EIWL Sections 45 and 46

4/8

Due to getting a little behind in the final two weeks of the semester, I only checked for completeness on PS 18-21. ~Brian

PS 20 — Section 45 was accidentally included in Rania's 4.18.2025 problem set, so I moved it here. See below.

Section 45 ~ Disregard! I misread the github site - will put in next PSet

```
(* ok, I moved Section 45 into this new notebook,
and called it PS20. However, you never sent Section 46. *)
```

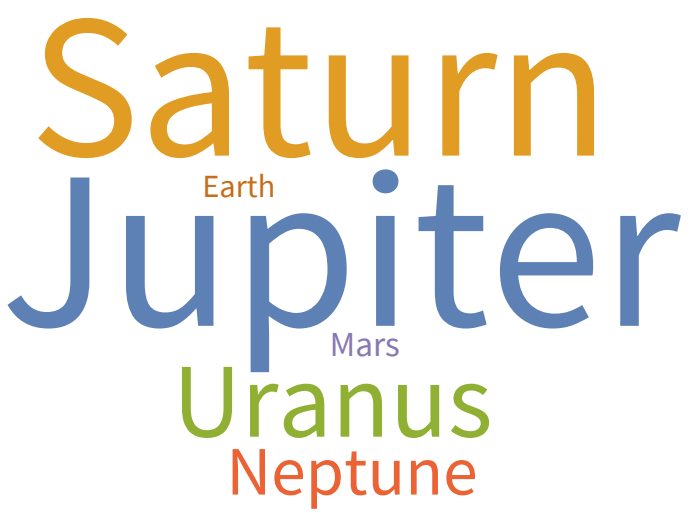
In[ ]:=
```
planets = CloudGet["https://wolfr.am/7FxLgPm5"]
```

Out[ ]=

	Mass	Radius	Moons		
				Mass	Radius
Mercury	3.30104×10^{23} kg	1516.0 mi			
Venus	4.86732×10^{24} kg	3760.4 mi			
Earth	5.9721986×10^{24} kg	3958.761 mi	Moon	7.3459×10^{22} kg	1079.6 mi
Mars	6.41693×10^{23} kg	2106.1 mi	Deimos	1.5×10^{15} kg	3.9 mi
			Phobos	1.072×10^{16} kg	6.90 mi
Jupiter	1.89813×10^{27} kg	43 441. mi	Adrastea	$7. \times 10^{15}$ kg	5.1 mi
			Aitne	$4. \times 10^{13}$ kg	0.93 mi
			69 total ›		
Saturn	5.68319×10^{26} kg	36 184. mi	Aegaeon	—	0.16 mi
			Aegir	—	1.9 mi
			62 total ›		
Uranus	8.68103×10^{25} kg	15 759. mi	Ariel	1.35×10^{21} kg	359.7 mi
			Belinda	3.57×10^{17} kg	25.0 mi
			27 total ›		
Neptune	1.02410×10^{26} kg	15 299. mi	Despina	2.1×10^{18} kg	47. mi
			Galatea	3.7×10^{18} kg	55. mi
			14 total ›		

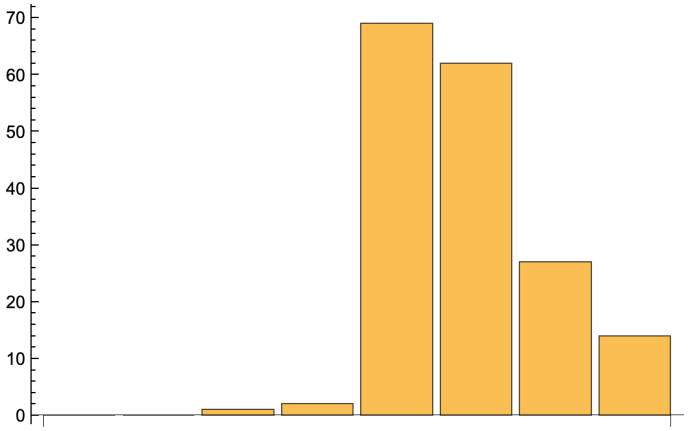
In[ ]:=
```
(*45.1 Make a word cloud of the planets,
with weights determined by their number of moons.*)
WordCloud[Normal[planets[All, "Moons", Length]]]
```

Out[ ]=




```
(*45.2 Make a bar chart of the number of moons for each planet.*)
BarChart[planets[All, "Moons", Length], ChartLabels → All]
```

Out[ ]=



In[•]:=
```
(*45.3 Make a dataset of the masses of the planets,
sorted by their number of moons*)
planets[SortBy[Length[#Moons] &], "Mass"]
```

Out[•]=

Mercury	3.30104×10^{23} kg
Venus	4.86732×10^{24} kg
Earth	5.9721986×10^{24} kg
Mars	6.41693×10^{23} kg
Neptune	1.02410×10^{26} kg
Uranus	8.68103×10^{25} kg
Saturn	5.68319×10^{26} kg
Jupiter	1.89813×10^{27} kg

In[•]:=
```
(*45.4 Make a dataset of planets and the mass of each one's most massive moon.*)
planets[All, "Moons", Max, "Mass"]
```

Out[•]=

Mercury	$-\infty$
Venus	$-\infty$
Earth	7.3459×10^{22} kg
Mars	1.072×10^{16} kg
Jupiter	1.4815×10^{23} kg
Saturn	1.3452×10^{23} kg
Uranus	3.526×10^{21} kg
Neptune	2.1394×10^{22} kg

In[•]:=
```
(*45.5 Make a dataset of masses of planets,
where the planets are sorted by the largest mass of their moons.*)
planets[All, "Moons", Total, "Mass"][Sort]
```

Out[•]=

Mercury	0
Venus	0
Mars	1.22×10^{16} kg
Uranus	9.14×10^{21} kg
Neptune	2.1487×10^{22} kg
Earth	7.3459×10^{22} kg
Saturn	1.4051×10^{23} kg
Jupiter	3.9301×10^{23} kg

In[•]:=
```
(*45.6 Make a dataset of the median mass of all moons for each planet. *)
planets[All, "Moons", Median, "Mass"]
```

Out[•]=

Mercury	—
Venus	—
Earth	7.3459×10^{22} kg
Mars	6.10×10^{15} kg
Jupiter	1.9×10^{14} kg
Saturn	8.2×10^{15} kg
Uranus	3.57×10^{17} kg
Neptune	3.7×10^{18} kg

In[•]:=
```
(*45. 7 For each planet,
make a list of moons larger in mass than 0.0001 Earth masses*)
planets[All, "Moons", Select[ 0.0001 M⊕ ] &][All, Keys]
```

Out[•]=

Failure[⚠ Message: The argument Select[0.0001 M⊕] is not a valid Association or a list of rules.
Tag: Keys]

```
(*45.8 Make a word cloud of countries in Central America,
with the names of countries proportional to
 the lengths of the Wikipedia article about them.*)
WordCloud[Association[
  # → StringLength[WikipediaData[#]] & /@ EntityList[ Central America COUNTRIES ]]]
```

Out[ ]=