

Brain/Body Mass Ratio in Mammals

DS2001: Practicum for DS2000 (Prof. Rachlin)



Overview

In this practicum, you'll study the brain/body mass ratio in mammals. The included data file, *brain.txt*, provides brain and body mass data for five mammals: whales, humans, cats, squirrels, and hamsters. The first six lines of the file are an informational header. When reading the file, these lines may be ignored. The real data begins on line 7. For each of the five mammals, the file includes a) The name of the animal, b) The animal's body mass in kilograms, and c) The animal's brain mass in grams.

Practicum Instructions

1. Open and read the data file. Store each data element in its own unique variable. For example, name1, body1, brain1, name2, body2, brain2, etc.
2. Create a scatter plot (brain.png) showing the brain and body masses for each of the five animals. Your plot will have five points. Use the plotting example I posted on the website as a guide. In Spyder, use the **plots** tab to see your visualization.
 - a. Be sure to label your X and Y axes
 - b. Give your graph a descriptive title
 - c. Give each data point a label attribute corresponding to the name of the animal
 - d. Use a distinctive marker for human so that it really stands out
 - e. Add a legend identifying each animal in your plot
 - f. For your X and Y axes, use *logarithmic* scaling. To do this, you simply add the commands:

```
plt.xscale('log')
plt.yscale('log')
```
3. Interpret your results. According to the plot, which animal has the largest brain / body mass *ratio*? Explain your answer. You can include your interpretation in the program header.

4. Let's now create a **bar** chart comparing the brain/body mass ratios more explicitly (ratio.png). For each mammal, compute: $\text{ratio} = \text{brain mass [grams]} / \text{body mass [kilograms]}$. To generate ONE bar in a bar chart, use the command:

```
plt.bar(bar-label, value)
```

Here, the bar-label is the name of the mammal and the value is the brain/body mass ratio for that animal. You will make one call per animal. Be sure to change the axis labels and titles. Remove any logarithmic scaling.

5. Submit your program (brain.py) and your visualizations (brain.png and ratio.png) to GradeScope. You may work in groups of two. For each group, make one gradescope submission. The submitter should indicate the team members during the submission process. If you are not sure how to do this, please ask. Be sure that the program header also identifies each team member.