Brian — PS 15 — 2025-04-01 — Solution

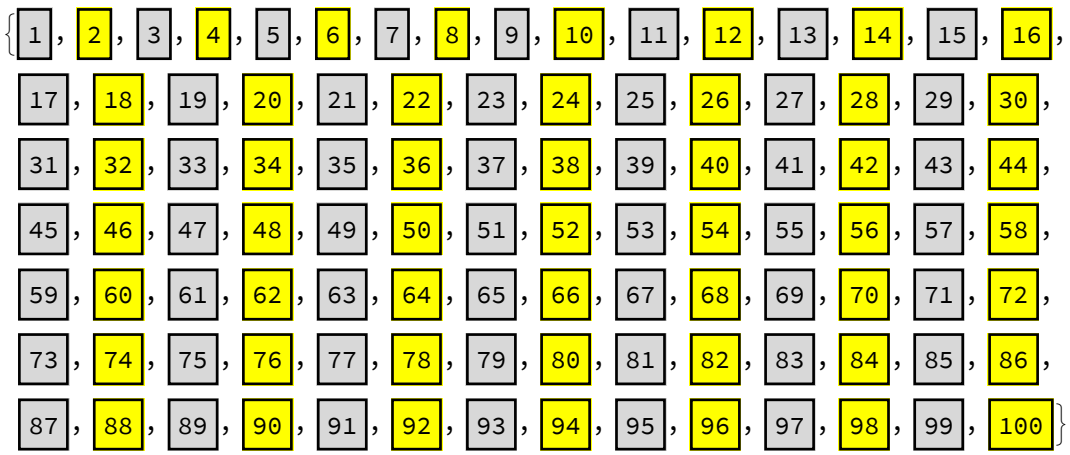
EIWL3 Sections 37 and 38

!! 38.5 and 38.6 were surprising !!

Exercises from *EIWL3* Section 37

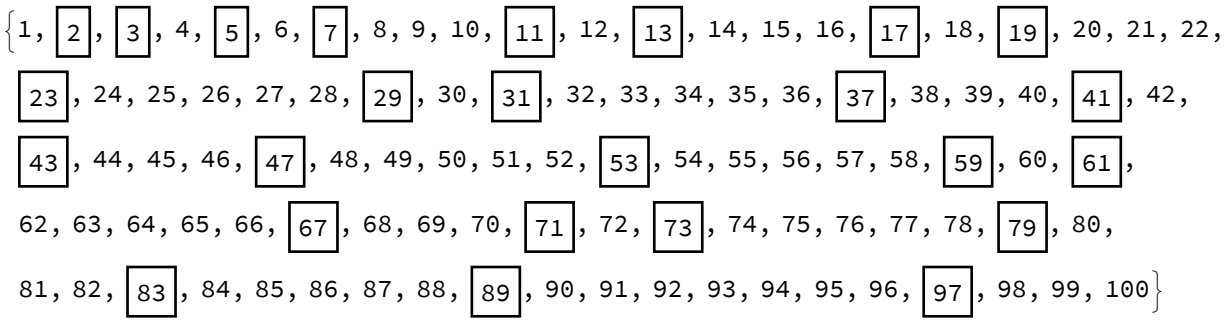
In[•]:=
```
(* 37.1 *) Array[Framed[#, Background → If[EvenQ[#], Yellow, LightGray]] &, 100]
```

Out[•]=



In[•]:=
```
(* 37.2 *) Array[If[PrimeQ[#], Framed[#], #] &, 100]
```

Out[•]=



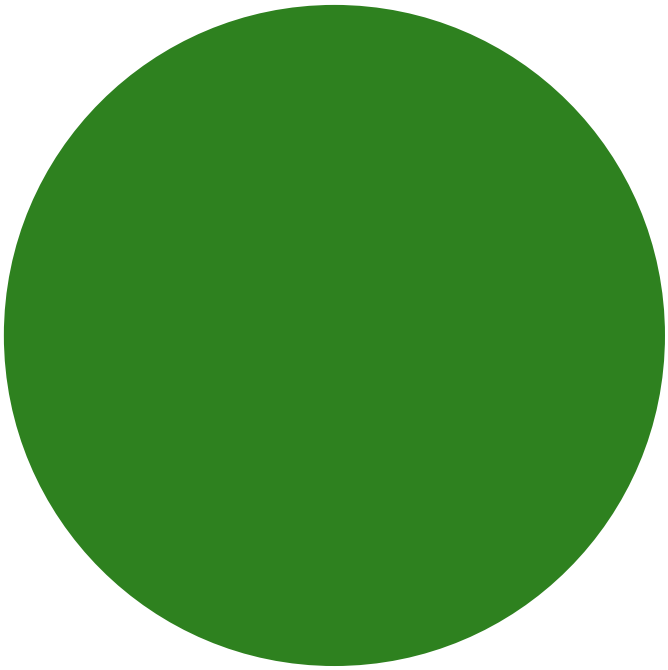
In[•]:=
```
(* 37.3 *)
Array[If[PrimeQ[#], Labeled[Framed[#, Background → LightGray], Mod[#, 4]], #] &, 100]
```

Out[•]=

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

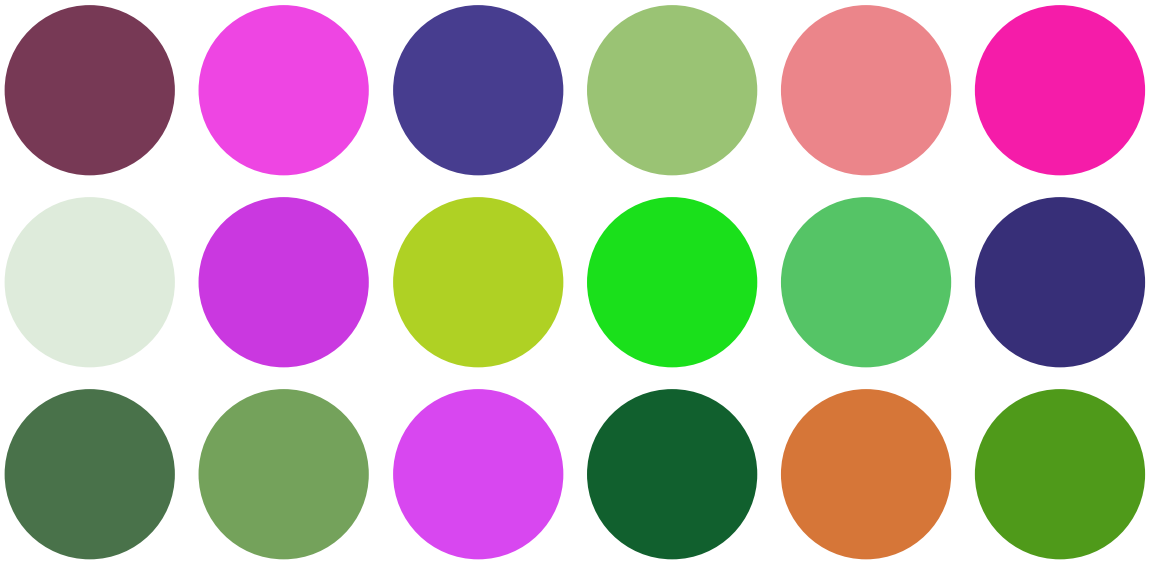
In[•]:=
```
Graphics[{RandomColor[], Disk[]}]
```

Out[•]=



In[ ]:=
```
(* 37.4 *) GraphicsGrid[Table[Graphics[{RandomColor[], Disk[]}], 3, 6]]
```

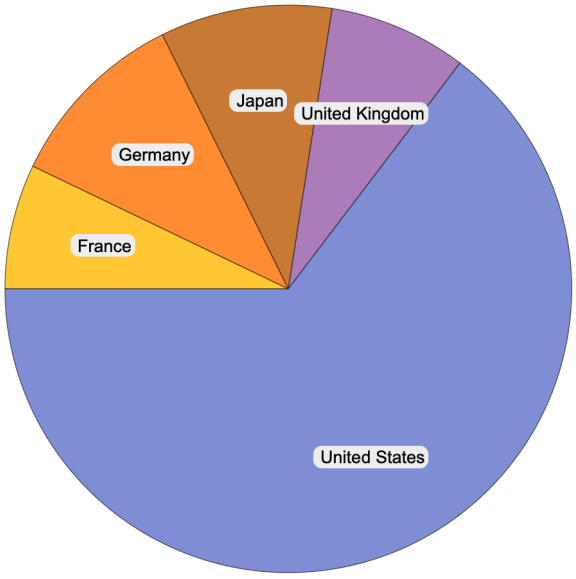
Out[ ]=



In[ ]:= Group of 5 COUNTRIES

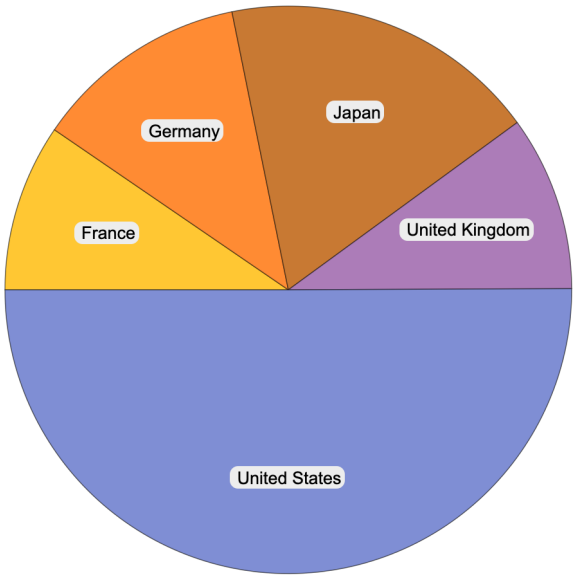
In[ ]:=
```
(* 37.5 *) countries = EntityList[ Group of 5 COUNTRIES ];
PieChart[Labeled[#["GDP"], #] & /@ countries]
```

Out[ ]=



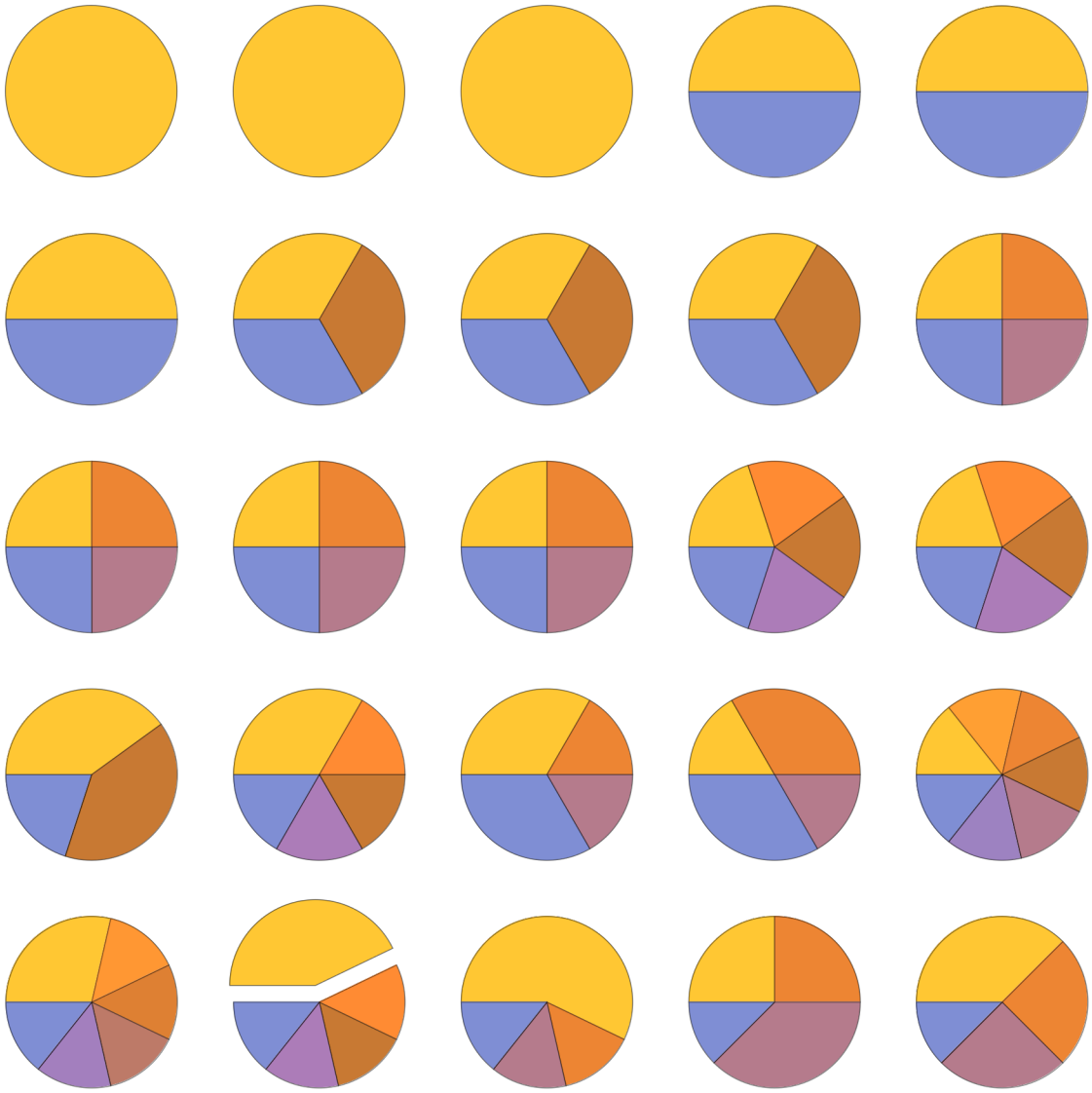
In[ ]:=
```
(* 37.6 *)
PieChart[Labeled[#["Population"], #] & /@ countries]
```

Out[ ]=



In[ ]:=
```
(* 37.7 *) pieCharts = PieChart[Counts[#]] & /@ Array[IntegerDigits[2^#] &, 25];
GraphicsGrid[Partition[pieCharts, 5]]
```

Out[ ]=



```
In[ ]:= (* 37.8 *)
countryNames = EntityValue[countries, "Name"];
wordClouds = WordCloud[WikipediaData[#]] & /@ countryNames;
GraphicsRow[wordClouds]
```

Out[ ]=

Exercises from *EIWL3* Section 38

```
In[ ]:= (* 38.1 *) Module[{x = Range[10]}, x^2 + x]
```

Out[ ]=

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

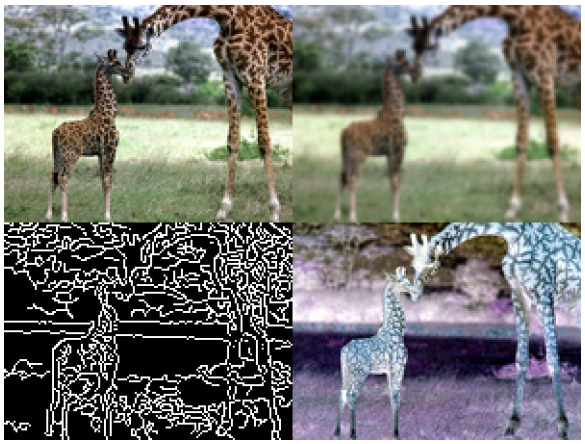
```
In[ ]:= (* 38.2 *)
Module[{x = RandomInteger[100, 10]}, Column[{x, Sort[x], Max[x], Total[x]}]]
```

Out[ ]=

```
{43, 55, 42, 38, 40, 64, 88, 9, 49, 50}
{9, 38, 40, 42, 43, 49, 50, 55, 64, 88}
88
478
```

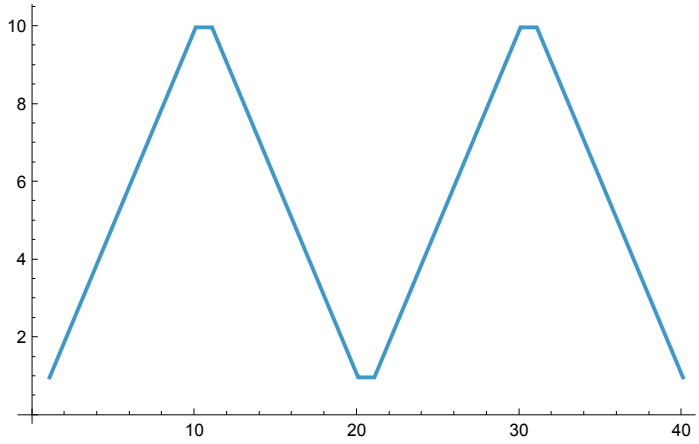
```
In[ ]:= (* 38.3 *) Module[{pic = giraffe SPECIES SPECIFICATION [image]},
 ImageCollage[{pic, Blur[pic], EdgeDetect[pic], ColorNegate[pic]}]]
```

Out[ ]=



In[•]:=
```
(* 38.4 *) Module[{r = Range[10]}, ListLinePlot[Join[r, Reverse[r], r, Reverse[r]]]]
```

Out[•]=




```
(* 38.5 *) (* First,
here is what we are being asked to make (but more simply): *)
{Range[10] + 1, Range[10] - 1, Reverse[Range[10]]}
```

Out[•]=
```
{{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[130]:=
```
(* We could make that like this: *)
Module[{x = Range[10]}, {x + 1, x - 1, 11 - x}]
```

Out[130]=
```
{{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}}
```

```
(* Wow did that teach me something. I thought the above was *)
(* going to give: *)
(* {{2, 0, 10},{3,1,9}, ..., {11,9,1}} *)
(* and that then I was then going to have to do a Transpose. Module is weird! *)

(* 38.6 *) (* First,
here is what we are being asked to make (but more simply): *)
Module[{u = 10}, Join[{u}, Table[u = Mod[17 u + 2, 11], 20]]]
```

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

```
(* Well, that is easy with NestList: *)
NestList[Mod[17 # + 2, 11] &, 10, 20]
```

Out[131]=
```
{10, 7, 0, 2, 3, 9, 1, 8, 6, 5, 10, 7, 0, 2, 3, 9, 1, 8, 6, 5, 10}
```

In[139]:=

```
(* 38.7 *) (* Probably not what Wolfram had in mind,
but it works: *)StringJoin /@
 Table[If[OddQ[j], RandomChoice[Complement[Alphabet[], {"a", "e", "i", "o", "u"}]],
   RandomChoice[{"a", "e", "i", "o", "u"}]], {i, 10}, {j, 5}]
```

Out[139]=

```
{tejik, bedik, hojuj, likim, yanac, cemav, notaf, zaris, hegan, bohiz}
```