# Brian — PS 13 — 2025-03-25 — Solution

*EIWL3* Sections 33 and 34

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## Exercises from *EIWL3* Section 33

In[4]:=
```
(* 33.1 *) Head[ListPlot[{1, 2, 3}]]
```

Out[4]=
```
Graphics
```

In[15]:=
```
(* 33.2 *) Times @@ Array[# &, 100]
```

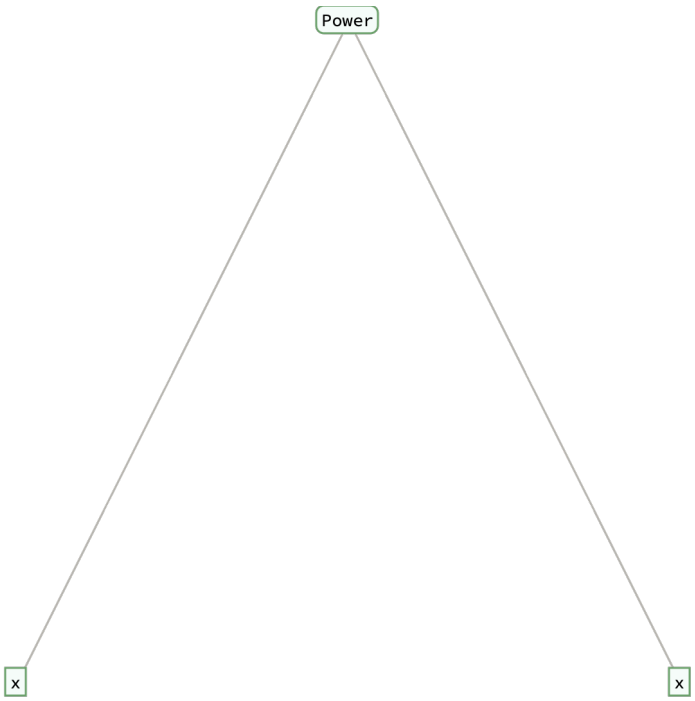
Out[15]=
```
93 326 215 443 944 152 681 699 238 856 266 700 490 715 968 264 381 621 468 592 963 895 217 599 993 ↘
 229 915 608 941 463 976 156 518 286 253 697 920 827 223 758 251 185 210 916 864 000 000 000 000 ↘
 000 000 000 000
```

In[19]:=
```
(* 33.3 *) f @@@ Tuples[{a, b}, 2]
```

Out[19]=
```
{f[a, a], f[a, b], f[b, a], f[b, b]}
```

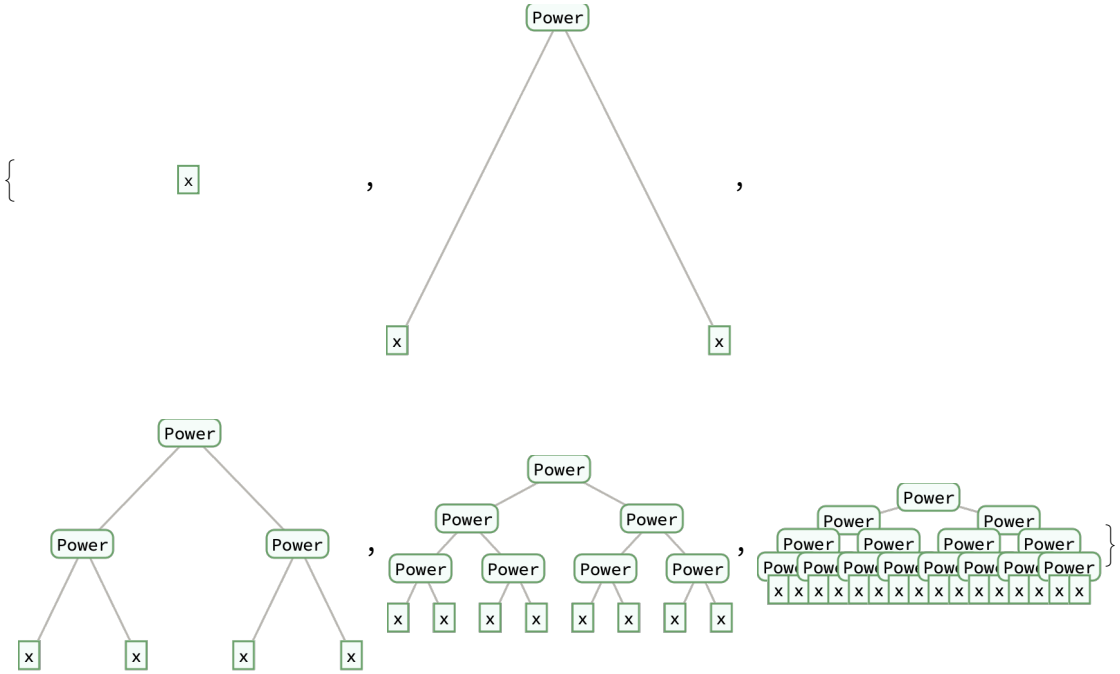
In[30]:=
```
ExpressionTree[x^x]
```

Out[30]=



In[32]:=
```
(* 33.4 *) ExpressionTree /@ NestList[#^# &, x, 4]
```

Out[32]=

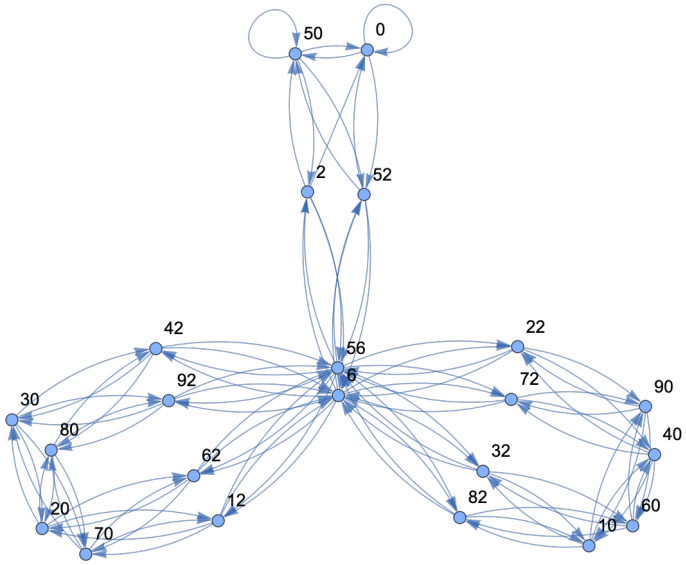



In[43]:=
```
(* 33.5 *) Union[Select[Flatten[Array[#1^2 / (#2^2 + 1) &, {20, 20}]], IntegerQ]]
```

Out[43]=
```
{2, 5, 8, 10, 17, 18, 20, 32, 40, 45, 50, 72, 80, 98, 128, 162, 200}
```

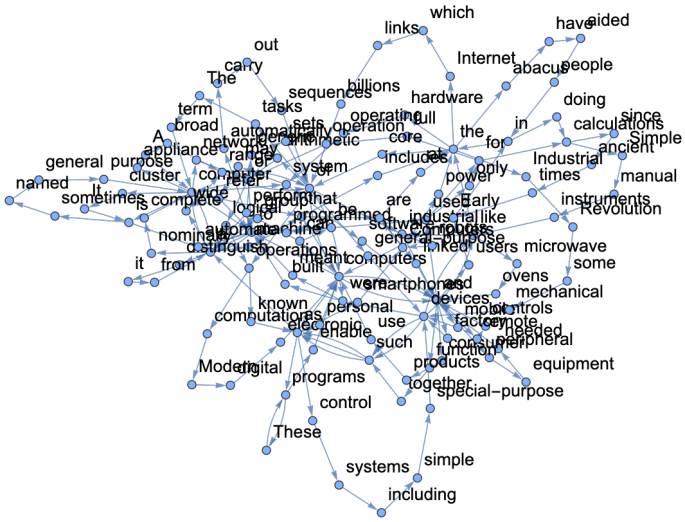
In[48]:=
```
(* 33.6 *)
Graph[Rule @@@ Partition[Table[Mod[n^2 + n, 100], {n, 100}], 2, 1], VertexLabels → All]
```

Out[48]=



In[54]:=
```
(* 33.7 *)
Graph[Rule @@@ Partition[Take[TextWords[WikipediaData["computers"]], 200], 2, 1],
 VertexLabels → All]
```

Out[54]=




In[59]:=
```
(* 33.8 *) f @@@ {{1, 2}, {7, 2}, {5, 4}}
```

Out[59]=
```
{f[1, 2], f[7, 2], f[5, 4]}
```

yields the same result as the more complicated

In[58]:=
```
f @@ # & /@ {{1, 2}, {7, 2}, {5, 4}}
```

Out[58]=
```
{f[1, 2], f[7, 2], f[5, 4]}
```

# Exercises from *EIWL3* Section 34

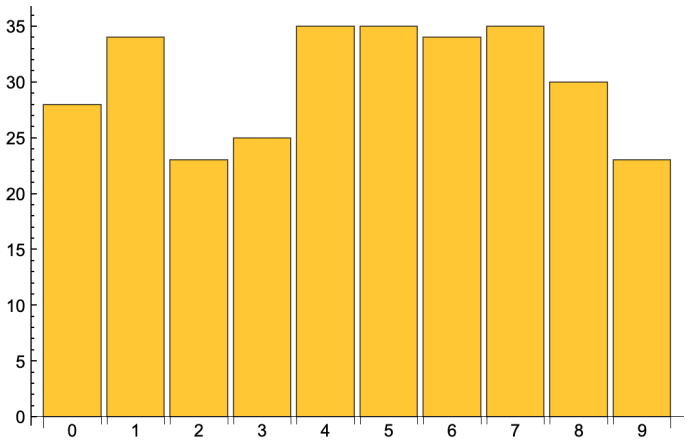
In[67]:=
```
(* 34.1 *)Count[IntegerDigits[3^100], #] & /@ Table[i, {i, 0, 9}]
```

Out[67]=
```
{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[75]:=
```
(* 34.2 *)
BarChart[Association[# → Count[IntegerDigits[2^1000], #] & /@ Table[i, {i, 0, 9}]],
 ChartLabels → Table[i, {i, 0, 9}]]
```

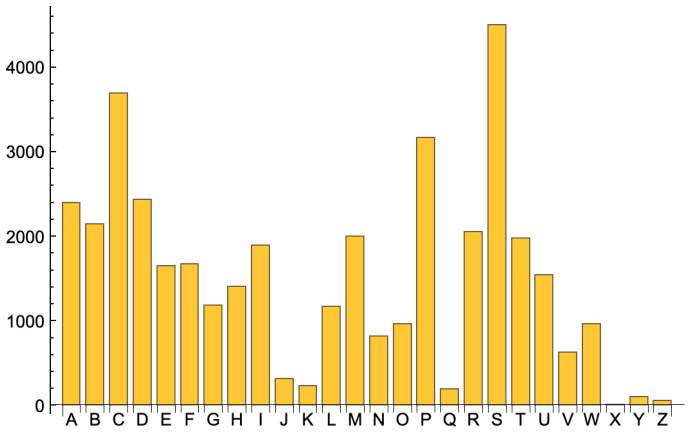
Out[75]=




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

In[85]:=
```
(* 34.3 *)
BarChart[Table[Count[Capitalize[First[Characters[#]]] & /@ WordList[], letter],
  {letter, Capitalize /@ Alphabet[]}], ChartLabels → Capitalize /@ Alphabet[]]
```

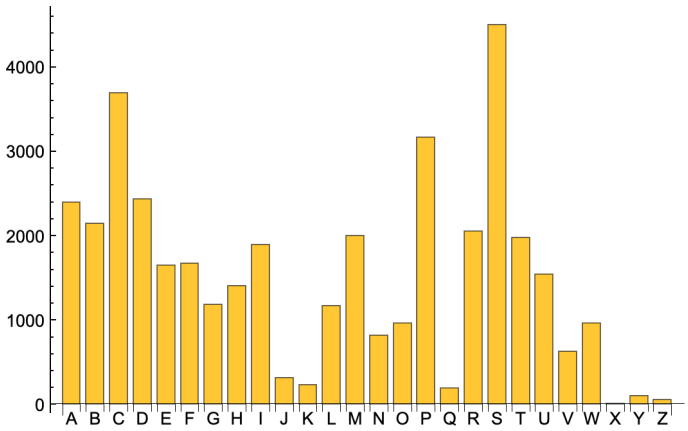
Out[85]=




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 34.3 I finally figured out the slicker way.

In[96]:=
```
(* 34.4 *)BarChart[Association[
  Table[letter → Count[Capitalize[First[Characters[#]]] & /@ WordList[], letter],
   {letter, Capitalize /@ Alphabet[]}]], ChartLabels → Automatic]
```

Out[96]=




In[111]:=
```
(* 34.5 *)Count[Characters[WikipediaData["computers"]], #] & /@ {"q", "u"} //
 Divide[#[[1]], #[[2]] &
```

Out[111]=

$$\frac{63}{1574}$$

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

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

Out[119]=

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