Brian — PS 13 — 2025-03-25 — Solution

EIWL3 Sections 33 and 34

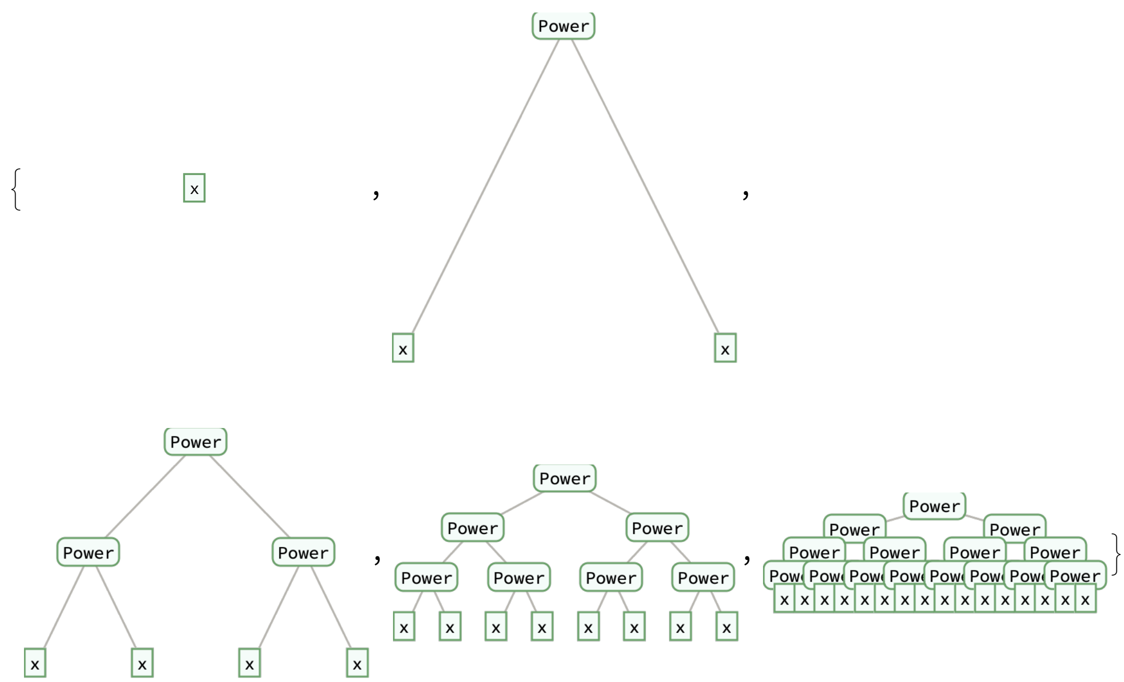
Exercises from *EIWL3* Section 33

In[ ]:=
```
(* 33.1 *) Head[ListPlot[{1, 2, 3}]]
```
Out[ ]=
```
Graphics
```

In[ ]:=
```
(* 33.2 *) Times @@ Array[# &, 100]
```
Out[ ]=
```
93 326 215 443 944 152 681 699 238 856 266 700 490 715 968 264 381 621 468 592 963 895 217 599 993
229 915 608 941 463 976 156 518 286 253 697 920 827 223 758 251 185 210 916 864 000 000 000 000
000 000 000 000
```

In[ ]:=
```
(* 33.3 *) f @@@ Tuples[{a, b}, 2]
```
Out[ ]=
```
{f[a, a], f[a, b], f[b, a], f[b, b]}
```

In[ ]:=
```
(* 33.4 *) ExpressionTree /@ NestList[#^# &, x, 4]
```
Out[ ]=

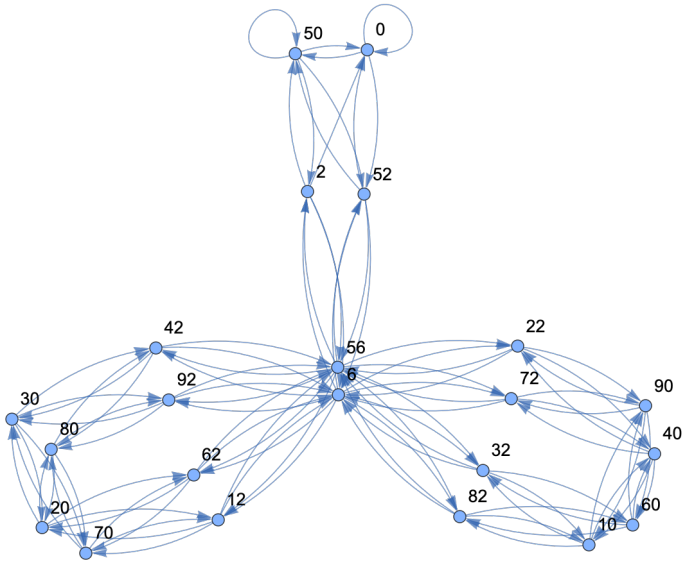


In[•]:=
```
(* 33.5 *) Union[Select[Flatten[Array[#1^2 / (#2^2 + 1) &, {20, 20}]], IntegerQ]]
```

Out[•]=
```
{2, 5, 8, 10, 17, 18, 20, 32, 40, 45, 50, 72, 80, 98, 128, 162, 200}
```

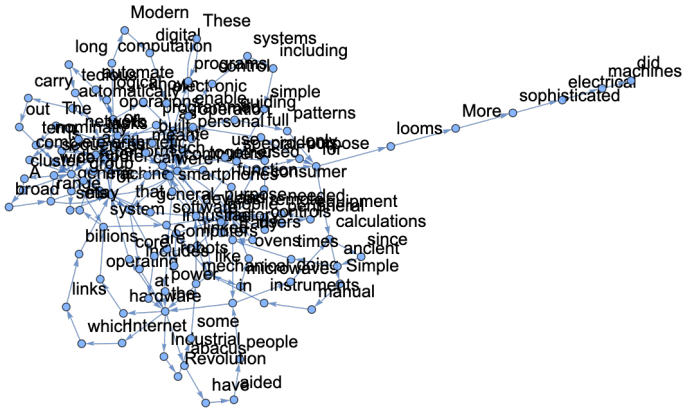
In[•]:=
```
(* 33.6 *)
Graph[Rule @@@ Partition[Table[Mod[n^2 + n, 100], {n, 100}], 2, 1], VertexLabels → All]
```

Out[•]=



In[•]:=
```
(* 33.7 *)
Graph[Rule @@@ Partition[Take[TextWords[WikipediaData["computers"]], 200], 2, 1],
 VertexLabels → All]
```

Out[•]=



In[•]:=
```
(* 33.8 *) f @@@ {{1, 2}, {7, 2}, {5, 4}}
```

Out[•]=
```
{f[1, 2], f[7, 2], f[5, 4]}
```

yields the same result as the more complicated

In[•]:=
```
f @@ # & /@ {{1, 2}, {7, 2}, {5, 4}}
```

Out[•]=
```
{f[1, 2], f[7, 2], f[5, 4]}
```

Exercises from *EIWL3* Section 34

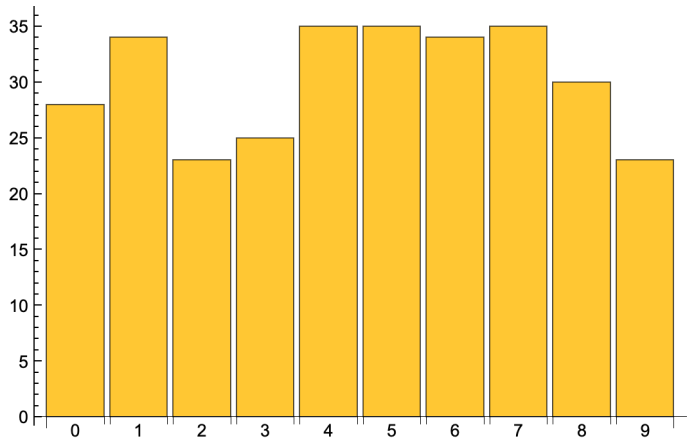
In[•]:=
```
(* 34.1 *) Count[IntegerDigits[3^100], #] & /@ Table[i, {i, 0, 9}]
```

Out[•]=
```
{7, 9, 9, 5, 1, 5, 4, 7, 0, 1}
```

I think Wolfram's expected output for Exercise 34.1 is wrong. He fails to include that 8 appears 0 times. His notebook says the expected output is {7,9,9,5,1,5,4,7,1}.

In[•]:=
```
(* 34.2 *)
BarChart[Association[# → Count[IntegerDigits[2^1000], #] & /@ Table[i, {i, 0, 9}]],
 ChartLabels → Table[i, {i, 0, 9}]]
```

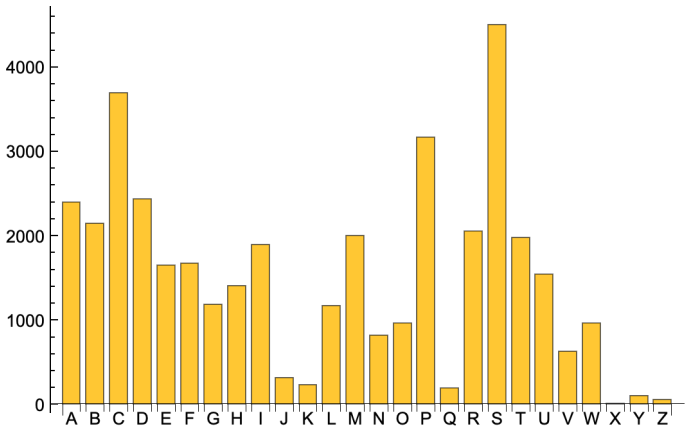
Out[•]=



My solution to Exercise 34.2 is a little clunky. Got a better one?

In[ ]:=
```
(* 34.3 *)
BarChart[Table[Count[Capitalize[First[Characters[#]]] & /@ WordList[], letter],
  {letter, Capitalize /@ Alphabet[]}], ChartLabels → Capitalize /@ Alphabet[]]
```

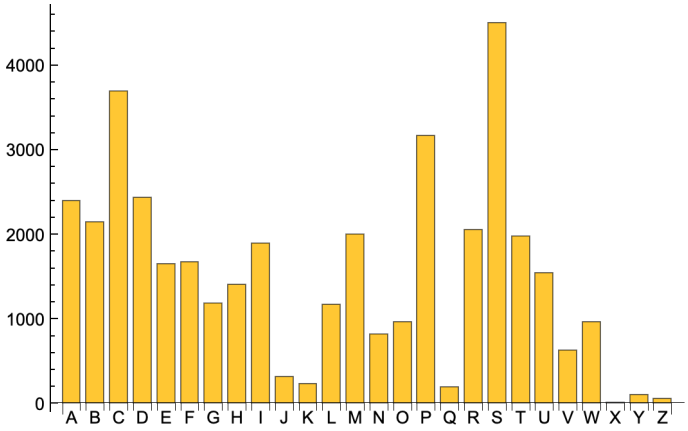
Out[ ]=



Same comment about my solution to Exercise 34.3 as 34.2. I'm guessing there is a slicker way to do these two using associations. In Exercise 34.4 I finally figured out the slicker way.

In[ ]:=
```
(* 34.4 *)BarChart[Association[
  Table[letter → Count[Capitalize[First[Characters[#]]] & /@ WordList[], letter],
   {letter, Capitalize /@ Alphabet[]}]], ChartLabels → Automatic]
```

Out[ ]=



In[ ]:=
```
(* 34.5 *)Count[Characters[WikipediaData["computers"]], #] & /@ {"q", "u"} //
 Divide[#[[1]], #[[2]]] &
```

Out[ ]=

$$\frac{63}{1570}$$

My solution to Exercise 34.5 is super-clunky. I may revise this solution after I look at yours :).

In[ ]:=
```
(* 34.6 *)Keys[
 Take[Reverse[Sort[WordCounts[ExampleData[{"Text", "AliceInWonderland"}]]]], 10]]
```

Out[ ]=

```
{the, and, a, to, she, of, was, Alice, in, it}
```