DSC640 WEEKS 5 & 6

EXERCISE 2.2

Datasets - You may also download them directly from this link:
https://content.bellevue.edu/cst/dsc/640/datasets/ex3-2.zip
(https://content.bellevue.edu/cst/dsc/640/datasets/ex3-2.zip)

Exercise Goal:

You need to submit 3 tree maps, 3 area charts and 3 stacked area charts using Tableau or PowerBI, Python and R using the data below (or your own datasets). You can also submit using D3. You can choose which library to use in Python or R, documentation is provided to help you decide and as you start to play around in the libraries, you will decide which you prefer.

I will be using THE PYTHON GRAPH GALLERY AS A SOURCE OF REFERENCE https://python-graph-gallery.com/201-control-the-color-of-treemap/ (https://python-graph-gallery.com/201-control-the-color-of-treemap/)

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1. Data collection: importing data and analyzing

In [32]:
```
import os
import datetime
import pprint
import pandas as pd
import numpy as np
import squarify
from pandas import ExcelWriter
from pandas import ExcelFile
import matplotlib as mpl
import matplotlib.pyplot as plt
%matplotlib inline
```

In [33]:
```
os.getcwd()
```

Out[33]:
```
'/Users/Cindy/Desktop/00 data640/ex3-3'
```

Load data into dataframe (In the text file, I noticed each line had '/' so I used the sep function to clean the data being read into the dataset.)

In [34]:
```
df1 = pd.read_csv('/Users/Cindy/Desktop/00 data640/ex3-3/unemployement-rate-1948-2010.csv')
df2 = pd.read_csv('/Users/Cindy/Desktop/00 data640/ex3-3/expenditures.txt', sep = '\t')
```

Check the dimension of table and view data Viewing the unmployement data

In [35]:
```
print("The dimension of the table is: ", df.shape)

print(df1)
```

```
The dimension of the table is:  (746, 4)
       Series id  Year Period  Value
0    LNS14000000  1948    M01    3.4
1    LNS14000000  1948    M02    3.8
2    LNS14000000  1948    M03    4.0
3    LNS14000000  1948    M04    3.9
4    LNS14000000  1948    M05    3.5
..           ...   ...    ...    ...
741  LNS14000000  2009    M10   10.1
742  LNS14000000  2009    M11   10.0
743  LNS14000000  2009    M12   10.0
744  LNS14000000  2010    M01    9.7
745  LNS14000000  2010    M02    9.7

[746 rows x 4 columns]
```

Now viewing the expenditures

In [36]:
```
print("The dimension of the table is: ", df2.shape)

print(df2)
```

```
The dimension of the table is:  (350, 4)
     year              category  expenditure  sex
0    2008                  Food         6443    1
1    2008  Alcoholic Beverages          444    1
2    2008               Housing        17109    1
3    2008               Apparel         1801    1
4    2008         Transportation         8604    1
..    ...                   ...          ...  ...
345  1984             Education          303    1
346  1984      Tobacco Products          228    1
347  1984         Miscellaneous          451    1
348  1984    Cash Contributions          706    1
349  1984    Personal Insurance         1897    1

[350 rows x 4 columns]
```

In [37]:
```
df1.head()
```

Out[37]:

	Series id	Year	Period	Value
0	LNS14000000	1948	M01	3.4
1	LNS14000000	1948	M02	3.8
2	LNS14000000	1948	M03	4.0
3	LNS14000000	1948	M04	3.9
4	LNS14000000	1948	M05	3.5

In [38]:
```
df2.head()
```

Out[38]:

	year	category	expenditure	sex
0	2008	Food	6443	1
1	2008	Alcoholic Beverages	444	1
2	2008	Housing	17109	1
3	2008	Apparel	1801	1
4	2008	Transportation	8604	1

2. Data formatting

Calculate the total expenditure for categories in the dataframe

In [49]:
```
df2_cat = df2.groupby(['category'])['expenditure'].sum().reset_index()
df2_cat.head()
```

Out[49]:

	category	expenditure
0	Alcoholic Beverages	8424
1	Apparel	41833
2	Cash Contributions	27987
3	Education	14498
4	Entertainment	44273

Calculate the total expenditure by year in the dataframe

In [50]:
```
df2_year = df2.groupby(['year'])['expenditure'].sum().reset_index()
df2_year.head()
```

Out[50]:

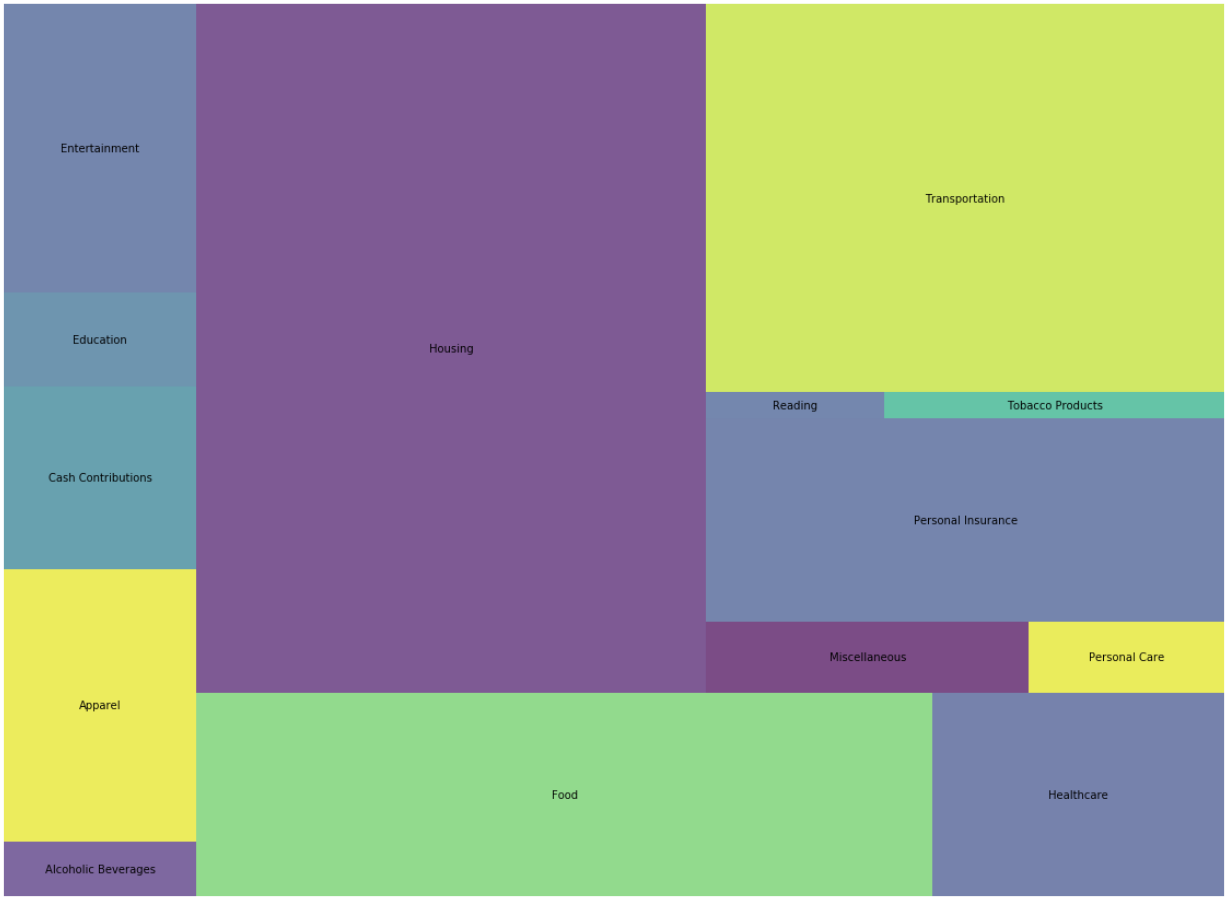
	year	expenditure
0	1984	21972
1	1985	23489
2	1986	23865
3	1987	24415
4	1988	25893

Treemap

I will be using the df2-Expenditure data for this example

In [44]:
```
fig = plt.figure(figsize=(20,15))
squarify.plot(sizes=df2_cat['expenditure'], label=df2_cat['category'],
alpha=.7)
plt.axis('off')
plt.show
```

Out[44]:
```
<function matplotlib.pyplot.show(*args, **kw)>
```

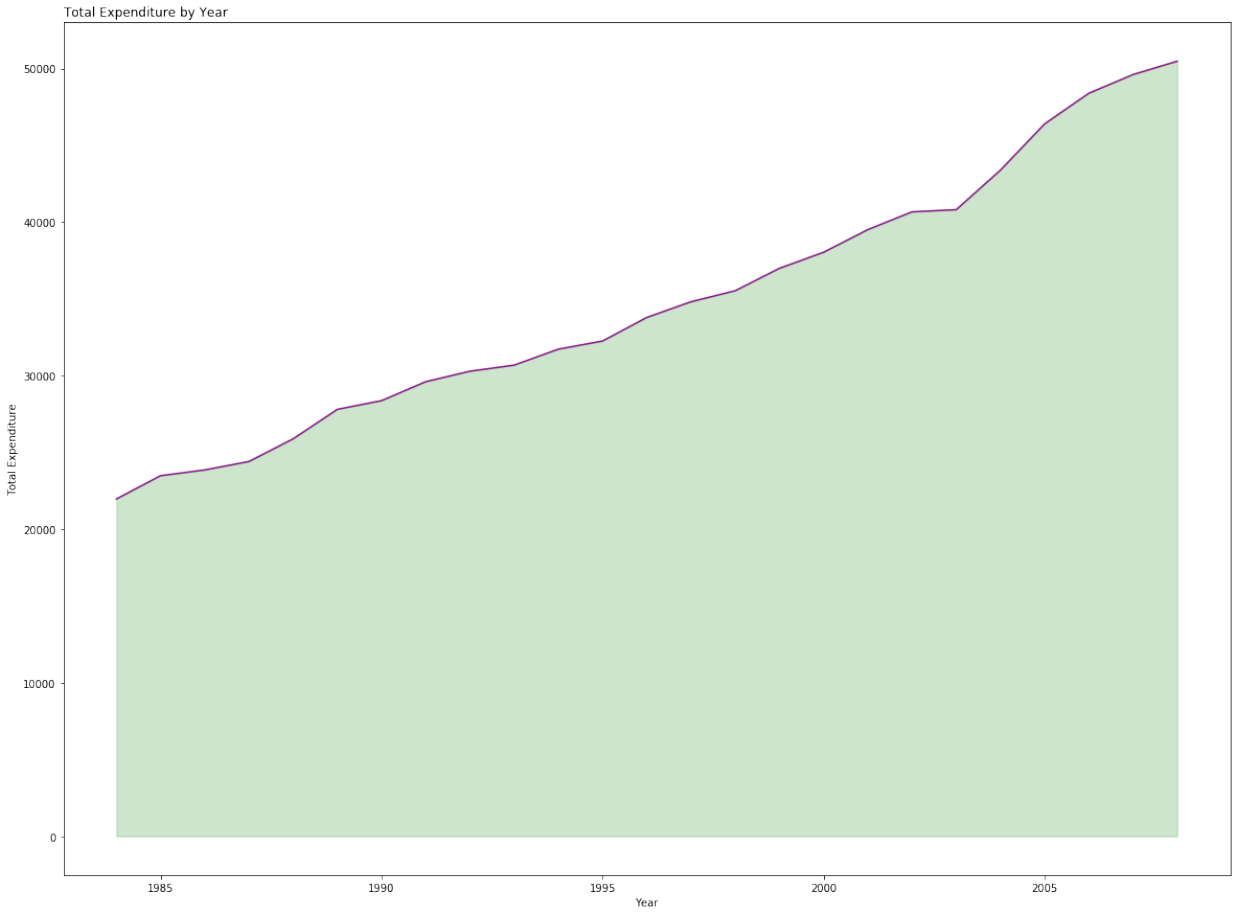


Area Chart

Now in this example we are going to view expenditures over time series

In [53]:
```
fig = plt.figure(figsize=(20,15))
x = df2_year['year']
y = df2_year['expenditure']


plt.fill_between( x, y, color='green', alpha=0.2)
plt.title('Total Expenditure by Year', loc='left')
plt.xlabel('Year')
plt.ylabel('Total Expenditure')
plt.plot(x, y, color='purple', alpha=0.9)
```

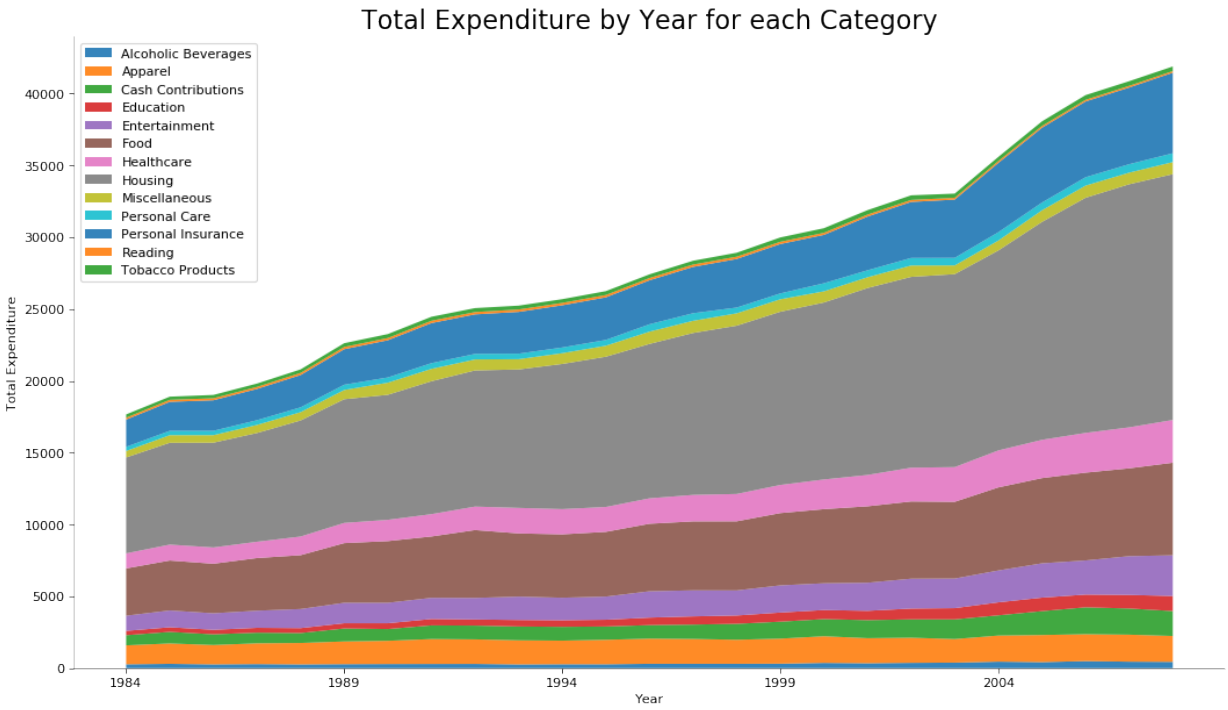
Out[53]:
```
[<matplotlib.lines.Line2D at 0x10fa92d50>]
```



Stacked Area Chart

In this chart we are going to review th progress over each year by stacking the expenditures results over time

In [56]:
```
plt_df2 = df2.loc[:, df2.columns != 'sex'].pivot(index='year', columns
='category', values='expenditure')
plt_df2.reset_index(level=0, inplace=True)

fig, ax = plt.subplots(1,1,figsize=(16, 9), dpi= 80)
columns = plt_df2.columns[1:]
labs = plt_df2.values.tolist()

# sort the data
x  = plt_df2['year'].values.tolist()
y0 = plt_df2[columns[0]].values.tolist()
y1 = plt_df2[columns[1]].values.tolist()
y2 = plt_df2[columns[2]].values.tolist()
y3 = plt_df2[columns[3]].values.tolist()
y4 = plt_df2[columns[4]].values.tolist()
y5 = plt_df2[columns[5]].values.tolist()
y6 = plt_df2[columns[6]].values.tolist()
y7 = plt_df2[columns[7]].values.tolist()
y8 = plt_df2[columns[8]].values.tolist()
y9 = plt_df2[columns[9]].values.tolist()
y10 = plt_df2[columns[10]].values.tolist()
y11 = plt_df2[columns[11]].values.tolist()
y12 = plt_df2[columns[12]].values.tolist()
y = np.vstack([y0, y1, y2, y3, y4, y5, y6, y7, y8, y9, y10, y11, y12])

# Plotting for each column
labs = columns.values.tolist()
ax = plt.gca()
ax.stackplot(x, y, labels=labs, alpha=0.9)

# Insert the title
ax.set_title('Total Expenditure by Year for each Category', fontsize=2
0)
plt.xlabel('Year')
plt.ylabel('Total Expenditure')

# Edits to the legend
ax.legend(fontsize=10, ncol=1, loc = 'upper left')
plt.xticks(x[::5], fontsize=10, horizontalalignment='center')

# Lighten borders
plt.gca().spines["top"].set_alpha(0)
plt.gca().spines["bottom"].set_alpha(.3)
plt.gca().spines["right"].set_alpha(0)
plt.gca().spines["left"].set_alpha(.3)

# Display graph
plt.show()
```


Total Expenditure by Year for each Category
Alcoholic Beverages
Apparel
Cash Contributions
Education
Entertainment
Food
Healthcare
Housing
Miscellaneous
Personal Care
Personal Insurance
Reading
Tobacco Products
Total Expenditure
0
5000
10000
15000
20000
25000
30000
35000
40000
1984
1989
1994
1999
2004
Year