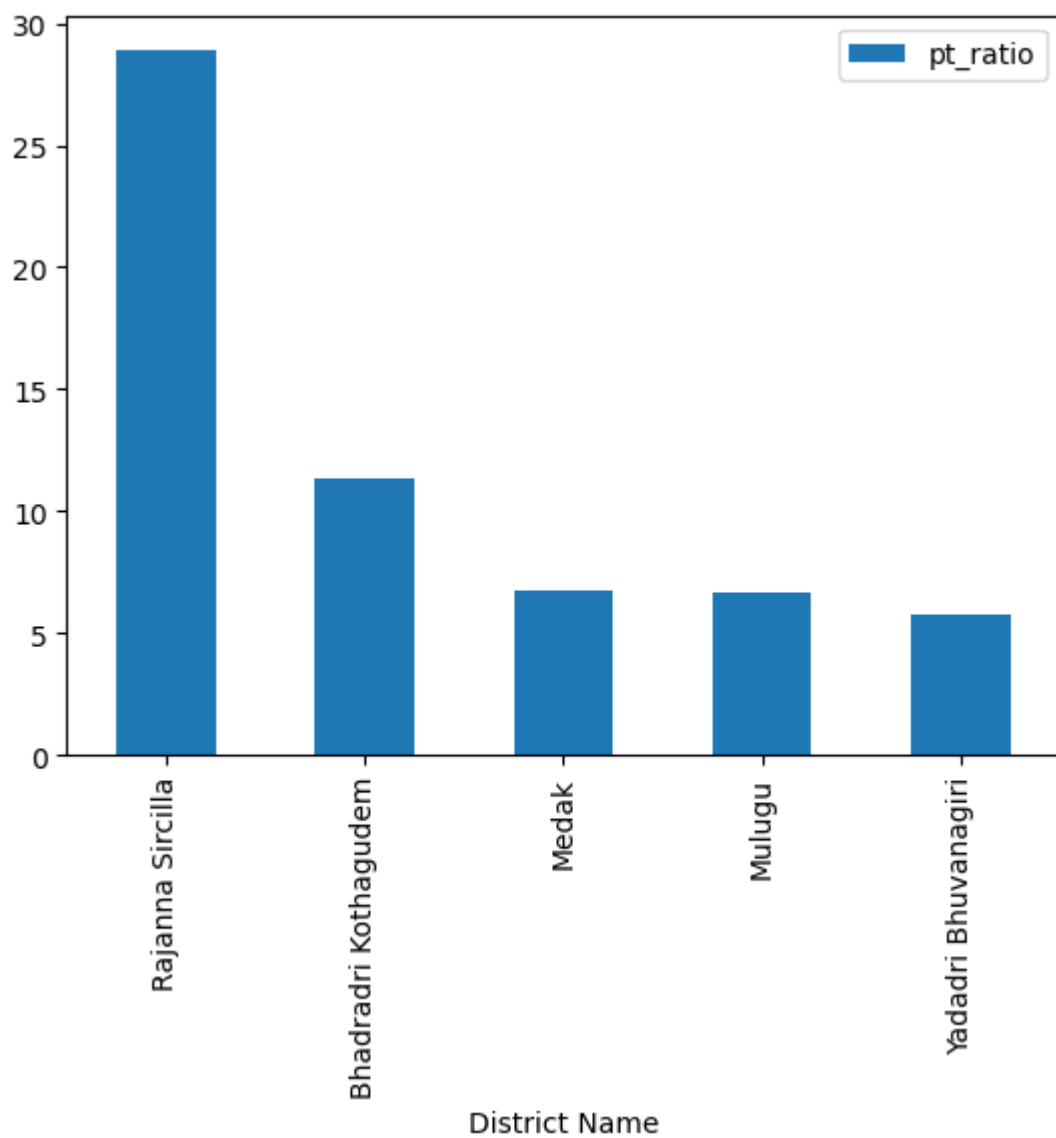
In [159]:
```python
import matplotlib.pyplot as plt

# Assuming you have a DataFrame called pop with 'District Name' and 'pt_rat

# Select the top 5 rows for plotting
top5_districts = pop.head()

# Create a bar chart
plt.figure(figsize=(10, 6))  # Adjust the figure size as needed
plt.bar(top5_districts["District Name"], top5_districts["pt_ratio"], color=

# Adding labels and titles
plt.xlabel("District Name")
plt.ylabel("PT Ratio")
plt.title("Top 5 Districts by PT Ratio")

# Rotating x-axis labels for better readability if needed
plt.xticks(rotation=45)

# Adding data labels to the bars
for i, value in enumerate(top5_districts["pt_ratio"]):
    plt.text(i, value, f'{value:.2f}', ha='center', va='bottom')

# Display the chart
plt.tight_layout()
plt.show()
```
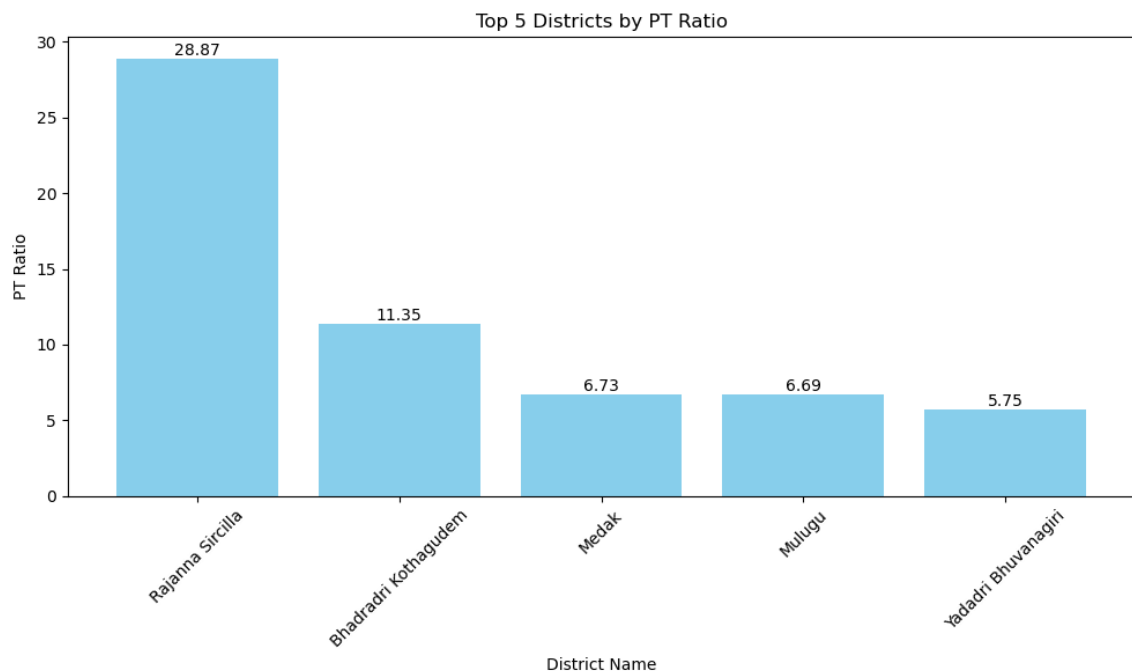

Top 5 Districts by PT Ratio

In [157]:
```
pop.tail()
```

Out[157]:

	District Name	As per 2011 census	Estimated Population in 2023	2019	dom_visitors	for_visitors	Total_Visitors	pt_ra
7	Kamareddy	972625	1054520	1027222	534	0	534	
15	Medchal–Malkajgiri	2440073	2645527	2577043	0	0	0	
28	Vikarabad	927140	1005205	979184	0	0	0	
27	Suryapet	1099560	1192143	1161282	0	0	0	
24	Ranga Reddy	2446265	2652241	2583583	0	0	0	

In [158]:
```
pop.tail().plot("District Name","pt_ratio", kind="bar")
```

Out[158]: `<AxesSubplot:xlabel='District Name'>`
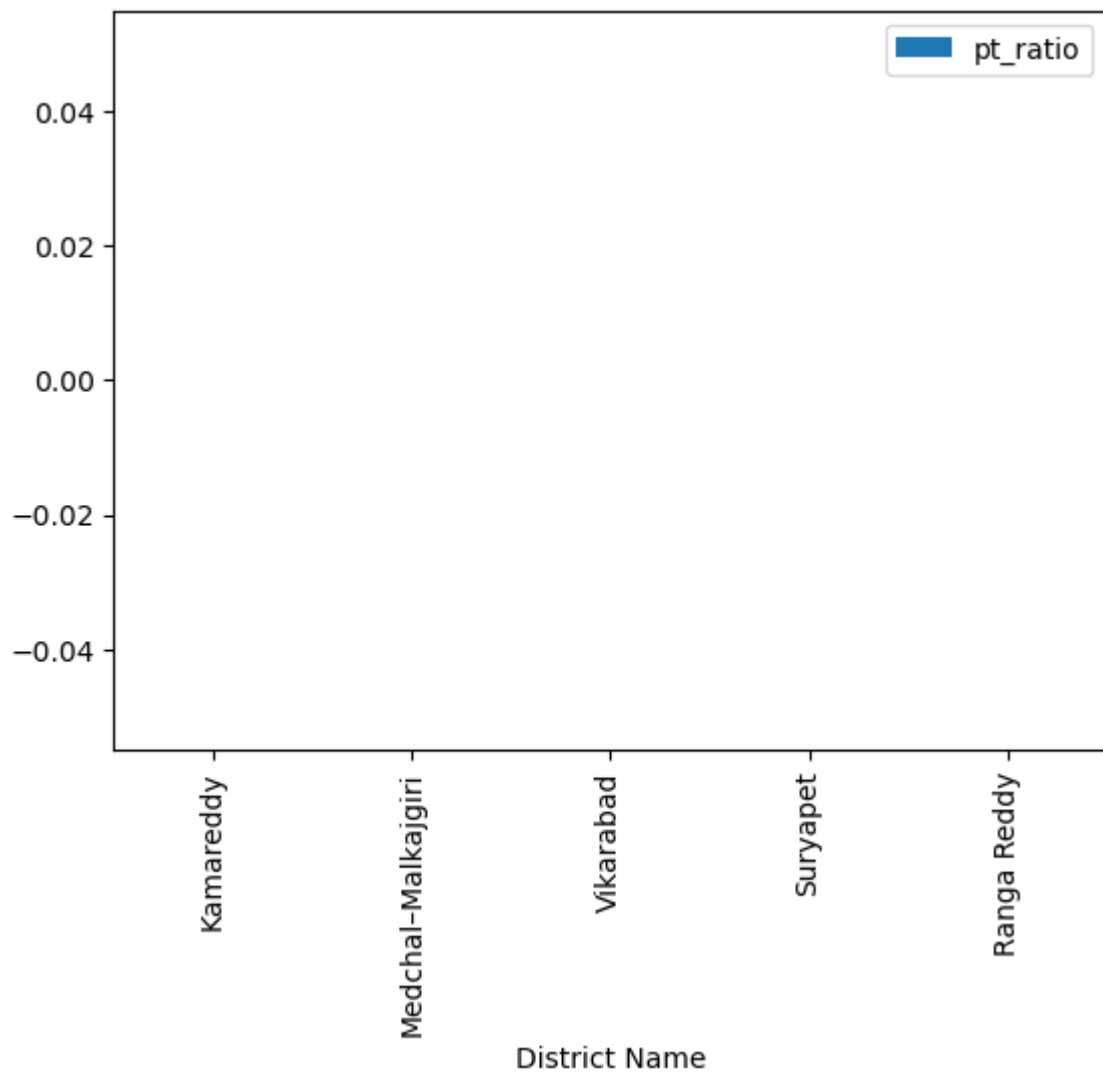
In [160]:
```python
import matplotlib.pyplot as plt

# Assuming you have a DataFrame called pop with 'District Name' and 'pt_rat

# Select the bottom 5 rows for plotting
tail5_districts = pop.tail()

# Create a bar chart
plt.figure(figsize=(10, 6))  # Adjust the figure size as needed
plt.bar(tail5_districts["District Name"], tail5_districts["pt_ratio"], colo

# Adding labels and titles
plt.xlabel("District Name")
plt.ylabel("PT Ratio")
plt.title("Bottom 5 Districts by PT Ratio")

# Rotating x-axis labels for better readability if needed
plt.xticks(rotation=45)

# Adding data labels to the bars
for i, value in enumerate(tail5_districts["pt_ratio"]):
    plt.text(i, value, f'{value:.2f}', ha='center', va='bottom')

# Display the chart
plt.tight_layout()
plt.show()
```