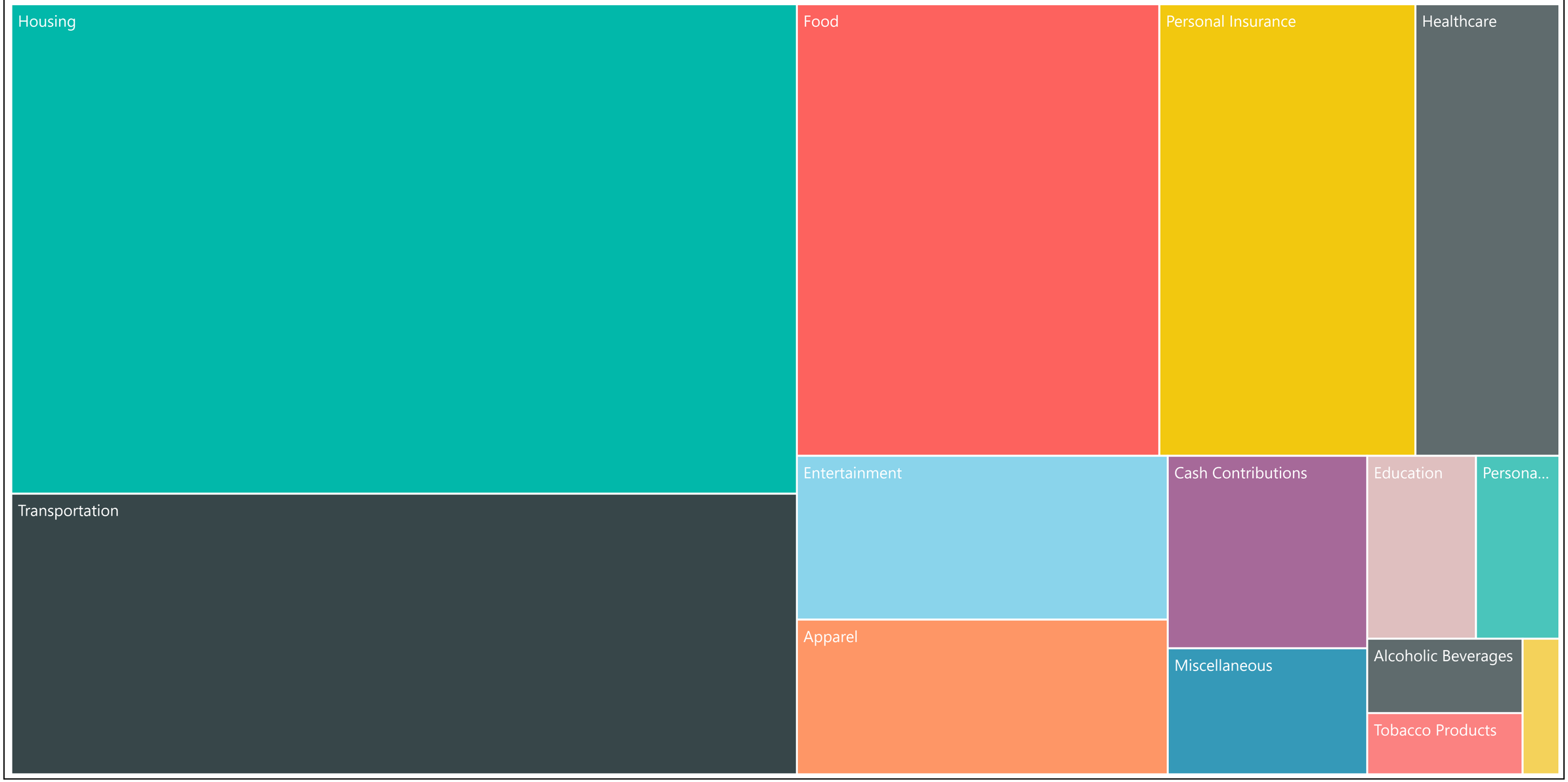
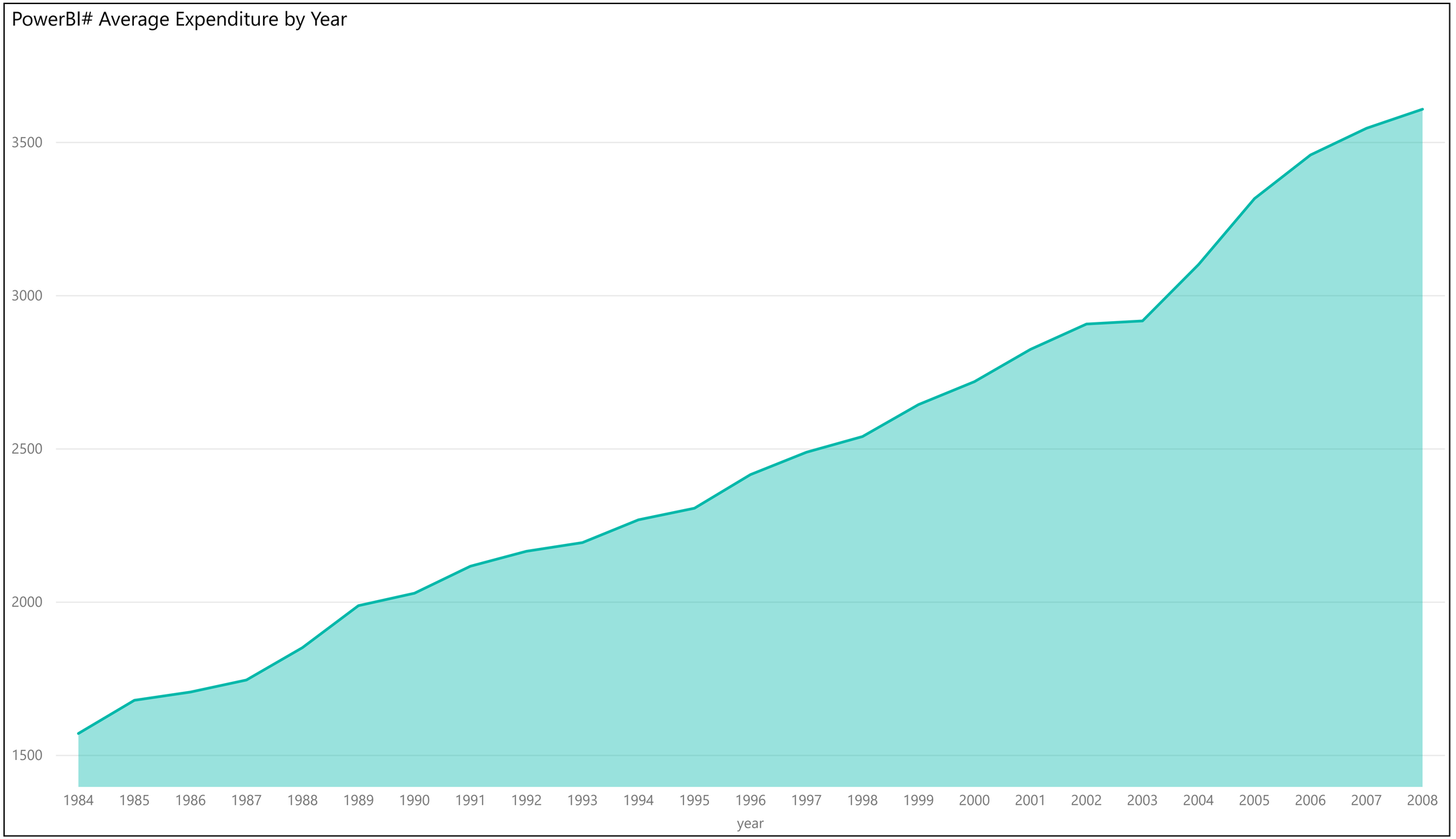
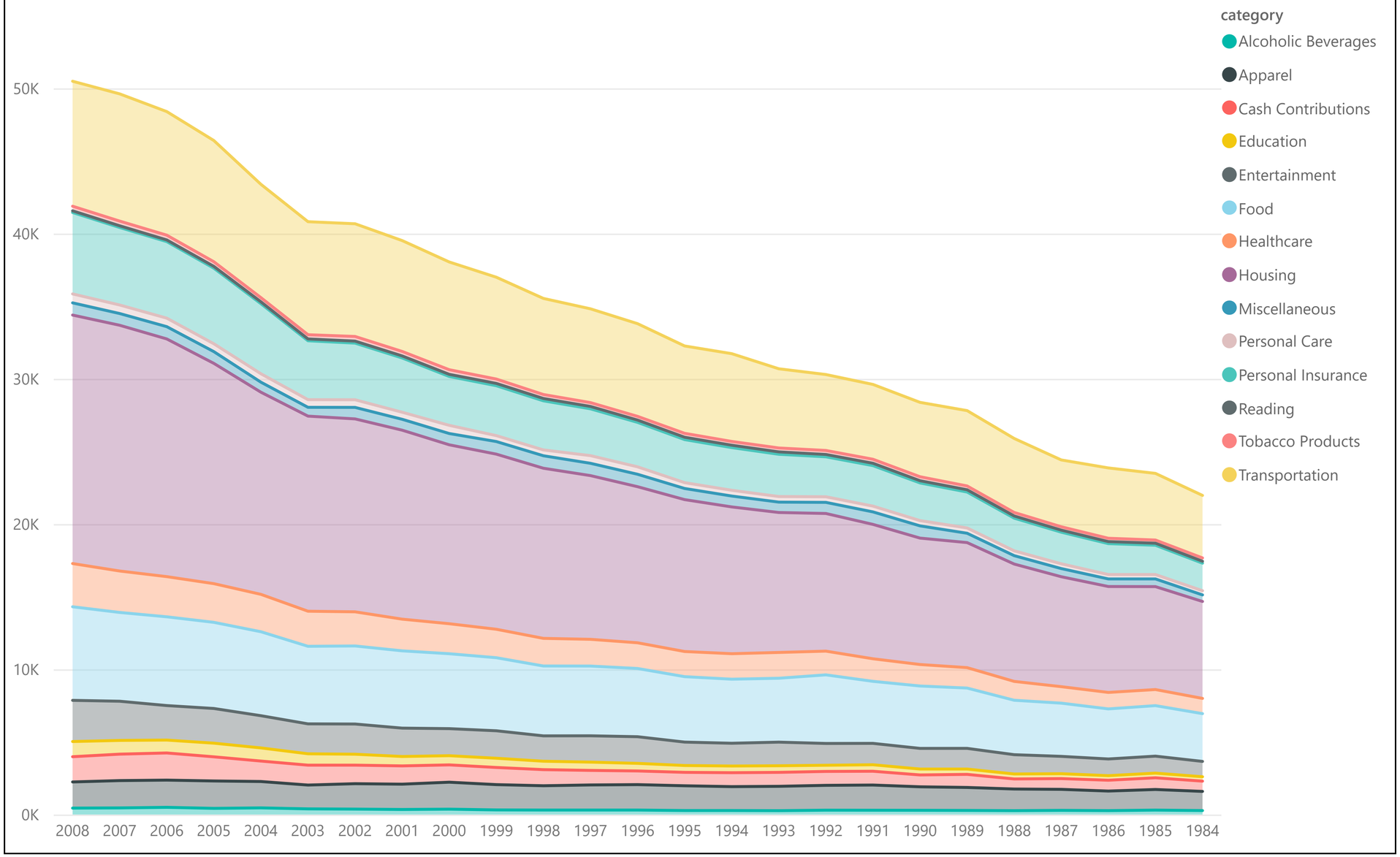
PowerBI# Expenditure by Category



PowerBI# Average Expenditure by Year



PowerBI# Expenditure by Year and Category



Assignment 3.2

Anjani Bonda

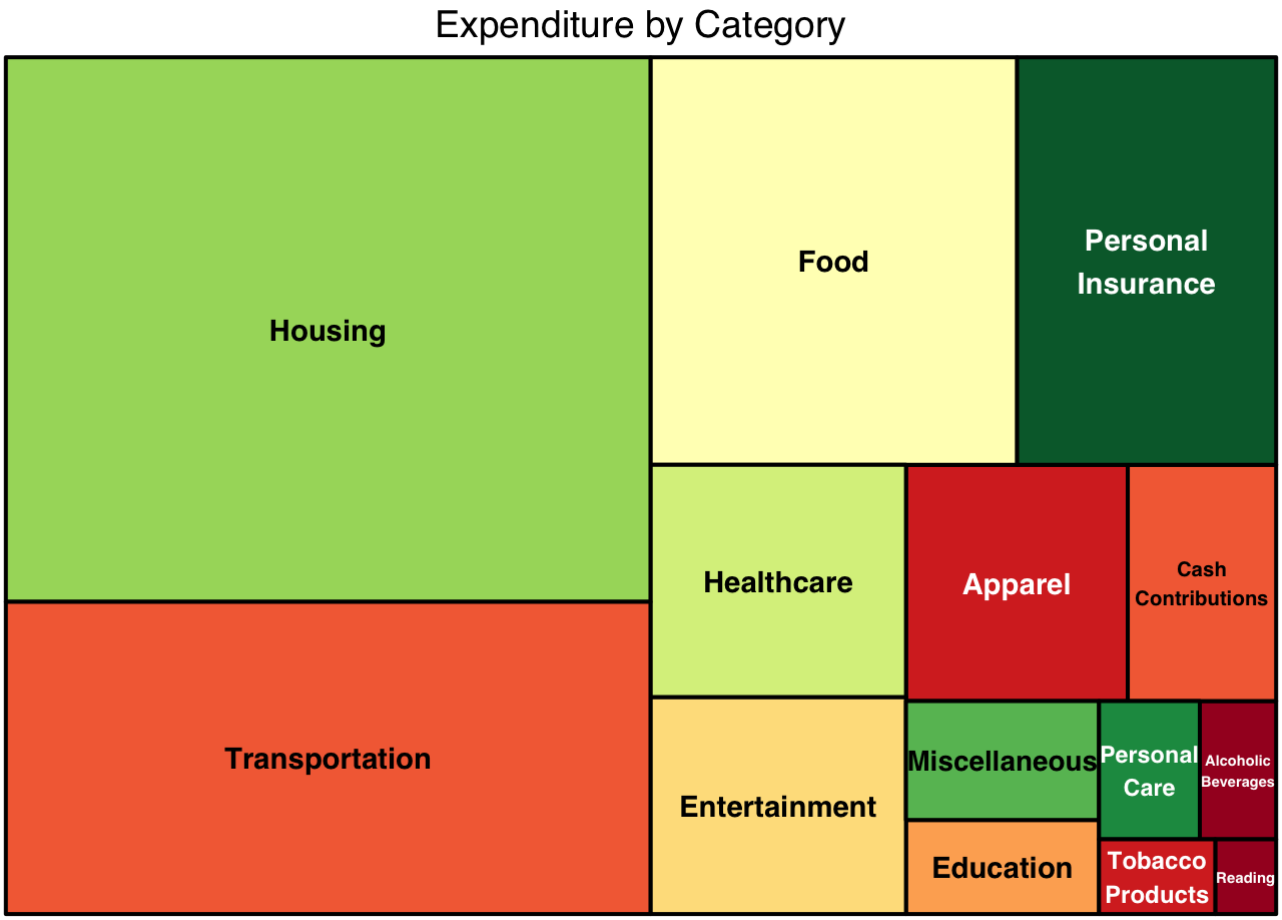
01/21/2023

```
##   year            category expenditure sex
## 1 2008                Food        6443   1
## 2 2008 Alcoholic Beverages         444   1
## 3 2008             Housing       17109   1
## 4 2008             Apparel        1801   1
## 5 2008      Transportation        8604   1
## 6 2008          Healthcare        2976   1
```

```
##     Series.id Year Period Value
## 1 LNS14000000 1948    M01   3.4
## 2 LNS14000000 1948    M02   3.8
## 3 LNS14000000 1948    M03   4.0
## 4 LNS14000000 1948    M04   3.9
## 5 LNS14000000 1948    M05   3.5
## 6 LNS14000000 1948    M06   3.6
```

Tree Map

Mapping how much each category has costed

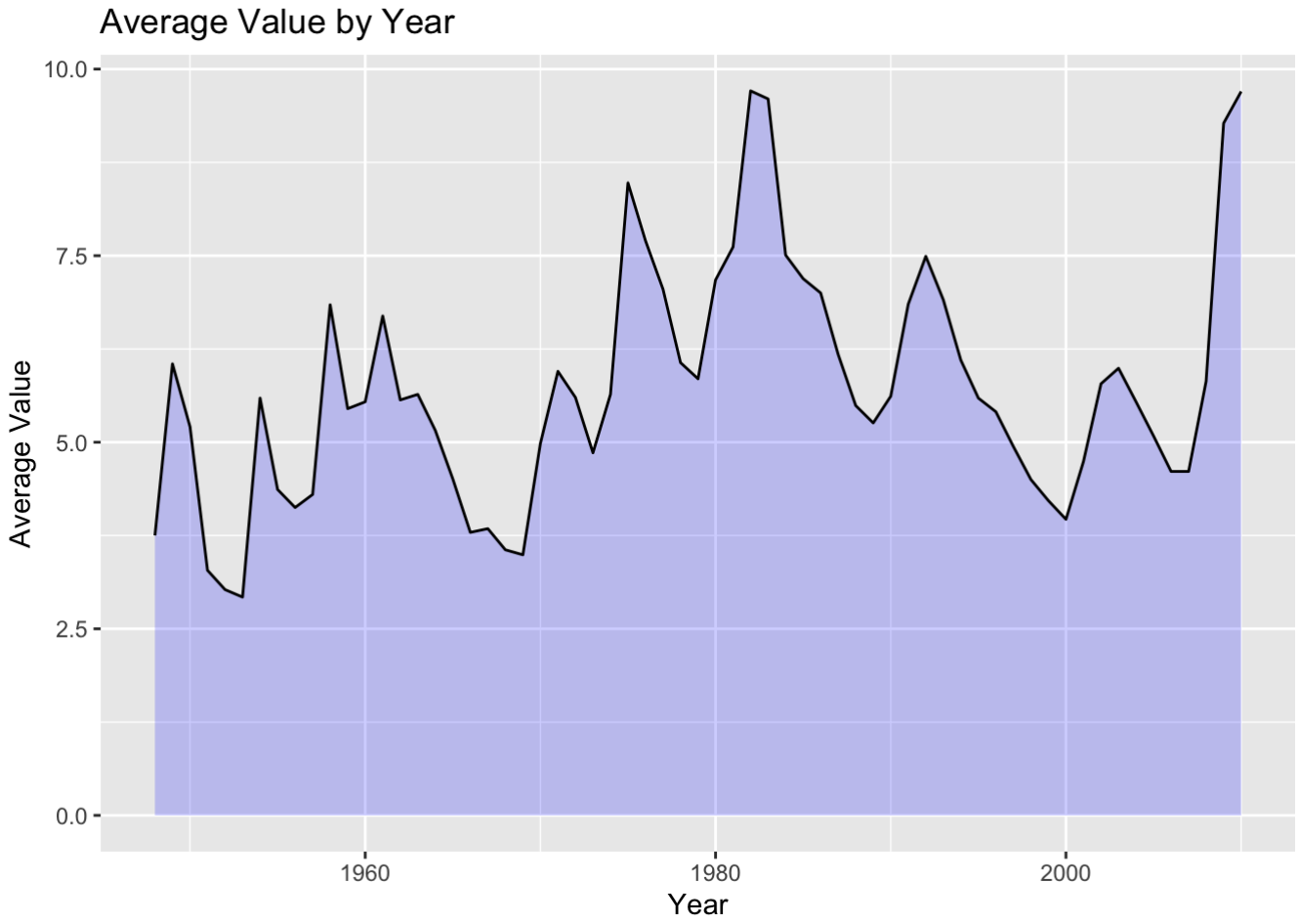


Area Chart

Mapping average value over the years, from the unemployment dataset

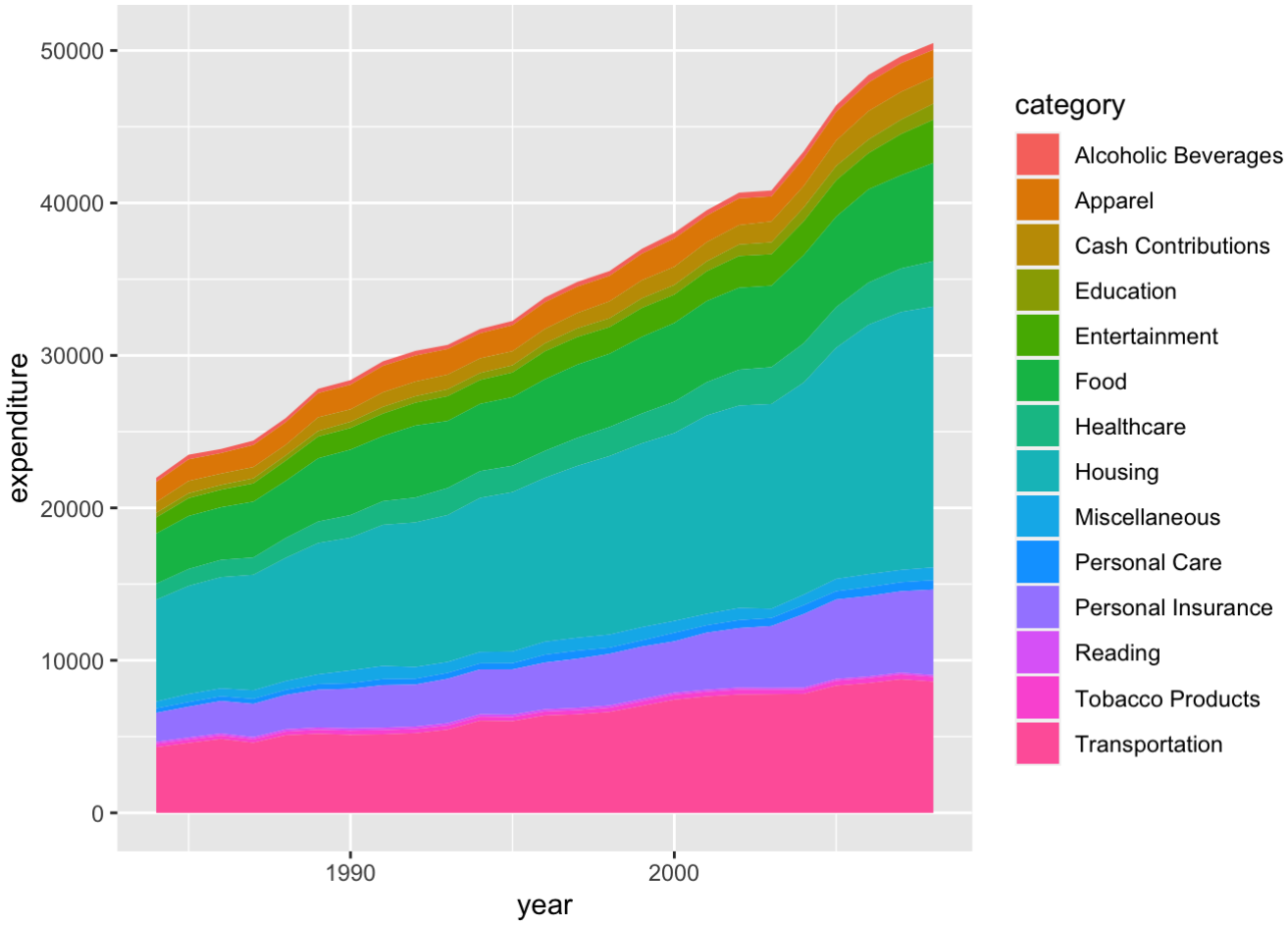
Year <int>	Average Value <dbl>
1948	3.750000
1949	6.050000
1950	5.208333
1951	3.283333
1952	3.025000
1953	2.925000

6 rows



Stacked Area Chart

Mapping the trend of the expenditure of each category over the years.


50000
40000
30000
20000
10000
0
expenditure
1990
2000
year
category
Alcoholic Beverages
Apparel
Cash Contributions
Education
Entertainment
Food
Healthcare
Housing
Miscellaneous
Personal Care
Personal Insurance
Reading
Tobacco Products
Transportation

Assignment 3.2 Tree Map, Area Charts and Stacked Area Charts

Python

Date: 1/20/2023

Author: Anjani Bonda

In [2]:
```
# Import libraries
import csv
import pandas as pd
import matplotlib.pyplot as plt
import matplotlib as mpl
import squarify
import numpy as np
from datetime import datetime as dt
```

In [3]:
```
# Read world population data
dirData = 'ex3-3'
file_expenditures = 'expenditures.txt'
file_unemployement = 'unemployement-rate-1948-2010.csv'

dir_expenditures = dirData+'/'+file_expenditures
dir_unemployment = dirData+'/'+file_unemployement

raw_expenditures = pd.read_csv(dir_expenditures, sep = '\t', header=0)
raw_unemployment = pd.read_csv(dir_unemployment)

# Calculate total expenditure for categories
expenditures_cat = raw_expenditures.groupby(['category'])['expenditure'].sum().

# Calculate total expenditure by year
expenditures_year = raw_expenditures.groupby(['year'])['expenditure'].sum().res

print(raw_expenditures.head())
print(expenditures_cat.head())
print(expenditures_year.head())
print(raw_unemployment.head())
```

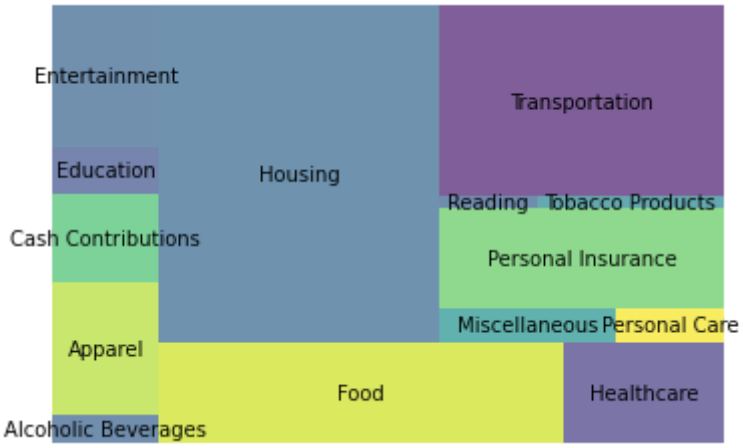
```
   year             category  expenditure  sex
0  2008                 Food         6443    1
1  2008  Alcoholic Beverages          444    1
2  2008              Housing        17109    1
3  2008              Apparel         1801    1
4  2008       Transportation         8604    1
             category  expenditure
0  Alcoholic Beverages         8424
1              Apparel        41833
2   Cash Contributions        27987
3            Education        14498
4        Entertainment        44273
   year  expenditure
0  1984        21972
1  1985        23489
2  1986        23865
3  1987        24415
4  1988        25893
     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
```

Treemap

Expenditure data

For this treemap, I would like to see how much each category accounted in total.

In [4]:
```
# Create tree map
squarify.plot(sizes=expenditures_cat['expenditure'], label=expenditures_cat['ca
plt.axis('off')
plt.show()
```



Area Chart

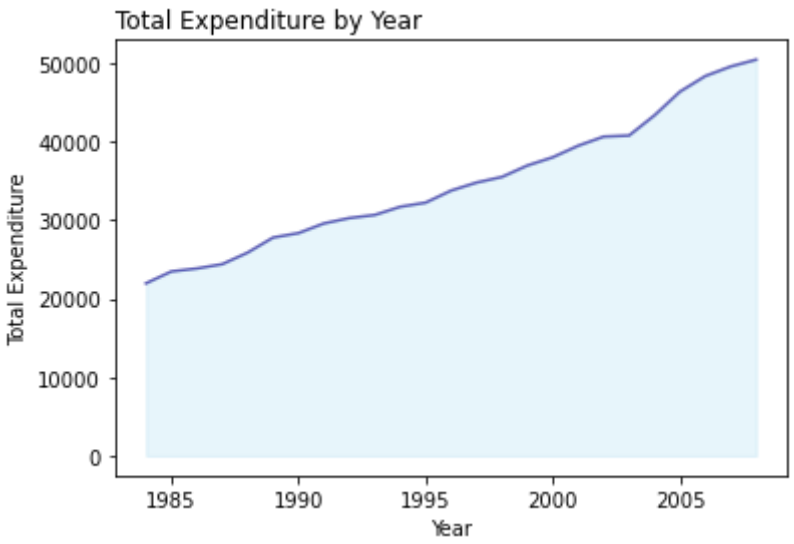
Expenditure data

For this area chart, I would like to see how much was the total expenditure every year

In [5]:
```
# Create x and y values to plot
x = expenditures_year['year']
y = expenditures_year['expenditure']

# Add a stronger line on top (edge)
plt.fill_between( x, y, color='skyblue', alpha=0.2)
plt.title('Total Expenditure by Year', loc='left')
plt.xlabel('Year')
plt.ylabel('Total Expenditure')
plt.plot(x, y, color='darkblue', alpha=0.6)
```

Out[5]:
```
[<matplotlib.lines.Line2D at 0x7fa8d3de1700>]
```



Stacked Area Chart

Expenditure data

For stacked area chart, I would like to see how much was the total expenditure every year for each category

In [6]:
```
# Reshape data to be used for stacked area chart
plt_expenditures = raw_expenditures.loc[:, raw_expenditures.columns != 'sex'].p
plt_expenditures.reset_index(level=0, inplace=True)

# Draw Plot and Annotate
fig, ax = plt.subplots(1,1,figsize=(16, 9), dpi= 80)
columns = plt_expenditures.columns[1:]
labs = plt_expenditures.values.tolist()

# Prepare data
x  = plt_expenditures['year'].values.tolist()
y0 = plt_expenditures[columns[0]].values.tolist()
y1 = plt_expenditures[columns[1]].values.tolist()
y2 = plt_expenditures[columns[2]].values.tolist()
y3 = plt_expenditures[columns[3]].values.tolist()
y4 = plt_expenditures[columns[4]].values.tolist()
y5 = plt_expenditures[columns[5]].values.tolist()
y6 = plt_expenditures[columns[6]].values.tolist()
y7 = plt_expenditures[columns[7]].values.tolist()
```

```
y8 = plt_expenditures[columns[8]].values.tolist()
y9 = plt_expenditures[columns[9]].values.tolist()
y10 = plt_expenditures[columns[10]].values.tolist()
y11 = plt_expenditures[columns[11]].values.tolist()
y12 = plt_expenditures[columns[12]].values.tolist()
y = np.vstack([y0, y1, y2, y3, y4, y5, y6, y7, y8, y9, y10, y11, y12])

# Plot for each column
labs = columns.values.tolist()
ax = plt.gca()
ax.stackplot(x, y, labels=labs, alpha=0.8)

# Create title
ax.set_title('Total Expenditure by Year for each Category', fontsize=18)
plt.xlabel('Year')
plt.ylabel('Total Expenditure')

# Show 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)

# Output graph
plt.show()
```