

# Brian — PS 15 — 2025-04-01 — Solution

*EIWL3* Sections 37 and 38

*!! 38.5 and 38.6 were surprising !!*

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## Exercises from *EIWL3* Section 37

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

Out[ ]:=

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

Out[ ]:=

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[ ]:= (* 37.3 *)
```

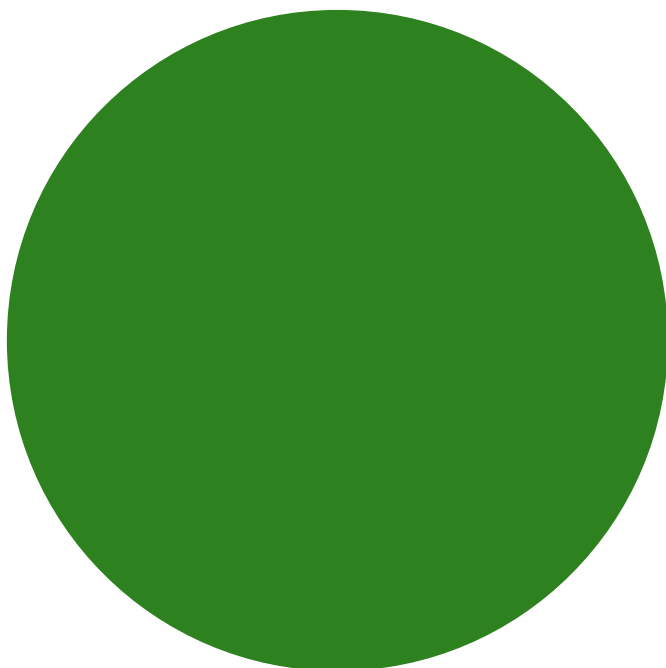
```
Array[If[PrimeQ[#], Labeled[Framed[#, Background → LightGray], Mod[#, 4]], #] &, 100]
```

```
Out[ ]:=
```

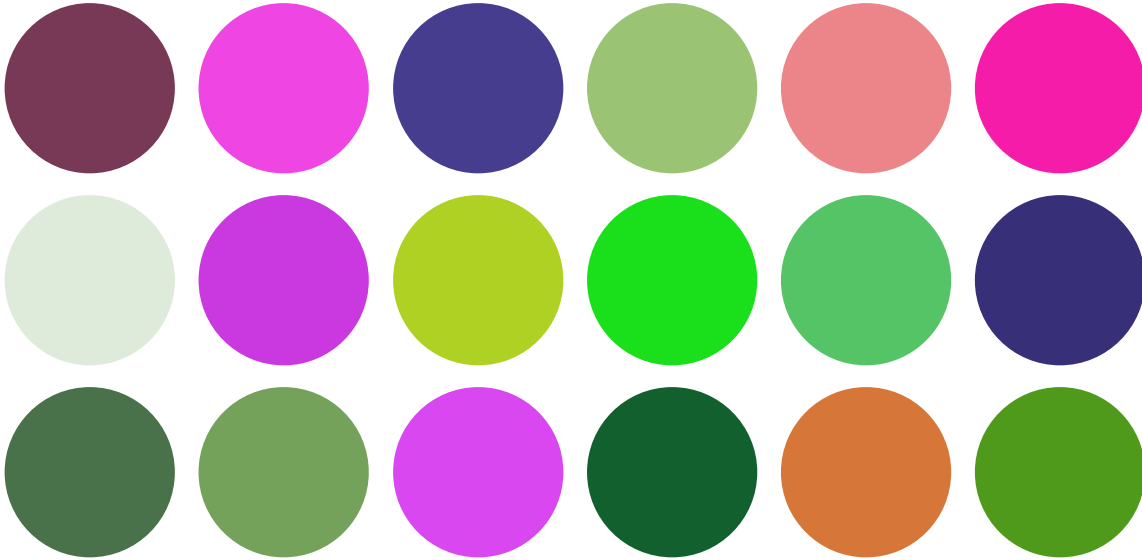
```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,
  2, 3, 1, 3, 3, 1, 1,
  18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33,
  3, 3, 1, 3,
  34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50,
  1, 1, 3, 3,
  51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62,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

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

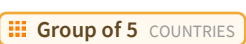
```
Out[ ]:=
```



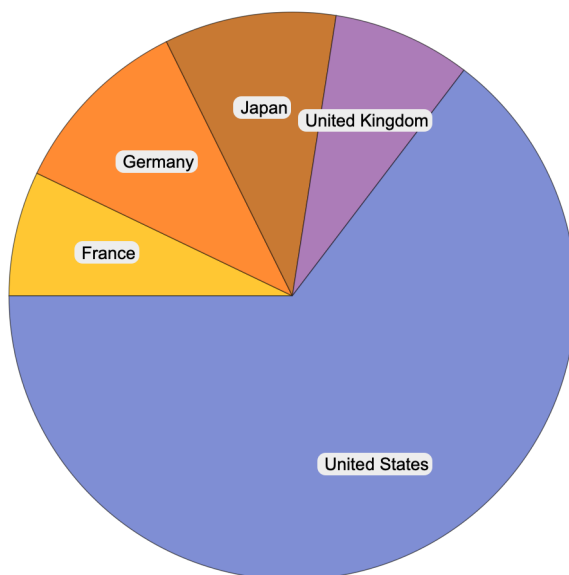
```
In[*]:= (* 37.4 *) GraphicsGrid[Table[Graphics[{RandomColor[], Disk[]}], 3, 6]]
Out[*]=
```



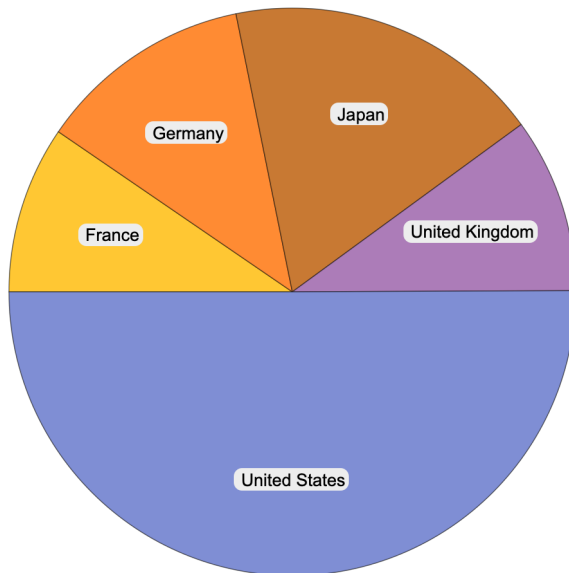
```
In[*]:= 
```

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

```
Out[*]=
```



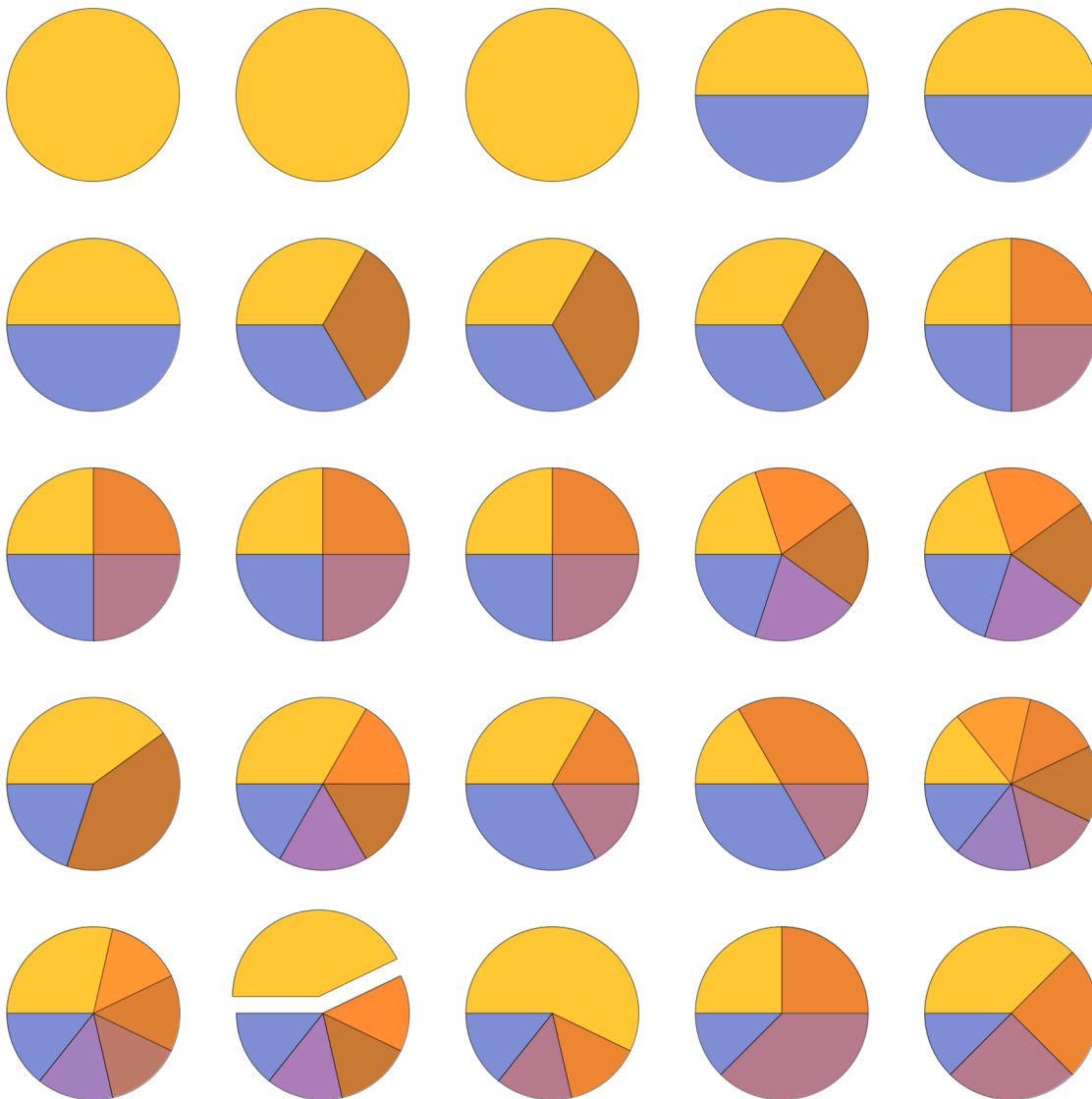
```
In[ ]:= (* 37.6 *)  
PieChart[Labeled[#[ "Population"], #] & /@ countries]  
Out[ ]:=
```



OOPS. We were supposed to use `Legended` instead of `Labeled`.

```
In[8]:= (* 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 EIW3 Section 38

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

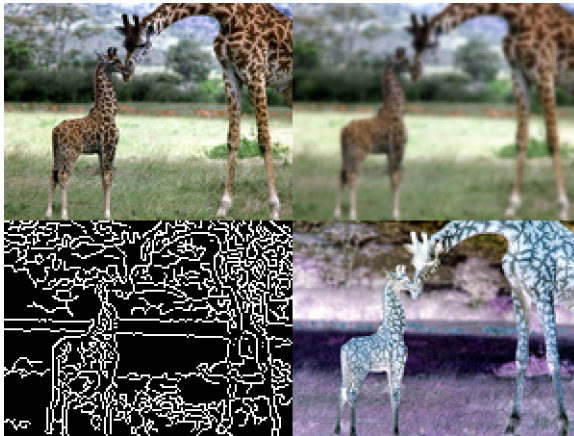
Out[*]=
{2, 6, 12, 20, 30, 42, 56, 72, 90, 110}

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

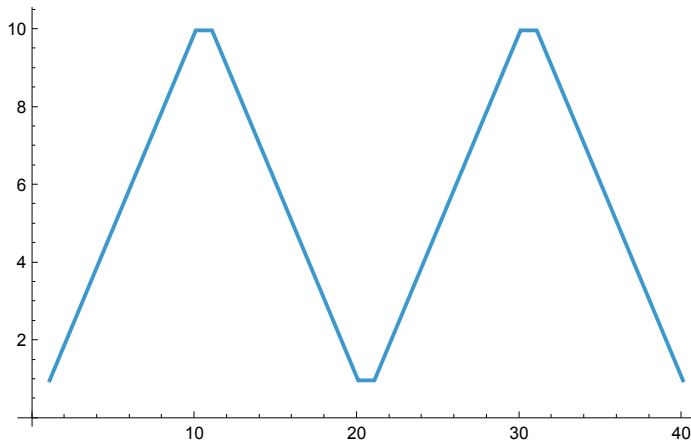
In[*]:= (* 38.3 *) Module[{pic = giraffe SPECIES SPECIFICATION [ image ]},
ImageCollage[{pic, Blur[pic], EdgeDetect[pic], ColorNegate[pic]}]]
```

```
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}
```