PS 15 — Rania 4.1.2025

37

In[266]:=

```
(*37.1 Make a list of numbers up to 100,
with even numbers on yellow and odd numbers on light gray.*)
If[EvenQ[#] == True , Style[#, Background → Yellow],
   Style[#, Background → LightGray]] & /@ Range[100]
```

Out[266]=

{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,
 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42,
 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62,
 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81,
 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100}

In[267]:=

```
(*37.2 Make a list of numbers up to 100, with primes framed*)
```

In[268]:=

```
If[PrimeQ[#] == True, Framed[#], #] & /@ Range[100]
```

Out[268]=

{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,
 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42,
 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61,
 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80,
 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100}

In[269]:=

```
(*37.3 Make a list of numbers up to 100,
with primes framed and labeled in light gray with their values modulo 4.*)

If[PrimeQ[#] == True, Labeled[Framed[#], Style[Mod[#, 4], LightGray]], #] & /@
 Range[100]
```

Out[269]=

{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,
18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33,
34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50,
51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67,
68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83,
84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100}

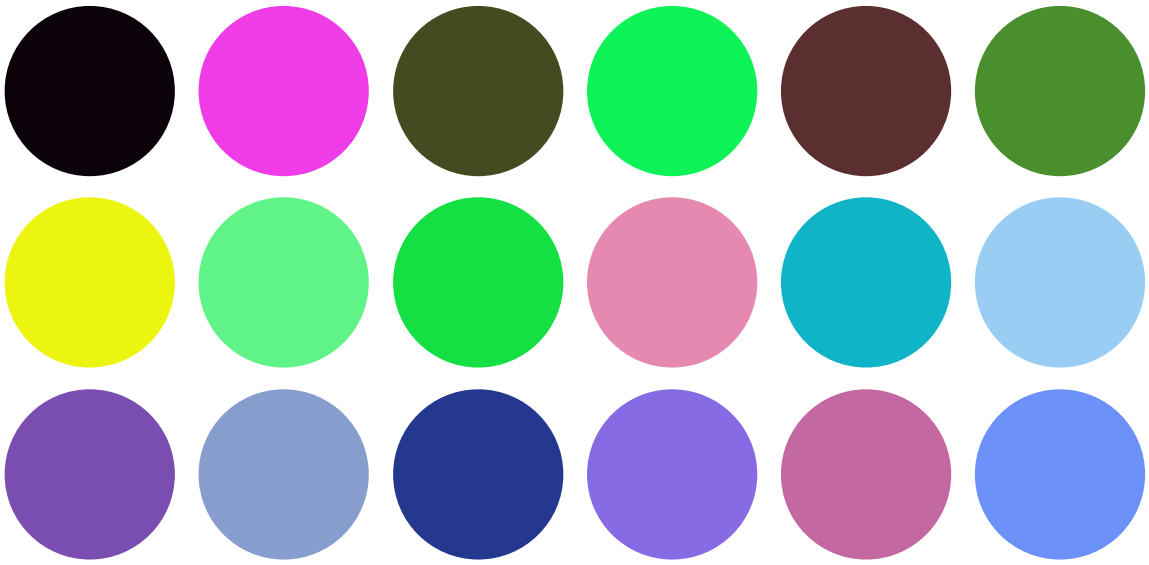
In[270]:=

```
(*37.4 Create a 3×6 GraphicsGrid of randomly colored disks.*)
```

In[271]:=

```
Table[Graphics[Style[Disk[], RandomColor[]]], 3, 6] // GraphicsGrid
(*what's the third argument style of Table again?*)
```

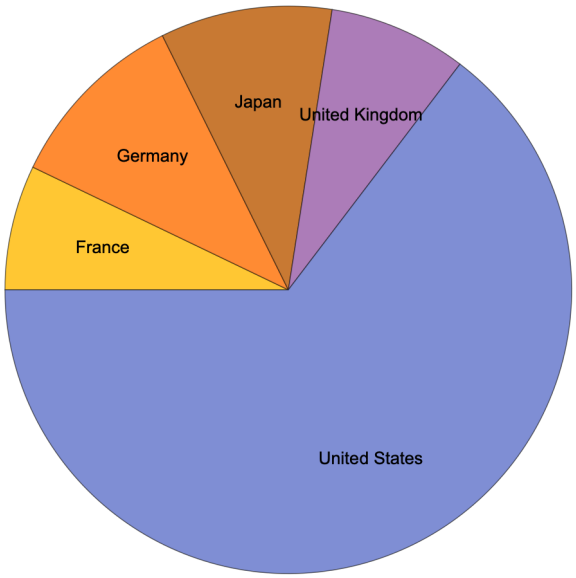
Out[271]=



In[272]:=

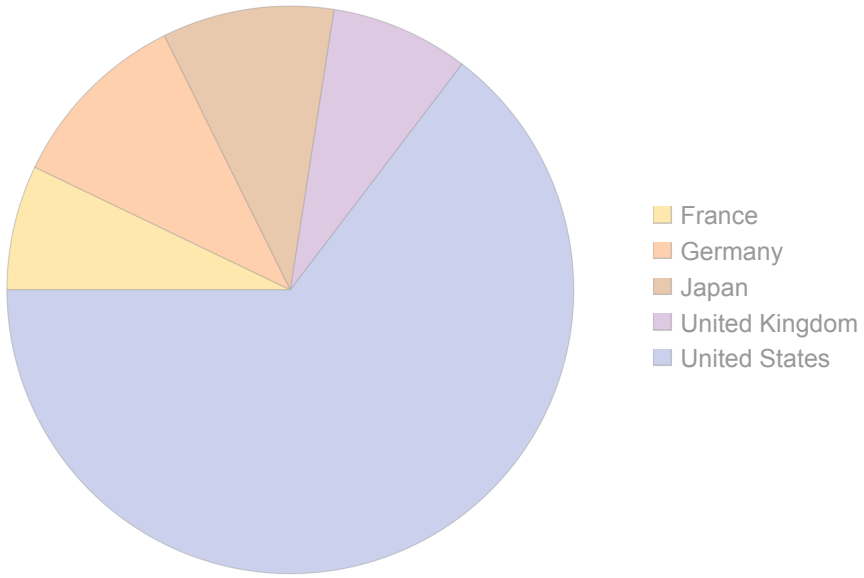
```
(*37.5 Make a pie chart of the GDPs of the countries in the G5,
labeling each wedge.*)

PieChart[EntityList[ Group of 5 COUNTRIES ["GDP"]],
 ChartLabels → Group of 5 COUNTRIES ["Name"]]
(*technique of ["Name"]*)
```

Out[272]=



```
(*37.6 Make a pie chart of the populations of the countries in the G5,
giving a legend for each wedge.*)
PieChart[EntityList[ Group of 5 COUNTRIES ["GDP"]],
 ChartLegends → Group of 5 COUNTRIES ["Name"]]
```

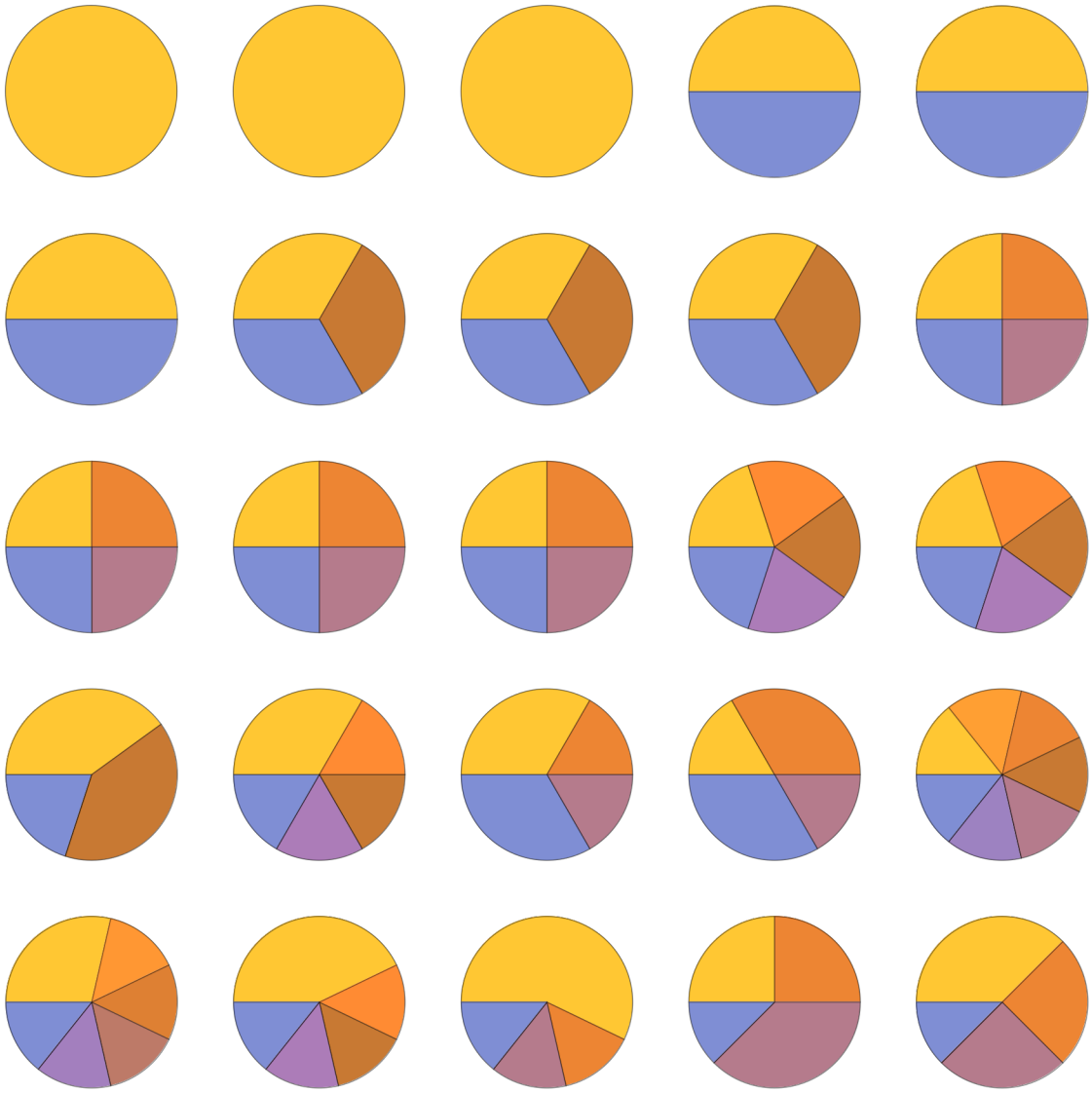
Out[273]=



In[274]:=

```
(*37.7 Make a 5×5 GraphicsGrid of pie charts that give the
 relative frequencies of digits in 2^n with n starting at 1.*)
Partition[Table[PieChart[Counts[IntegerDigits[2^n]]], {n, 25}], 5] // GraphicsGrid
```

Out[274]=



In[275]:=

```
(* 37.8 Make a graphics row of word clouds
 for Wikipedia articles on the G5 countries.*)
WordCloud[WikipediaData[#]] & /@ EntityList[ Group of 5 COUNTRIES ] // GraphicsRow
```

Out[275]=

38 - variables!

In[276]:=

```
(*38.1 Use Module to compute x^2+x where x is Range[10]*)
Module[{x = Range[10]}, x^2 + x]
```

Out[276]=

```
{2, 6, 12, 20, 30, 42, 56, 72, 90, 110}
```

In[277]:=

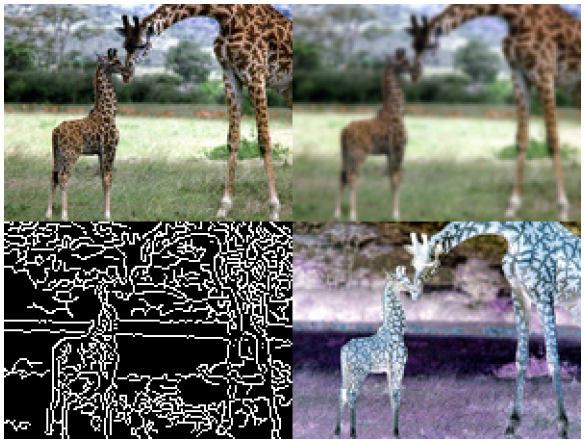
```
(*38.2 Use Module to generate a list of 10 random integers up to 100,
then make a column giving the original list,and the results of applying Sort,
Max and Total to it*)
Module[{randomint = RandomInteger[100, 10]},
 Column[{randomint, Sort[randomint], Max[randomint], Total[randomint]}]]
```

Out[277]=

```
{8, 49, 61, 36, 82, 98, 11, 32, 71, 92}
{8, 11, 32, 36, 49, 61, 71, 82, 92, 98}
98
540
```

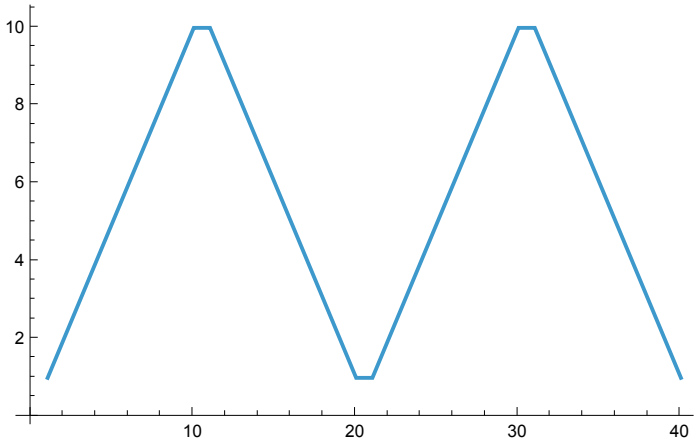
In[278]:=
```
(*38.3 Use Module to generate an image collage from a picture of a giraffe,
and the results of applying Blur,EdgeDetect and ColorNegate to it.*)
Module[{x = giraffe SPECIES SPECIFICATION [ image ]},
 ImageCollage[{x, Blur[x], EdgeDetect[x], ColorNegate[x]}]]
```

Out[278]=



In[279]:=
```
(*38.4 Inside a Module,let r=Range[10],then make a line plot of r joined
 with the reverse of r joined with r joined with the reverse of r.*)
Module[{r = Range[10]}, ListLinePlot[Join[r, Reverse[r], r, Reverse[r]]]]
```

Out[279]=



In[280]:=
```
(*38.5 Find a simpler form for {Range[10]+1,Range[10]-1,Reverse[Range[10]]}.*)
{Range[10] + 1, Range[10] - 1, Reverse[Range[10]]}
Module[{x = Range[10]}, {x + 1, x - 1, Reverse[x]}]
```

Out[280]=
```
{{2, 3, 4, 5, 6, 7, 8, 9, 10, 11},
 {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}, {10, 9, 8, 7, 6, 5, 4, 3, 2, 1}}
```

Out[281]=
```
{{2, 3, 4, 5, 6, 7, 8, 9, 10, 11},
 {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}, {10, 9, 8, 7, 6, 5, 4, 3, 2, 1}}
```

In[282]:=
```
(*38.6 Find a simpler form for
 Module[{u=10},Join[{u},Table[u=Mod[17u+2,11],20]]].*)
Module[{u = 10}, Join[{u}, Table[u = Mod[17 u + 2, 11], 20]]]
NestList[Mod[17 # + 2, 11] &, 10, 20]
```

Out[282]=
```
{10, 7, 0, 2, 3, 9, 1, 8, 6, 5, 10, 7, 0, 2, 3, 9, 1, 8, 6, 5, 10}
```

Out[283]=
```
{10, 7, 0, 2, 3, 9, 1, 8, 6, 5, 10, 7, 0, 2, 3, 9, 1, 8, 6, 5, 10}
```

In[284]:=
```
(*38.7 Generate 10 random strings made of 5 letters,
in which consonants (non-vowels) alternate with vowels (aeiou).*)
vowels = {"a", "e", "i", "o", "u", "y"};
constants = Complement[Alphabet[], vowels];

Table[StringJoin[RandomSample[constants, 1],
  RandomSample[vowels, 1], RandomSample[constants, 1],
  RandomSample[vowels, 1], RandomSample[constants, 1]], 5]
```

Out[286]=
```
{sakin, pebyg, parux, fizyc, ludyp}
```