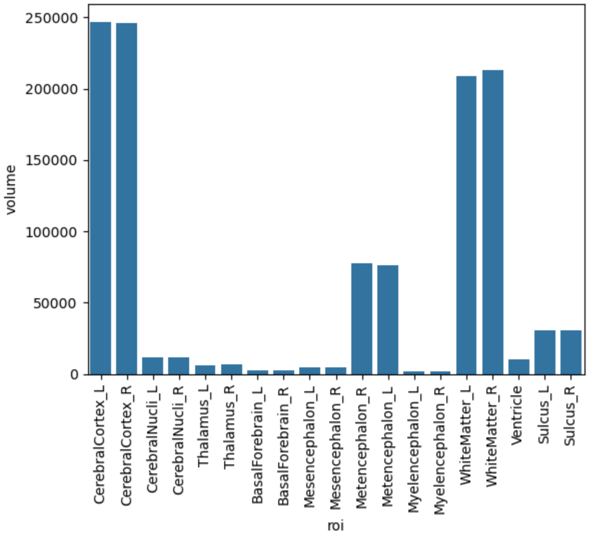
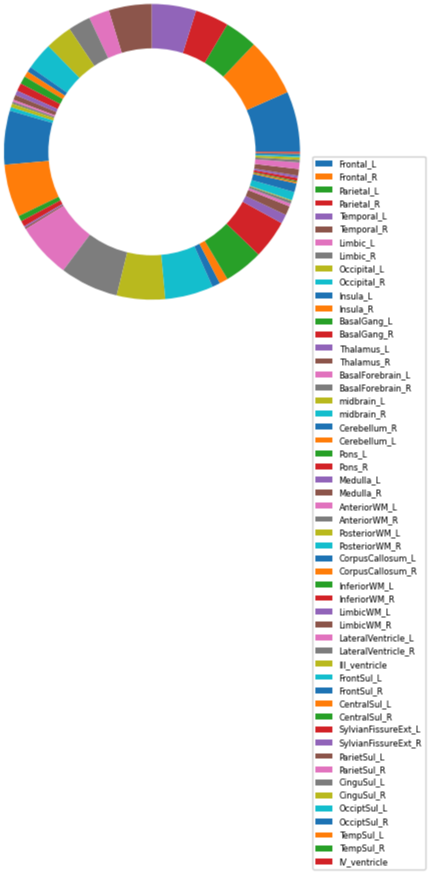
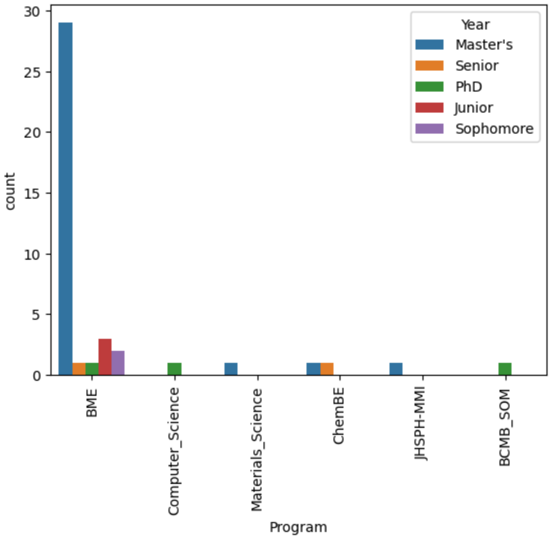
In [1]:

```
## Matthew Lamblaot homework 3
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns


##### questions using Kirb21 data


kirb21_df= pd.read_csv("https://raw.githubusercontent.com/smart-stats/ds4bio_book/main/book/assetts/kirby21AllLevels.csv") ## reading csv file
print(kirb21_df.head(4)) ## checking csv file contents
kirby906a_ax_df= kirb21_df.loc[(kirb21_df['rawid']=="kirby906a_ax.img")].copy() ##creating new dataframe with only values that where rawid= kirby906a_ax.img
print(kirby906a_ax_df.head(4)) # print new dataframe
telencephalon_L= kirby906a_ax_df.loc[(kirby906a_ax_df['type'] ==1) & (kirby906a_ax_df['level'] ==1) & (kirby906a_ax_df['roi'] =='Telencephalon_L')].copy() ##creating new dataframe that only consists of type1 level1 data for Telecephalon_L
print(telencephalon_L.head(4))
telencephalon_L_volume= telencephalon_L.loc[12540,'volume'] ##assigning new variable to be the value for volume of this dataframe
print(telencephalon_L_volume) #printing volume value

telencephalon_R= kirby906a_ax_df.loc[(kirby906a_ax_df['type'] ==1) & (kirby906a_ax_df['level'] ==1) & (kirby906a_ax_df['roi'] =='Telencephalon_R')].copy()##creating new dataframe that only consists of type1 level1 data for Telecephalon_R
print(telencephalon_R.head(4))
telencephalon_R_volume= telencephalon_R.loc[12541,'volume']##assigning new variable to be the value for volume of this dataframe
print(telencephalon_R_volume) # printing volume value

ICV_fraction= (telencephalon_L_volume+telencephalon_R_volume)/kirby906a_ax_df.loc[12540,'icv'] ##creating ICV fraction variable that is the fraction of telencephalon volume to ICV
TBV_fraction= (telencephalon_L_volume+telencephalon_R_volume)/kirby906a_ax_df.loc[12540,'tbv']## creation of TBV fraction variable that is the fraciton of telecephalon volume to TBV
print(ICV_fraction)
print(TBV_fraction)



all_regions_df= (kirby906a_ax_df.groupby(["type","level"], as_index=False)["volume"].sum())## create new dataframe that groups the data in kirby906 by type and level, then takes the sum of the volumes for those parameters
all_regions_df= all_regions_df.rename(columns={"volume":"total_volume"}) ##renames the column name to be total_volume instead of volume
print(all_regions_df)

t1l2= kirby906a_ax_df.loc[(kirby906a_ax_df['type'] ==1) & (kirby906a_ax_df['level'] ==2)].copy() ##creating new dataframe that only contains type 1 level 2 data
Volume_bar= sns.barplot(x='roi', y='volume', data=t1l2) #creates a bar graph depicting the volume from each part of the brain from t1l2
plt.xticks(rotation=90) #rotates tick
plt.show()
plt.clf() ##clear the current plot figure
plt.cla() ##clear the current ploy axes



t1l3= kirby906a_ax_df.loc[(kirby906a_ax_df['type'] ==1) & (kirby906a_ax_df['level'] ==3)] ##creates new dataframe for only data that is type 1 level 3 from kirby
labels= t1l3['roi'] ##creates labels from roi of t1l3
Volume_donut= plt.pie( t1l3['volume'],textprops={'fontsize':'smaller'}, rotatelabels=270)##create pie plot
center_circle= plt.Circle((0,0), 0.70, fc='white') ##creates a white circle
fig=plt.gcf() ## return reference to the pie chart
fig.gca().add_artist(center_circle) ##adds center circle to the pie plot to make it a donut
plt.legend(labels,loc="upper right", fontsize=6, bbox_to_anchor=(1.25,.5))
plt.show()


############## data using class_interests_df
plt.clf()
plt.cla()
class_interests_df= pd.read_table("https://raw.githubusercontent.com/bcaffo/ds4ph-bme/refs/heads/master/data/classInterests.txt")
sns.countplot(x='Program', hue='Year', data=class_interests_df) ##plots the data based the proportion of students from each year in the class per program
plt.xticks(rotation=90) #rotates tick
plt.show()



#############data using gene expression dataset

gene_expression_df= pd.read_csv("https://raw.githubusercontent.com/jhu-advdatasci/2018/refs/heads/master/data/GSE5859_exprs.csv") ## reading csv file
print(gene_expression_df.head(4))
gene_ids= gene_expression_df.iloc[:,0] ## splitting dataframe to remove string values and numberical values
expression_val= gene_expression_df.iloc[:,1:] ## splitting dataframe to remove string values and numberical values
row_means=expression_val.mean(axis=1) ## taking the mean of each row
gene_expression_df_pt1= expression_val.sub(row_means, axis=0) ##subtracting the row mean from each row
col_means= gene_expression_df_pt1.mean(axis=0) ##takes the mean of each column in the previous matrix
gene_expression_df_pt2= gene_expression_df_pt1.sub(col_means, axis=1) ##substracts the column mean from each column
col_dev= gene_expression_df_pt2.std(axis=0) # calculates the standard deviation of each column
gene_expression_df_pt3= gene_expression_df_pt2.div(col_dev, axis=1) #subtracts the standard deviation from each column

gene_expression_df_pt1.insert(0, "gene_id", gene_ids) ## adds back gene ids to each matrix
gene_expression_df_pt2.insert(0, "gene_id", gene_ids)## adds back gene ids to each matrix
gene_expression_df_pt3.insert(0, "gene_id", gene_ids)## adds back gene ids to each matrix

print(gene_expression_df_pt1.head(4))
print(gene_expression_df_pt2.head(4))
print(gene_expression_df_pt3.head(4)) ##shows first 4 rows of final data



###### data using healthcare_df
healthcare_df= pd.read_csv("https://raw.githubusercontent.com/jhu-advdatasci/2018/master/data/KFF/healthcare-spending.csv", skiprows=2) ## reading csv file
print(healthcare_df.head(10))
us_states = [
    "Alabama","Alaska","Arizona","Arkansas","California","Colorado","Connecticut","Delaware",
    "Florida","Georgia","Hawaii","Idaho","Illinois","Indiana","Iowa","Kansas","Kentucky",
    "Louisiana","Maine","Maryland","Massachusetts","Michigan","Minnesota","Mississippi",
    "Missouri","Montana","Nebraska","Nevada","New Hampshire","New Jersey","New Mexico",
    "New York","North Carolina","North Dakota","Ohio","Oklahoma","Oregon","Pennsylvania",
    "Rhode Island","South Carolina","South Dakota","Tennessee","Texas","Utah","Vermont",
    "Virginia","Washington","West Virginia","Wisconsin","Wyoming"
]
healthcare_df= healthcare_df[healthcare_df["Location"].isin(us_states)] ##filters out all data that isn't linked to one of the states in us_states
healthcare_df_melt= healthcare_df.melt(id_vars=["Location"],var_name="Year", value_name="Spending") ##transforms the dataframe from wide format to long which makes it easier to graph by grouping each location to a year and spending
healthcare_df_melt["Year"]=healthcare_df_melt["Year"].str.extract(r"(\d{4})").astype(int) ##pulls the first 4 characters in the Year tab to get only the year from 1991_Total Health Spending
print(healthcare_df_melt.head())
plt.figure(figsize=(16,8))
for state, group in healthcare_df_melt.groupby("Location"): ## groups the data by location to create a line plot from each state for spending vs year
    plt.plot(group["Year"], group["Spending"], label=state)
plt.xlabel("Year")
plt.ylabel("Spending")
plt.legend(bbox_to_anchor=(1,1),loc="upper left")
plt.tight_layout()
plt.show

plt.figure()

avg_Spending=healthcare_df_melt.groupby("Location")["Spending"].mean().sort_values() ##finds the mean spending from each state
avg_Spending.plot(kind="bar")
plt.ylabel("Average Healthcare Spending")
plt.tight_layout()
plt.show()
```

```
   Unnamed: 0                rawid              roi  volume   min    max  \
0           1  kirby127a_3_1_ax.img  Telencephalon_L  531111   0.0  374.0   
1           2  kirby127a_3_1_ax.img  Telencephalon_R  543404   0.0  300.0   
2           3  kirby127a_3_1_ax.img   Diencephalon_L    9683  15.0  295.0   
3           4  kirby127a_3_1_ax.img   Diencephalon_R    9678  10.0  335.0   

       mean      std  type  level   id      icv      tbv  
0  128.3013  51.8593     1      1  127  1378295  1268519  
1  135.0683  53.6471     1      1  127  1378295  1268519  
2  193.5488  32.2733     1      1  127  1378295  1268519  
3  193.7051  32.7869     1      1  127  1378295  1268519  
       Unnamed: 0            rawid              roi  volume   min    max  \
12540       12541  kirby906a_ax.img  Telencephalon_L  467063   2.0  350.0   
12541       12542  kirby906a_ax.img  Telencephalon_R  470488   2.0  337.0   
12542       12543  kirby906a_ax.img   Diencephalon_L    8801  60.0  327.0   
12543       12544  kirby906a_ax.img   Diencephalon_R    9054  63.0  415.0   

           mean      std  type  level   id      icv      tbv  
12540  165.2599  57.1707     1      1  906  1195015  1123076  
12541  171.8695  59.3001     1      1  906  1195015  1123076  
12542  227.1878  31.2303     1      1  906  1195015  1123076  
12543  231.6770  31.1780     1      1  906  1195015  1123076  
       Unnamed: 0            rawid              roi  volume  min    max  \
12540       12541  kirby906a_ax.img  Telencephalon_L  467063  2.0  350.0   

           mean      std  type  level   id      icv      tbv  
12540  165.2599  57.1707     1      1  906  1195015  1123076  
467063
       Unnamed: 0            rawid              roi  volume  min    max  \
12541       12542  kirby906a_ax.img  Telencephalon_R  470488  2.0  337.0   

           mean      std  type  level   id      icv      tbv  
12541  171.8695  59.3001     1      1  906  1195015  1123076  
470488
0.7845516583473847
0.8348063710737297
   type  level  total_volume
0     1      1       1195015
1     1      2       1195021
2     1      3       1195034
3     1      4       1195065
4     1      5       1195124
5     2      1       1195015
6     2      2       1195022
7     2      3       1195032
8     2      4       1195041
9     2      5       1195092
```




Frontal_L
Frontal_R
Parietal_L
Parietal_R
Temporal_L
Temporal_R
Limbic_L
Limbic_R
Occipital_L
Occipital_R
Insula_L
Insula_R
BasalGang_L
BasalGang_R
Thalamus_L
Thalamus_R
BasalForebrain_L
BasalForebrain_R
midbrain_L
midbrain_R
Cerebellum_R
Cerebellum_L
Pons_L
Pons_R
Medulla_L
Medulla_R
AnteriorWM_L
AnteriorWM_R
PosteriorWM_L
PosteriorWM_R
CorpusCallosum_L
CorpusCallosum_R
InferiorWM_L
InferiorWM_R
LimbicWM_L
LimbicWM_R
LateralVentricle_L
LateralVentricle_R
III_ventricle
FrontSul_L
FrontSul_R
CentralSul_L
CentralSul_R
SylvianFissureExt_L
SylvianFissureExt_R
ParietSul_L
ParietSul_R
CinguSul_L
CinguSul_R
OcciptSul_L
OcciptSul_R
TempSul_L
TempSul_R
IV_ventricle


Year
Master's
Senior
PhD
Junior
Sophomore
count
0
5
10
15
20
25
30
BME
Computer_Science
Materials_Science
ChemBE
JHSPH-MMI
BCMB_SOM
Program

```
  Unnamed: 0  GSM25581.CEL.gz  GSM25681.CEL.gz  GSM136524.CEL.gz  \
0  1007_s_at         6.333951         5.736190          6.156754   
1    1053_at         7.255622         7.399993          7.491967   
2     117_at         5.760106         4.825169          5.039387   
3     121_at         6.935451         7.025210          7.543667   

   GSM136707.CEL.gz  GSM25553.CEL.gz  GSM136676.CEL.gz  GSM136711.CEL.gz  \
0          6.513010         6.061013          6.506493          6.863426   
1          7.006123         7.250995          7.082581          6.842236   
2          5.414160         5.205697          5.300078          5.099337   
3          7.959781         7.223323          8.006816          8.102504   

   GSM136542.CEL.gz  GSM136535.CEL.gz  ...  GSM48650.CEL.gz  GSM25687.CEL.gz  \
0          6.369645          6.646321  ...         7.082636         6.315866   
1          7.048487          7.042361  ...         6.599718         7.412731   
2          5.156459          5.736109  ...         6.231457         5.240717   
3          7.434617          7.532321  ...         8.215096         7.677593   

   GSM25685.CEL.gz  GSM136549.CEL.gz  GSM25427.CEL.gz  GSM25525.CEL.gz  \
0         7.010165          6.460107         6.122355         6.330314   
1         7.274429          6.928642         7.168782         7.235648   
2         5.275062          5.759827         5.409720         5.491938   
3         7.923624          7.219401         7.432338         6.785174   

   GSM25349.CEL.gz  GSM136727.CEL.gz  GSM25626.CEL.gz  GSM136725.CEL.gz  
0         6.627014          6.133068         6.419444          6.488579  
1         6.939184          7.280781         6.351776          7.517410  
2         5.113570          5.401876         5.537605          5.247190  
3         7.833862          7.607461         7.302935          7.331864  

[4 rows x 209 columns]
     gene_id  GSM25581.CEL.gz  GSM25681.CEL.gz  GSM136524.CEL.gz  \
0  1007_s_at        -0.049313        -0.647073         -0.226509   
1    1053_at         0.163992         0.308363          0.400337   
2     117_at         0.283074        -0.651863         -0.437645   
3     121_at        -0.648591        -0.558832         -0.040375   

   GSM136707.CEL.gz  GSM25553.CEL.gz  GSM136676.CEL.gz  GSM136711.CEL.gz  \
0          0.129747        -0.322250          0.123230          0.480163   
1         -0.085507         0.159365         -0.009050         -0.249394   
2         -0.062873        -0.271335         -0.176954         -0.377696   
3          0.375740        -0.360718          0.422774          0.518462   

   GSM136542.CEL.gz  GSM136535.CEL.gz  ...  GSM48650.CEL.gz  GSM25687.CEL.gz  \
0         -0.013618          0.263058  ...         0.699373        -0.067397   
1         -0.043143         -0.049269  ...        -0.491913         0.321100   
2         -0.320573          0.259077  ...         0.754425        -0.236315   
3         -0.149425         -0.051720  ...         0.631054         0.093552   

   GSM25685.CEL.gz  GSM136549.CEL.gz  GSM25427.CEL.gz  GSM25525.CEL.gz  \
0         0.626902          0.076844        -0.260908        -0.052949   
1         0.182799         -0.162988         0.077152         0.144017   
2        -0.201970          0.282794        -0.067313         0.014905   
3         0.339583         -0.364641        -0.151704        -0.798867   

   GSM25349.CEL.gz  GSM136727.CEL.gz  GSM25626.CEL.gz  GSM136725.CEL.gz  
0         0.243751         -0.250195         0.036180          0.105316  
1        -0.152446          0.189150        -0.739855          0.425779  
2        -0.363462         -0.075156         0.060573         -0.229842  
3         0.249820          0.023419        -0.281107         -0.252178  

[4 rows x 209 columns]
     gene_id  GSM25581.CEL.gz  GSM25681.CEL.gz  GSM136524.CEL.gz  \
0  1007_s_at        -0.024490        -0.640032         -0.223988   
1    1053_at         0.188815         0.315404          0.402858   
2     117_at         0.307897        -0.644822         -0.435124   
3     121_at        -0.623768        -0.551790         -0.037853   

   GSM136707.CEL.gz  GSM25553.CEL.gz  GSM136676.CEL.gz  GSM136711.CEL.gz  \
0          0.114936        -0.428929          0.109485          0.457383   
1         -0.100318         0.052687         -0.022794         -0.272174   
2         -0.077684        -0.378014         -0.190699         -0.400475   
3          0.360928        -0.467397          0.409030          0.495682   

   GSM136542.CEL.gz  GSM136535.CEL.gz  ...  GSM48650.CEL.gz  GSM25687.CEL.gz  \
0         -0.017008          0.250137  ...         0.678049        -0.061456   
1         -0.046533         -0.062190  ...        -0.513237         0.327042   
2         -0.323963          0.246157  ...         0.733100        -0.230374   
3         -0.152814         -0.064641  ...         0.609730         0.099493   

   GSM25685.CEL.gz  GSM136549.CEL.gz  GSM25427.CEL.gz  GSM25525.CEL.gz  \
0         0.665913          0.076758        -0.251423        -0.031388   
1         0.221810         -0.163074         0.086637         0.165579   
2        -0.162959          0.282708        -0.057828         0.036467   
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3        0.378593         -0.364727        -0.142219        -0.777306

   GSM25349.CEL.gz  GSM136727.CEL.gz  GSM25626.CEL.gz  GSM136725.CEL.gz
0         0.235241         -0.261128         0.041275          0.090015
1        -0.160956          0.178217        -0.734760          0.410478
2        -0.371972         -0.086090         0.065668         -0.245143
3         0.241310          0.012486        -0.276012         -0.267479

[4 rows x 209 columns]
     gene_id  GSM25581.CEL.gz  GSM25681.CEL.gz  GSM136524.CEL.gz  \
0  1007_s_at        -0.062810        -1.694428         -0.797346   
1    1053_at         0.484259         0.835005          1.434085   
2     117_at         0.789673        -1.707110         -1.548943   
3     121_at        -1.599798        -1.460817         -0.134750   

   GSM136707.CEL.gz  GSM25553.CEL.gz  GSM136676.CEL.gz  GSM136711.CEL.gz  \
0          0.362538        -1.152413          0.366177          1.252187   
1         -0.316432         0.141554         -0.076237         -0.745136   
2         -0.245036        -1.015618         -0.637799         -1.096388   
3          1.138467        -1.255766          1.368016          1.357039   

   GSM136542.CEL.gz  GSM136535.CEL.gz  ...  GSM48650.CEL.gz  GSM25687.CEL.gz  \
0         -0.054154          1.008166  ...         1.446603        -0.185273   
1         -0.148166         -0.250652  ...        -1.094982         0.985940   
2         -1.031533          0.992122  ...         1.564055        -0.694512   
3         -0.486577         -0.260531  ...         1.300847         0.299944   

   GSM25685.CEL.gz  GSM136549.CEL.gz  GSM25427.CEL.gz  GSM25525.CEL.gz  \
0         1.615970          0.245537        -0.568262        -0.069236   
1         0.538265         -0.521649         0.195814         0.365237   
2        -0.395453          0.904341        -0.130702         0.080440   
3         0.918732         -1.166704        -0.321440        -1.714599   

   GSM25349.CEL.gz  GSM136727.CEL.gz  GSM25626.CEL.gz  GSM136725.CEL.gz
0         0.617954         -0.598607         0.088393          0.257410
1        -0.422815          0.408542        -1.573530          1.173822
2        -0.977132         -0.197351         0.140632         -0.701024
3         0.633897          0.028623        -0.591095         -0.764897

[4 rows x 209 columns]
               Location  1991__Total Health Spending  \
0         United States                     675896.0   
1               Alabama                      10393.0   
2                Alaska                       1458.0   
3               Arizona                       9269.0   
4              Arkansas                       5632.0   
5            California                      81438.0   
6              Colorado                       8460.0   
7           Connecticut                      10950.0   
8              Delaware                       1938.0   
9  District of Columbia                       2800.0   

   1992__Total Health Spending  1993__Total Health Spending  \
0                     731455.0                     778684.0   
1                      11284.0                      12028.0   
2                       1558.0                       1661.0   
3                       9815.0                      10655.0   
4                       6022.0                       6397.0   
5                      87949.0                      91963.0   
6                       9215.0                       9803.0   
7                      11635.0                      12081.0   
8                       2111.0                       2285.0   
9                       3098.0                       3240.0   

   1994__Total Health Spending  1995__Total Health Spending  \
0                     820172.0                     869578.0   
1                      12742.0                      13590.0   
2                       1728.0                       1879.0   
3                      11364.0                      12042.0   
4                       6810.0                       7343.0   
5                      94245.0                      96870.0   
6                      10382.0                      11153.0   
7                      12772.0                      13649.0   
8                       2489.0                       2655.0   
9                       3255.0                       3285.0   

   1996__Total Health Spending  1997__Total Health Spending  \
0                     917540.0                     969531.0   
1                      14450.0                      15462.0   
2                       2076.0                       2240.0   
3                      12850.0                      13418.0   
4                       7817.0                       8393.0   
5                     100215.0                     103681.0   
6                      11863.0                      12572.0   
```
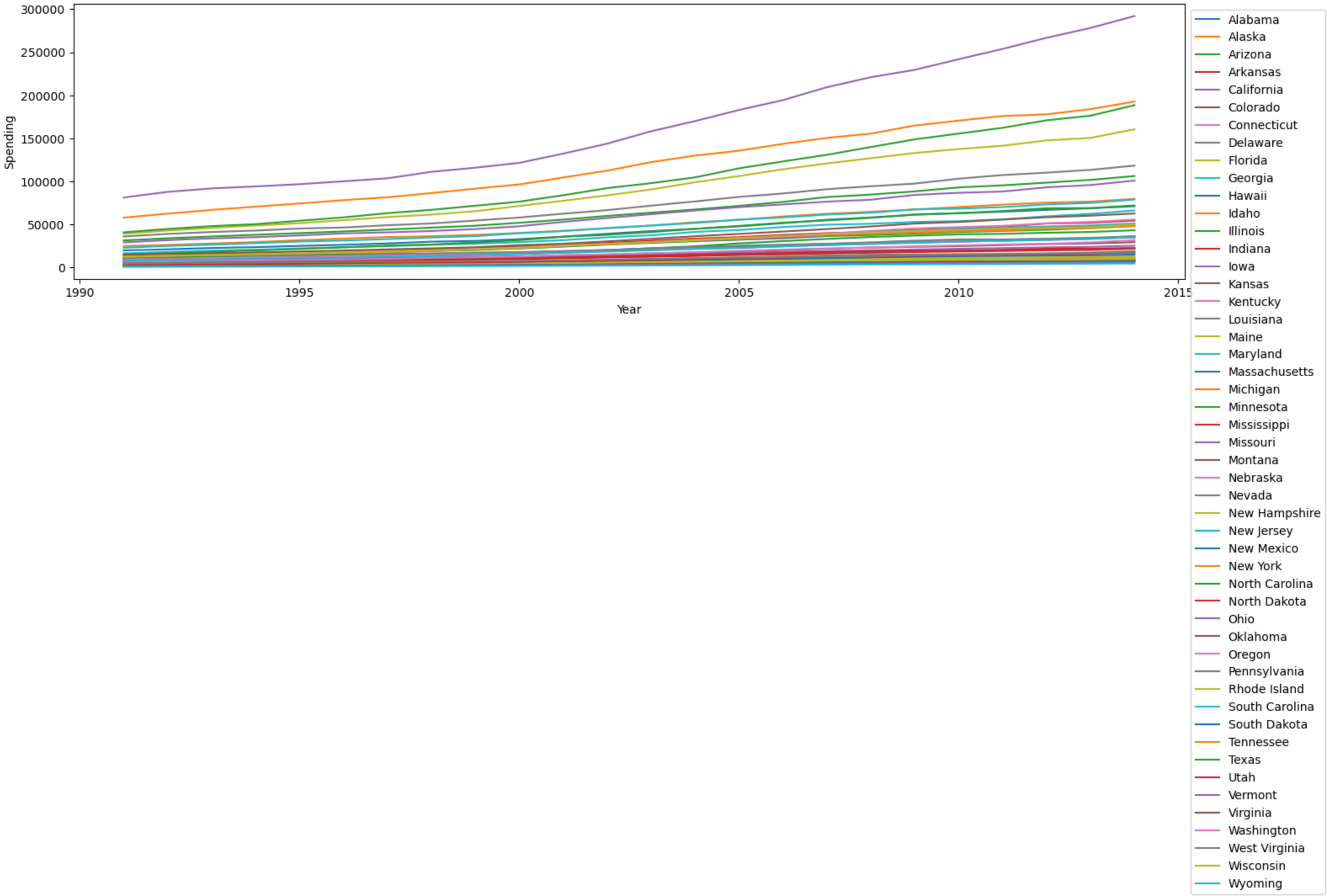
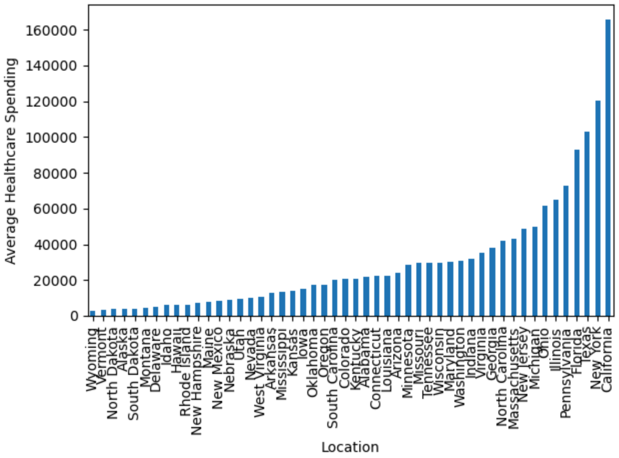

```
7                     14139.0                     14948.0
8                      2772.0                      3026.0
9                      3362.0                      3374.0

   1998__Total Health Spending  1999__Total Health Spending  ...  \
0                    1026103.0                    1086280.0  ...   
1                      15860.0                      16451.0  ...   
2                       2386.0                       2569.0  ...   
3                      14465.0                      15550.0  ...   
4                       8814.0                       9407.0  ...   
5                     111224.0                     116036.0  ...   
6                      13790.0                      14764.0  ...   
7                      15944.0                      16785.0  ...   
8                       3207.0                       3539.0  ...   
9                       3461.0                       3578.0  ...   

   2005__Total Health Spending  2006__Total Health Spending  \
0                    1696222.0                    1804672.0   
1                      25338.0                      26638.0   
2                       4765.0                       5048.0   
3                      28190.0                      30766.0   
4                      14611.0                      15431.0   
5                     182958.0                     194413.0   
6                      22867.0                      24849.0   
7                      24538.0                      25997.0   
8                       5899.0                       6285.0   
9                       4971.0                       5138.0   

   2007__Total Health Spending  2008__Total Health Spending  \
0                    1918820.0                    2010690.0   
1                      27700.0                      28765.0   
2                       5426.0                       5807.0   
3                      33366.0                      35547.0   
4                      16426.0                      17246.0   
5                     209397.0                     221013.0   
6                      26525.0                      27797.0   
7                      27488.0                      29141.0   
8                       6735.0                       7191.0   
9                       5492.0                       5779.0   

   2009__Total Health Spending  2010__Total Health Spending  \
0                    2114221.0                    2194625.0   
1                      30095.0                      30728.0   
2                       6112.0                       6519.0   
3                      37258.0                      38620.0   
4                      18071.0                      18735.0   
5                     229541.0                     241916.0   
6                      29246.0                      30187.0   
7                      31132.0                      31727.0   
8                       7495.0                       7938.0   
9                       6182.0                       6582.0   

   2011__Total Health Spending  2012__Total Health Spending  \
0                    2272582.0                    2365948.0   
1                      31398.0                      32848.0   
2                       6928.0                       7406.0   
3                      39295.0                      40495.0   
4                      19356.0                      20076.0   
5                     253844.0                     266767.0   
6                      31372.0                      32726.0   
7                      32129.0                      33421.0   
8                       8365.0                       8650.0   
9                       7000.0                       7130.0   

   2013__Total Health Spending  2014__Total Health Spending  
0                    2435624.0                    2562824.0  
1                      33788.0                      35263.0  
2                       7684.0                       8151.0  
3                      41481.0                      43356.0  
4                      20500.0                      21980.0  
5                     278168.0                     291989.0  
6                      34090.0                      36398.0  
7                      34223.0                      35413.0  
8                       9038.0                       9587.0  
9                       7443.0                       7871.0  

[10 rows x 25 columns]
     Location  Year  Spending
0     Alabama  1991   10393.0
1      Alaska  1991    1458.0
2     Arizona  1991    9269.0
3    Arkansas  1991    5632.0
4  California  1991   81438.0
```


300000
250000
200000
150000
100000
50000
0
Spending
1990
1995
2000
2005
2010
2015
Year
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming


160000
140000
120000
100000
80000
60000
40000
20000
0
Average Healthcare Spending
Wyoming
Vermont
North Dakota
Alaska
South Dakota
Montana
Delaware
Idaho
Hawaii
Rhode Island
New Hampshire
Maine
New Mexico
Nebraska
Utah
Nevada
West Virginia
Arkansas
Mississippi
Kansas
Iowa
Oklahoma
Oregon
South Carolina
Colorado
Kentucky
Alabama
Connecticut
Louisiana
Arizona
Minnesota
Missouri
Tennessee
Wisconsin
Maryland
Washington
Indiana
Virginia
Georgia
North Carolina
Massachusetts
New Jersey
Michigan
Ohio
Illinois
Pennsylvania
Florida
Texas
New York
California
Location