Minor comment on 33.5. Otherwise perfect. 8 / 8

PS 13 — Rania 3.25.2025

Section 33

In[53]:=
```
(*33.1 Head of output from ListPlot*)
Head[ListPlot[Range[10]]]
```

Out[53]=
```
Graphics
```

In[54]:=
```
(*33.2*)
Times @@ Range[100]
```

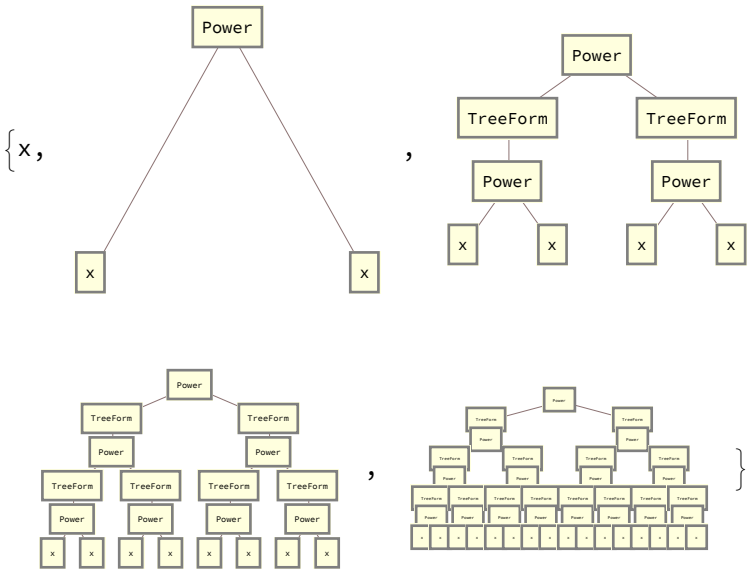
Out[54]=
```
93 326 215 443 944 152 681 699 238 856 266 700 490 715 968 264 381 621 468 592 963 895 217 599 993 ⁘
 229 915 608 941 463 976 156 518 286 253 697 920 827 223 758 251 185 210 916 864 000 000 000 000 ⁘
 000 000 000 000
```

In[55]:=
```
(*33.3 Use @@@ and Tuples to generate {f[a,a],f[a,b],f[b,a],f[b,b]}.*)
f @@@ Tuples[{a, b}, 2]
```

Out[55]=
```
{f[a, a], f[a, b], f[b, a], f[b, b]}
```

In[56]:=
```
(*33.4 Make a list of expression trees for the
   results of 4 successive applications of #^#& starting from x.*)
NestList[TreeForm[#^#] &, x, 4]
```

Out[56]=



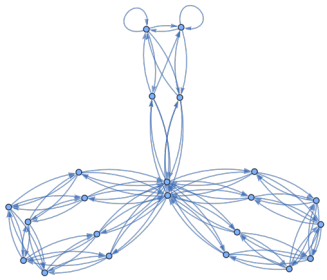
In[57]:=
```
(*33.5 Find the unique cases where i^2/(j^2+1) is an integer,
with i and j going up to 20.*)
Select[Flatten[Table[i^2/(j^2+1), {i, 20}, {j, 20}]], IntegerQ]
```

Wolfram wanted this uniqued, so you could add a Union to remove duplicates.

Out[57]=
```
{2, 8, 5, 18, 32, 50, 20, 10, 2, 72, 98, 45, 128, 17, 162, 200, 80, 40, 8}
```

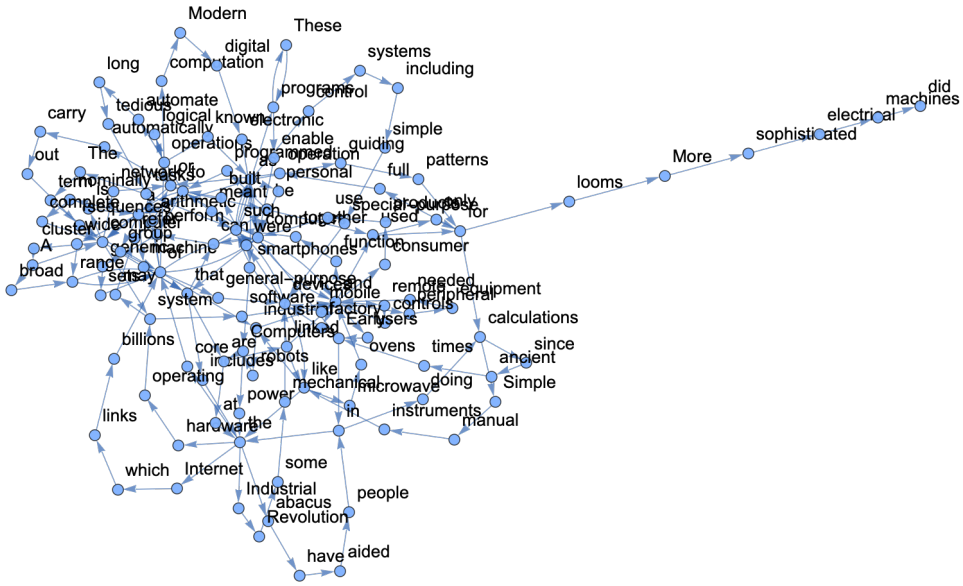
In[58]:=
```
(*33.6 Create a graph that connects successive
 pairs of numbers in Table[Mod[n^2+n,100],{n,100}]*)
Graph[Rule @@@ Partition[Table[Mod[n^2+n, 100], {n, 100}], 2, 1]]
```

Out[58]=



In[59]:=
```
(*33.7 Generate a graph showing which word can follow which
 in the first 200 words of the Wikipedia article on computers.*)
Graph[Rule @@@ Partition[Take[TextWords[WikipediaData["computers"]], 200], 2, 1],
 VertexLabels → All]
```

Out[59]=



In[60]:=
```
(*33.8 Find a simpler form for f@@#&/@{{1,2},{7,2},{5,4}}.*)
f @@ # & /@ {{1, 2}, {7, 2}, {5, 4}}
f @@@ {{1, 2}, {7, 2}, {5, 4}}
```

Out[60]=
```
{f[1, 2], f[7, 2], f[5, 4]}
```

Out[61]=
```
{f[1, 2], f[7, 2], f[5, 4]}
```

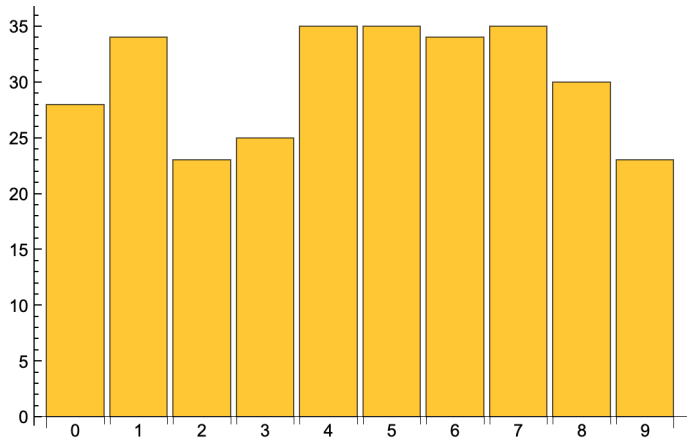
Section 34

In[62]:=
```
(*34.1 Make a list, in order,
of the number of times each of the digits 0 through 9 occurs in 3^100*)
Values[KeyTake[Counts[IntegerDigits[3^100]], Range[10] - 1]]
```

Out[62]=
```
{7, 9, 9, 5, 1, 5, 4, 7, 1}
```

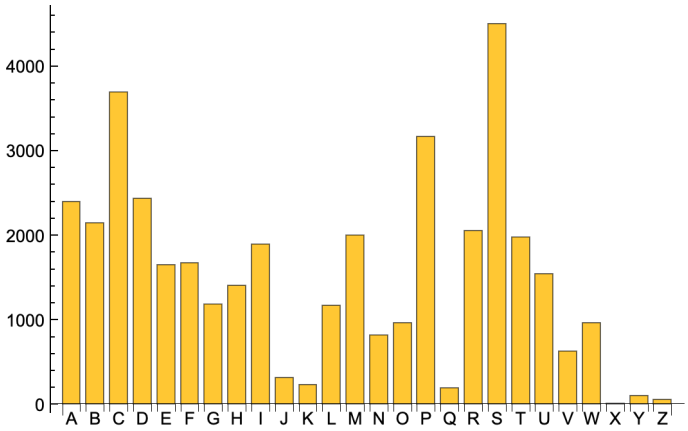
In[63]:=
```
(*34.2 Make a labeled bar chart of the number of
 times each of the digits 0 through 9 occurs in 2^1000 *)
BarChart[KeyTake[Counts[IntegerDigits[2^1000]], Range[10] - 1],
 ChartLabels → Automatic]
```

Out[63]=



In[64]:=
```
(*34.3Make a labeled bar chart of the number of times each possible first
 letter occurs in words from WordList[],with all letters made uppercase*)
BarChart[Counts[First /@ Characters /@ ToUpperCase /@ WordList[]],
 ChartLabels → Automatic]
```

Out[64]=



In[65]:=
```
(*34.4Make an association giving the 5 most common
 first letters of words in WordList[] and their counts.»*)
Reverse[Sort[Counts[First /@ Characters /@ WordList[]]]][[1 ;; 5]]
```

Out[65]=

⟨| s → 4499, c → 3693, p → 3168, d → 2433, a → 2393 |⟩

In[66]:=
```
(*34.5Find the numerical ratio of the number of occurrences
 of “q” and “u” in the Wikipedia entry for computers.»*)
Counts[Flatten[Characters /@ TextWords[ WikipediaData["computers"]]]]["q"] /
  Counts[Flatten[Characters /@ TextWords[ WikipediaData["computers"]]]]["u"] // N

(*#q/#e&@@Counts[Flatten[Characters/@TextWords[ WikipediaData["computers"]]]]//N*)
```

Out[66]=

0.0401274

In[67]:=
```
(*34.6Find the 10 most common words in ExampleData[{"Text","AliceInWonderland"}]*)
```

In[68]:=
```
Reverse[Sort[Counts[TextWords[ExampleData[{"Text", "AliceInWonderland"}]]]]][[
  1 ;; 10]] // Keys
```

Out[68]=

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