Data Analysis - IT Helpdesk Tickets

Most names have been encrypted to help protect personal data. Some names were replaced with randomly generated names, using the following name generator:

Fossbytes Name Generator

https://fossbytes.com/tools/random-name-generator

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

In [2]:
```
df = pd.read_csv('Requests-before-2023.csv')
```

In [3]:
```
df = df.set_index('Request ID')
df = df.sort_index(ascending=True)
```

In [4]:
```
df.info()
df.head()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 9562 entries, 9067 to 20479
Data columns (total 11 columns):
 #   Column                Non-Null Count  Dtype 
---  ------                --------------  ----- 
 0   Subject               9562 non-null   object
 1   Branch or Department  9562 non-null   object
 2   Created Date          9562 non-null   object
 3   Resolved Date         9562 non-null   object
 4   Last Update Time      9562 non-null   object
 5   DueBy Date            9562 non-null   object
 6   Completed Date        9562 non-null   object
 7   Requester             9562 non-null   object
 8   Technician            9562 non-null   object
 9   Priority              9562 non-null   object
 10  Status                9562 non-null   object
dtypes: object(11)
memory usage: 896.4+ KB
```

Out[4]:

Request ID	Subject	Branch or Department	Created Date	Resolved Date	Last Update Time	DueBy Date	Completed Date	Requester	T
9067	Locke's TVs in open area don't work	-	Feb 21, 2016 06:28 PM	Feb 21, 2016 06:28 PM	-	-	Feb 21, 2016 06:28 PM	Kinkus, Mary	
9068	PopTeen: iMac #12	-	Feb 21, 2016 06:28 PM	Apr 1, 2016 12:32 PM	Apr 1, 2016 12:32 PM	-	Apr 1, 2016 12:32 PM	Lutz, David	I
9069	Ext. 5264 Answers on Speakerphone	-	Feb 21, 2016 06:28 PM	Feb 21, 2016 06:28 PM	-	-	Feb 21, 2016 06:28 PM	Hebert, Gayle	
9070	pc 18 in Pop/Teen	-	Feb 21, 2016 06:28 PM	Feb 21, 2016 06:28 PM	-	-	Feb 21, 2016 06:28 PM	Shriner, Martin	I
9071	bad copies of windows in Pop/Teen	-	Feb 21, 2016 06:28 PM	Mar 22, 2016 11:27 AM	Mar 22, 2016 11:27 AM	-	Mar 22, 2016 11:27 AM	Shriner, Martin	I

In [5]:
```
df['Created Date'] = pd.to_datetime(df['Created Date'])
df['Resolved Date'] = pd.to_datetime(df['Resolved Date'], errors='coerce')
df['Last Update Time'] = pd.to_datetime(df['Last Update Time'], errors='coerce')
df['DueBy Date'] = pd.to_datetime(df['DueBy Date'], errors='coerce')
df['Completed Date'] = pd.to_datetime(df['Completed Date'], errors='coerce')
```

In [6]:
```
# Prevent false positive error when running code in future cells
pd.options.mode.chained_assignment = None
```

In [7]:
```
# find tickets where resolved date is not 2016-02-21
# find tickets where agency is not '-'
#df['Resolved Date'] > datetime.date(2016,2,21)
df_backup = df
df = df[(df['Resolved Date'] > '2016-02-22') & (df['Branch or Department'] != '-')]
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 7243 entries, 11435 to 20479
Data columns (total 11 columns):
 #   Column                Non-Null Count  Dtype
---  ------                --------------  -----
 0   Subject               7243 non-null   object
 1   Branch or Department  7243 non-null   object
 2   Created Date          7243 non-null   datetime64[ns]
 3   Resolved Date         7243 non-null   datetime64[ns]
 4   Last Update Time      7185 non-null   datetime64[ns]
 5   DueBy Date            3937 non-null   datetime64[ns]
 6   Completed Date        7232 non-null   datetime64[ns]
 7   Requester             7243 non-null   object
 8   Technician            7243 non-null   object
 9   Priority              7243 non-null   object
 10  Status                7243 non-null   object
dtypes: datetime64[ns](5), object(6)
memory usage: 679.0+ KB
```

In [8]:
```
df.head()
```

Out[8]:

Request ID	Subject	Branch or Department	Created Date	Resolved Date	Last Update Time	DueBy Date	Completed Date
11435	Events on Screen at Waterville	WATERVILLE	2017-07-25 16:25:00	2017-08-02 14:03:00	2017-08-02 08:55:00	2017-07-26 00:25:00	2017-08-02 14:03:00
11448	Children's PC 2	WEST TOLEDO	2017-07-27 15:18:00	2017-07-28 10:21:00	2017-07-28 10:21:00	NaT	2017-07-28 10:21:00
11450	Barcode scanner on selfcheck not working	HEATHERDOWNS	2017-07-27 15:50:00	2017-08-03 13:26:00	2017-08-03 13:26:00	2017-07-27 16:50:00	2017-08-03 13:26:00
11451	Sanger OPAC1	SANGER	2017-07-27 16:31:00	2017-07-28 12:18:00	2017-07-28 12:18:00	2017-07-27 20:31:00	2017-07-28 12:18:00
11452	South--Celeste unable to access August schedul...	SOUTH	2017-07-27 16:44:00	2017-07-28 09:31:00	2017-07-28 09:31:00	2017-07-27 17:44:00	2017-07-28 09:31:00

In [9]:
```
df.Technician.unique()
```

Out[9]:
```
array(['Roxanna Foster', 'Alyssa Burke', 'Duane Ackley',
       'Jonathan Hoover', 'Ben Bolbach', 'Shazad Bakhsh', 'Dave Misko',
       'IT Tech', '-', 'Tom Gray', 'Andy Lechlak', 'Jeff Wale',
       'Donna Spychala', 'Kristie Lanzotti', 'Collins Onyia'],
      dtype=object)
```

In [10]:
```
df.Technician.value_counts()
```

Out[10]:
```
Jonathan Hoover     2143
Alyssa Burke        1586
Shazad Bakhsh        878
Duane Ackley         820
-                    727
Collins Onyia        411
Roxanna Foster       254
Dave Misko           230
IT Tech              124
Ben Bolbach           48
Andy Lechlak          14
Jeff Wale              5
Tom Gray               1
Donna Spychala         1
Kristie Lanzotti       1
Name: Technician, dtype: int64
```

In [11]:
```
df_agency = df['Branch or Department'].value_counts()
df['Branch or Department'].value_counts()
```

Out[11]:

WEST TOLEDO	516
SANGER	407
KING ROAD	399
REYNOLDS CORNERS	344
OREGON	334
SYLVANIA	298
HOLLAND	275
MOTT	267
WASHINGTON	259
LAGRANGE	257
Technical Services	250
LOCKE	248
KENT	222
WATERVILLE	221
Local History	217
Fact and Fiction	199
Computers and Media	192
TOLEDO HEIGHTS	187
HEATHERDOWNS	187
BIRMINGHAM	174
MAUMEE	169
POINT PLACE	151
Teen / Making Space	142
Children's Library	137
Main Circulation	136
SOUTH	110
Marketing	99
MOBILE SERVICES	79
Director's Office	72
Children's Library/Teen Library-Metro	63
Human Resources	62
Humanities	53
Youth Services	52
Development Office	41
OUTREACH	39
Public Services	38
Cherry Street Mission	36
Facilities & Operations	35
Business Technology	33
Finance	28
Business and Workforce Development	28
Main Library Manager	27
Popular Library	25
Branch Services	23
Audio/Visual	23
Security	22
Information Technology	20
Adult Services	18
Friends of the Library	13
Read for Literacy	9
Classics Gift Shop	3
Institutional & Community Initiatives	2
Virtual Services	1
External and Governmental Affairs	1

Name: Branch or Department, dtype: int64

In [12]:
```
ser_agency_counts = df['Branch or Department'].value_counts()
ser_agency_counts.to_csv('!ticket-totals-per-branch.csv')
```

The following will select all helpdesk tickets created in the year 2020. It will then group them by the Branch or Department and show how many tickets each one had that year, sorted in descending order.

This can be done for each year and gives us very useful information about which branches have more reported technology issues, and how these numbers change over time.

In [13]:
```
# Create totals for each branch, by year.
df_2020 = df[df['Created Date'].dt.year == 2020]
```

In [14]:
```
df_2020.head()
```

Out[14]:

Request ID	Subject	Branch or Department	Created Date	Resolved Date	Last Update Time	DueBy Date	Completed Date	
15685	public bw printing legal as default	SYLVANIA	2020-01-02 09:40:00	2020-01-02 10:26:00	2020-01-02 10:26:00	NaT	2020-01-02 10:26:00	
15686	Images in Time is Down	Local History	2020-01-02 10:25:00	2020-01-02 11:47:00	2020-01-02 11:47:00	2020-01-02 14:25:00	2020-01-02 11:47:00	
15687	obituary request link is down	Local History	2020-01-02 10:58:00	2020-01-02 11:41:00	2020-01-02 11:41:00	2020-01-02 11:58:00	2020-01-02 11:41:00	v
15688	Database Maintenance for obituaries is down	Local History	2020-01-02 11:02:00	2020-01-02 11:40:00	2020-01-02 11:40:00	2020-01-02 12:02:00	2020-01-02 11:40:00	v
15689	Install Vidbox Software on Media Conversion PC...	Teen / Making Space	2020-01-02 11:28:00	2020-03-06 14:20:00	2020-03-06 14:20:00	NaT	2020-03-06 14:20:00	

In [15]:
```
df_2020['Branch or Department'].value_counts()
```

Out[15]:

```
WEST TOLEDO                          108
SANGER                                77
Computers and Media                   70
Technical Services                    69
Fact and Fiction                      67
KING ROAD                             67
REYNOLDS CORNERS                      59
HOLLAND                               57
SYLVANIA                              49
OREGON                                49
BIRMINGHAM                            48
WASHINGTON                            47
TOLEDO HEIGHTS                        43
KENT                                  42
LOCKE                                 40
MOTT                                  40
LAGRANGE                              40
WATERVILLE                            32
Local History                         30
Teen / Making Space                   30
MAUMEE                                28
POINT PLACE                           27
HEATHERDOWNS                          26
MOBILE SERVICES                       26
Human Resources                       24
Children's Library                    23
Marketing                             21
Main Circulation                      16
Public Services                       14
Branch Services                       10
Director's Office                      9
Adult Services                         6
Friends of the Library                 6
Business and Workforce Development     5
Finance                                5
Security                               5
SOUTH                                  5
Youth Services                         4
Development Office                     3
Information Technology                 3
Cherry Street Mission                  2
Main Library Manager                   1
Facilities & Operations                1
Name: Branch or Department, dtype: int64
```

In [16]:

```
# Columns are dates (month-year)
df['month_year_created'] = df['Created Date'].dt.to_period('M')

df['month_year_created'].head(10)
```

Out[16]:
```
Request ID
11435    2017-07
11448    2017-07
11450    2017-07
11451    2017-07
11452    2017-07
11453    2017-07
11454    2017-07
11455    2017-07
11456    2017-07
11457    2017-07
Name: month_year_created, dtype: period[M]
```

In [17]:
```
# Rows are Agencies
rows_branch = df['Branch or Department'].unique()
```

In [18]:
```
rows_branch
```

Out[18]:
```
array(['WATERVILLE', 'WEST TOLEDO', 'HEATHERDOWNS', 'SANGER', 'SOUTH',
       'SYLVANIA', 'HOLLAND', 'Audio/Visual', 'Humanities', 'KING ROAD',
       'LOCKE', "Director's Office", 'Technical Services', 'MOTT',
       'OREGON', 'BIRMINGHAM', 'KENT', 'Security',
       "Children's Library/Teen Library-Metro", 'TOLEDO HEIGHTS',
       'MAUMEE', 'REYNOLDS CORNERS', 'Local History', 'Popular Library',
       'OUTREACH', 'Marketing', 'WASHINGTON', 'Main Circulation',
       'LAGRANGE', 'POINT PLACE', 'Information Technology',
       'Business Technology', 'Main Library Manager', 'Branch Services',
       'Classics Gift Shop', 'Virtual Services', 'Human Resources',
       'Read for Literacy', 'Youth Services', 'Development Office',
       'Cherry Street Mission', 'Finance', 'Facilities & Operations',
       'Friends of the Library', 'MOBILE SERVICES', 'Adult Services',
       'Institutional & Community Initiatives', 'Teen / Making Space',
       'Computers and Media', "Children's Library", 'Fact and Fiction',
       'Business and Workforce Development', 'Public Services',
       'External and Governmental Affairs'], dtype=object)
```

In [19]:
```
df['resolved_time'] = (df['Resolved Date'] - df['Created Date']).dt.days
```

In [20]:
```
df.head()
```

Out[20]:

Request ID	Subject	Branch or Department	Created Date	Resolved Date	Last Update Time	DueBy Date	Completed Date
11435	Events on Screen at Waterville	WATERVILLE	2017-07-25 16:25:00	2017-08-02 14:03:00	2017-08-02 08:55:00	2017-07-26 00:25:00	2017-08-02 14:03:00
11448	Children's PC 2	WEST TOLEDO	2017-07-27 15:18:00	2017-07-28 10:21:00	2017-07-28 10:21:00	NaT	2017-07-28 10:21:00
11450	Barcode scanner on selfcheck not working	HEATHERDOWNS	2017-07-27 15:50:00	2017-08-03 13:26:00	2017-08-03 13:26:00	2017-07-27 16:50:00	2017-08-03 13:26:00
11451	Sanger OPAC1	SANGER	2017-07-27 16:31:00	2017-07-28 12:18:00	2017-07-28 12:18:00	2017-07-27 20:31:00	2017-07-28 12:18:00
11452	South--Celeste unable to access August schedul...	SOUTH	2017-07-27 16:44:00	2017-07-28 09:31:00	2017-07-28 09:31:00	2017-07-27 17:44:00	2017-07-28 09:31:00

In [21]:
```
df['resolved_time'].describe()
```

Out[21]:
```
count    7243.000000
mean        8.162916
std        29.642815
min         0.000000
25%         0.000000
50%         1.000000
75%         5.000000
max      1041.000000
Name: resolved_time, dtype: float64
```

There are a total of nine tickets that were open for more than a year. We will omit these nine outliers that are skewing our statistics.

In [22]:
```
df = df[df['resolved_time'] <= 365]
```

The statistics for how long it took to close 9,217 tickets are shown below:

- There are 9,217 tickets that were resolved in less than one year.
- The average time it took to resolve these tickets was 7.7 days.
- 75% of all tickets were resolved in six days or less.
- The longest time it took to resolve a ticket was 345 days.

In [23]:
```
df['resolved_time'].describe()
```

Out[23]:
```
count    7235.000000
mean        7.582308
std        22.880735
min         0.000000
25%         0.000000
50%         1.000000
75%         5.000000
max       343.000000
Name: resolved_time, dtype: float64
```

In [24]:
```
# Now to work with total tickets per agency, and create our bar chart
xvar = ser_agency_counts.index
yvar = ser_agency_counts.values
print(ser_agency_counts)
```

```
WEST TOLEDO                              516
SANGER                                   407
KING ROAD                                399
REYNOLDS CORNERS                         344
OREGON                                   334
SYLVANIA                                 298
HOLLAND                                  275
MOTT                                     267
WASHINGTON                               259
LAGRANGE                                 257
Technical Services                       250
LOCKE                                    248
KENT                                     222
WATERVILLE                               221
Local History                            217
Fact and Fiction                         199
Computers and Media                      192
TOLEDO HEIGHTS                           187
HEATHERDOWNS                             187
BIRMINGHAM                               174
MAUMEE                                   169
POINT PLACE                              151
Teen / Making Space                      142
Children's Library                       137
Main Circulation                         136
SOUTH                                    110
Marketing                                 99
MOBILE SERVICES                           79
Director's Office                         72
Children's Library/Teen Library-Metro     63
Human Resources                           62
Humanities                                53
Youth Services                            52
Development Office                        41
OUTREACH                                  39
Public Services                           38
Cherry Street Mission                     36
Facilities & Operations                   35
Business Technology                       33
Finance                                   28
Business and Workforce Development        28
Main Library Manager                      27
Popular Library                           25
Branch Services                           23
Audio/Visual                              23
Security                                  22
Information Technology                    20
Adult Services                            18
Friends of the Library                    13
Read for Literacy                          9
Classics Gift Shop                         3
Institutional & Community Initiatives      2
Virtual Services                           1
External and Governmental Affairs          1
Name: Branch or Department, dtype: int64
```

In [25]:
```
ser_agency_counts.to_csv('total-tickets-per-branch.csv')
```

In [26]:
```
df['Created Date'].describe()
```

```
C:\Users\Jonathan\AppData\Local\Temp\ipykernel_20420\412843494.py:1: FutureWarning:
Treating datetime data as categorical rather than numeric in `.describe` is depreca
ted and will be removed in a future version of pandas. Specify `datetime_is_numeric
=True` to silence this warning and adopt the future behavior now.
  df['Created Date'].describe()
```

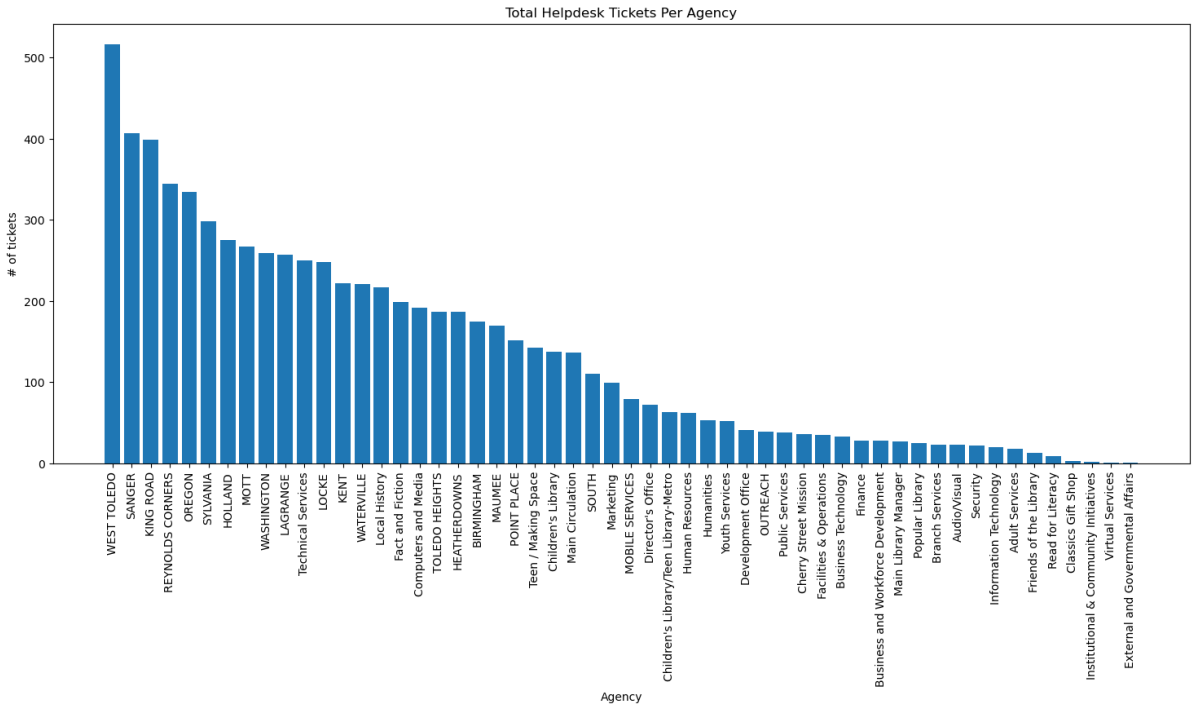
Out[26]:
```
count                    7235
unique                   7196
top       2020-01-24 09:53:00
freq                        2
first     2017-07-25 16:25:00
last      2022-12-30 16:07:00
Name: Created Date, dtype: object
```

In [27]:
```
plt.figure(figsize=(18,7))
plt.bar(xvar, yvar)

plt.title('Total Helpdesk Tickets Per Agency')
plt.xlabel('Agency')
plt.ylabel('# of tickets')

plt.xticks(rotation=90)

plt.savefig(fname='total-tickets-chart.png', bbox_inches='tight')
plt.show()
```



In [28]:
```
ser_agency_counts.describe()
```

Out[28]:
```
count     54.000000
mean     134.129630
std      125.397037
min        1.000000
25%       28.000000
50%       89.000000
75%      220.000000
max      516.000000
Name: Branch or Department, dtype: float64
```

In order to compare number of helpdesk tickets by physical location, we need to group all Main Library locations under one Agency called MAIN.

In [29]:
```
# Create a list of all Main Library agencies
main_agencies = ['Audio/Visual', 'Humanities', "Director's Office", 'Technical Serv
       "Children's Library/Teen Library-Metro", 'Local History', 'Popular Library',
       'Marketing', 'Main Circulation',
       'Information Technology',
       'Business Technology', 'Main Library Manager', 'Branch Services',
       'Classics Gift Shop', 'Virtual Services', 'Human Resources',
       'Read for Literacy', 'Youth Services', 'Development Office',
       'Cherry Street Mission', 'Finance', 'Facilities & Operations',
       'Friends of the Library', 'Adult Services',
       'Institutional & Community Initiatives', 'Teen / Making Space',
       'Computers and Media', "Children's Library", 'Fact and Fiction',
       'Business and Workforce Development', 'Public Services',
       'External and Governmental Affairs']
len(main_agencies)
```

Out[29]:
```
33
```

In [30]:
```
# Change all Main agencies to MAIN
df_backup = df.copy()
df['Branch or Department'] = df['Branch or Department'].replace(main_agencies, 'MAI
```

In [31]:
```
df.head(20)
```

Out[31]:

Request ID	Subject	Branch or Department	Created Date	Resolved Date	Last Update Time	DueBy Date	Completed Date
11435	Events on Screen at Waterville	WATERVILLE	2017-07-25 16:25:00	2017-08-02 14:03:00	2017-08-02 08:55:00	2017-07-26 00:25:00	2017-08-02 14:03:00
11448	Children's PC 2	WEST TOLEDO	2017-07-27 15:18:00	2017-07-28 10:21:00	2017-07-28 10:21:00	NaT	2017-07-28 10:21:00
11450	Barcode scanner on selfcheck not working	HEATHERDOWNS	2017-07-27 15:50:00	2017-08-03 13:26:00	2017-08-03 13:26:00	2017-07-27 16:50:00	2017-08-03 13:26:00
11451	Sanger OPAC1	SANGER	2017-07-27 16:31:00	2017-07-28 12:18:00	2017-07-28 12:18:00	2017-07-27 20:31:00	2017-07-28 12:18:00
11452	South--Celeste unable to access August schedul...	SOUTH	2017-07-27 16:44:00	2017-07-28 09:31:00	2017-07-28 09:31:00	2017-07-27 17:44:00	2017-07-28 09:31:00
11453	Outlook not working on Ref02	SYLVANIA	2017-07-27 16:45:00	2017-07-31 08:02:00	2017-07-31 08:02:00	NaT	2017-07-31 08:02:00
11454	Holland Internet 2, 12 and 20 reporting malware	HOLLAND	2017-07-27 17:32:00	2017-07-29 09:08:00	2017-07-29 09:08:00	2017-07-27 18:32:00	2017-07-29 09:08:00
11455	AVOPAC-01	MAIN	2017-07-27 17:39:00	2017-07-28 12:18:00	2017-07-28 12:18:00	2017-07-27 21:39:00	2017-07-28 12:18:00
11456	SRC Netbook 01	HOLLAND	2017-07-27 18:36:00	2017-07-28 14:07:00	2017-07-28 14:07:00	2017-07-28 02:36:00	2017-07-28 14:07:00
11457	Public Internet PC #10 - not connecting when b...	MAIN	2017-07-28 09:18:00	2017-07-28 12:17:00	2017-07-28 12:17:00	2017-07-28 13:18:00	2017-07-28 12:17:00
11458	Two self checks nearest circ desk not repondin...	KING ROAD	2017-07-28 09:56:00	2017-07-28 09:57:00	2017-07-28 09:57:00	2017-07-28 10:56:00	2017-07-28 09:57:00

Request ID	Subject	Branch or Department	Created Date	Resolved Date	Last Update Time	DueBy Date	Completed Date
11459	Sanginet08 trust relationship failed	SANGER	2017-07-28 12:14:00	2017-07-28 12:14:00	2017-07-28 12:14:00	2017-07-28 13:14:00	2017-07-28 12:14:00
11460	Internet #7	LOCKE	2017-07-28 12:52:00	2017-07-28 13:11:00	2017-07-28 13:11:00	2017-07-28 16:52:00	2017-07-28 13:11:00
11461	Classic Catalog Link to Programs	MAIN	2017-07-28 14:15:00	2017-08-02 08:54:00	2017-07-28 14:47:00	NaT	2017-08-02 08:54:00
11462	Book Kit Form Revision	MAIN	2017-07-28 14:16:00	2017-07-28 14:27:00	2017-07-28 14:27:00	NaT	2017-07-28 14:27:00
11463	Regular pop-ups / possible viruses	MAIN	2017-07-28 15:19:00	2017-07-28 16:24:00	2017-07-28 16:24:00	2017-07-28 19:19:00	2017-07-28 16:24:00
11464	Public PC 8	SANGER	2017-07-29 11:16:00	2017-07-29 11:28:00	2017-07-29 11:28:00	2017-07-29 15:16:00	2017-07-29 11:28:00
11465	Laptop Kit	MOTT	2017-07-29 17:20:00	2017-07-31 15:21:00	2017-07-31 15:21:00	2017-07-29 21:20:00	2017-07-31 15:21:00
11466	Smart Locker screen is flipped upside down	OREGON	2017-07-31 09:53:00	2017-07-31 10:31:00	2017-07-31 10:31:00	NaT	2017-07-31 10:31:00
11467	Computer Issues	MOTT	2017-07-31 10:33:00	2017-08-01 09:05:00	2017-08-01 09:05:00	2017-07-31 11:33:00	2017-08-01 09:05:00

In [32]:
```
df_backup.head(20)
```

Out[32]:

Request ID	Subject	Branch or Department	Created Date	Resolved Date	Last Update Time	DueBy Date	Completed Date
11435	Events on Screen at Waterville	WATERVILLE	2017-07-25 16:25:00	2017-08-02 14:03:00	2017-08-02 08:55:00	2017-07-26 00:25:00	2017-08-02 14:03:00
11448	Children's PC 2	WEST TOLEDO	2017-07-27 15:18:00	2017-07-28 10:21:00	2017-07-28 10:21:00	NaT	2017-07-28 10:21:00
11450	Barcode scanner on selfcheck not working	HEATHERDOWNS	2017-07-27 15:50:00	2017-08-03 13:26:00	2017-08-03 13:26:00	2017-07-27 16:50:00	2017-08-03 13:26:00
11451	Sanger OPAC1	SANGER	2017-07-27 16:31:00	2017-07-28 12:18:00	2017-07-28 12:18:00	2017-07-27 20:31:00	2017-07-28 12:18:00
11452	South--Celeste unable to access August schedul...	SOUTH	2017-07-27 16:44:00	2017-07-28 09:31:00	2017-07-28 09:31:00	2017-07-27 17:44:00	2017-07-28 09:31:00
11453	Outlook not working on Ref02	SYLVANIA	2017-07-27 16:45:00	2017-07-31 08:02:00	2017-07-31 08:02:00	NaT	2017-07-31 08:02:00
11454	Holland Internet 2, 12 and 20 reporting malware	HOLLAND	2017-07-27 17:32:00	2017-07-29 09:08:00	2017-07-29 09:08:00	2017-07-27 18:32:00	2017-07-29 09:08:00
11455	AVOPAC-01	Audio/Visual	2017-07-27 17:39:00	2017-07-28 12:18:00	2017-07-28 12:18:00	2017-07-27 21:39:00	2017-07-28 12:18:00
11456	SRC Netbook 01	HOLLAND	2017-07-27 18:36:00	2017-07-28 14:07:00	2017-07-28 14:07:00	2017-07-28 02:36:00	2017-07-28 14:07:00
11457	Public Internet PC #10 - not connecting when b...	Humanities	2017-07-28 09:18:00	2017-07-28 12:17:00	2017-07-28 12:17:00	2017-07-28 13:18:00	2017-07-28 12:17:00
11458	Two self checks nearest circ desk not repondin...	KING ROAD	2017-07-28 09:56:00	2017-07-28 09:57:00	2017-07-28 09:57:00	2017-07-28 10:56:00	2017-07-28 09:57:00

Request ID	Subject	Branch or Department	Created Date	Resolved Date	Last Update Time	DueBy Date	Completed Date
11459	Sanginet08 trust relationship failed	SANGER	2017-07-28 12:14:00	2017-07-28 12:14:00	2017-07-28 12:14:00	2017-07-28 13:14:00	2017-07-28 12:14:00
11460	Internet #7	LOCKE	2017-07-28 12:52:00	2017-07-28 13:11:00	2017-07-28 13:11:00	2017-07-28 16:52:00	2017-07-28 13:11:00
11461	Classic Catalog Link to Programs	Director's Office	2017-07-28 14:15:00	2017-08-02 08:54:00	2017-07-28 14:47:00	NaT	2017-08-02 08:54:00
11462	Book Kit Form Revision	Technical Services	2017-07-28 14:16:00	2017-07-28 14:27:00	2017-07-28 14:27:00	NaT	2017-07-28 14:27:00
11463	Regular pop-ups / possible viruses	Humanities	2017-07-28 15:19:00	2017-07-28 16:24:00	2017-07-28 16:24:00	2017-07-28 19:19:00	2017-07-28 16:24:00
11464	Public PC 8	SANGER	2017-07-29 11:16:00	2017-07-29 11:28:00	2017-07-29 11:28:00	2017-07-29 15:16:00	2017-07-29 11:28:00
11465	Laptop Kit	MOTT	2017-07-29 17:20:00	2017-07-31 15:21:00	2017-07-31 15:21:00	2017-07-29 21:20:00	2017-07-31 15:21:00
11466	Smart Locker screen is flipped upside down	OREGON	2017-07-31 09:53:00	2017-07-31 10:31:00	2017-07-31 10:31:00	NaT	2017-07-31 10:31:00
11467	Computer Issues	MOTT	2017-07-31 10:33:00	2017-08-01 09:05:00	2017-08-01 09:05:00	2017-07-31 11:33:00	2017-08-01 09:05:00

In [33]:
```
# Find total helpdesk tickets per physical location
ser_location_counts = df['Branch or Department'].value_counts()
print(ser_location_counts)
```

```
MAIN                2095
WEST TOLEDO          516
SANGER               406
KING ROAD            399
REYNOLDS CORNERS     344
OREGON               334
SYLVANIA             298
HOLLAND              275
MOTT                 267
WASHINGTON           259
LAGRANGE             257
LOCKE                248
KENT                 222
WATERVILLE           220
TOLEDO HEIGHTS       187
HEATHERDOWNS         186
BIRMINGHAM           174
MAUMEE               169
POINT PLACE          151
SOUTH                110
MOBILE SERVICES       79
OUTREACH              39
Name: Branch or Department, dtype: int64
```

In [34]:
```
# Descriptive statistics for each location
ser_location_counts.describe()
```

Out[34]:
```
count      22.000000
mean      328.863636
std       409.935105
min        39.000000
25%       177.000000
50%       252.500000
75%       325.000000
max      2095.000000
Name: Branch or Department, dtype: float64
```

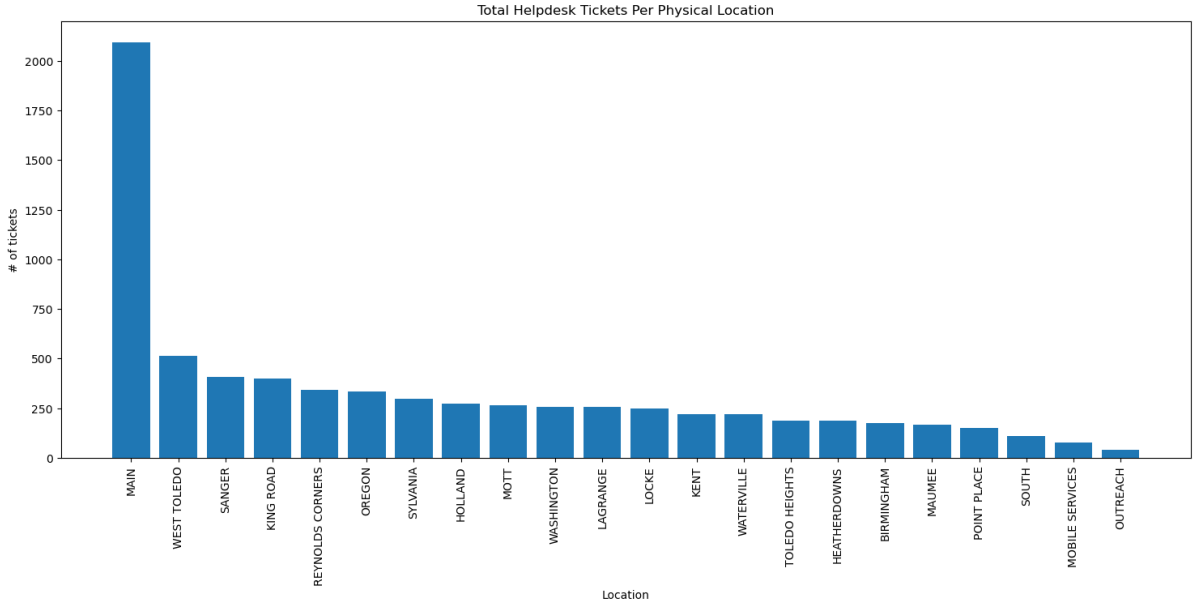
In [35]:
```
# Create x and y variables for chart
xvar = ser_location_counts.index
yvar = ser_location_counts.values
```

In [36]:
```
# Create chart for library locations
plt.figure(figsize=(18,7))
plt.bar(xvar, yvar)

plt.title('Total Helpdesk Tickets Per Physical Location')
plt.xlabel('Location')
plt.ylabel('# of tickets')

plt.xticks(rotation=90)

plt.savefig(fname='total-tickets-location-chart.png', bbox_inches='tight')
plt.show()
```



In [37]:
```
ser_location_counts.to_csv('total-helpdesk-ticket-per-location.csv')
```

In [ ]:
```

```