Looks great. See comment at bottom of this page. 8/8

Hexi—PS12—2025 - 03 - 21

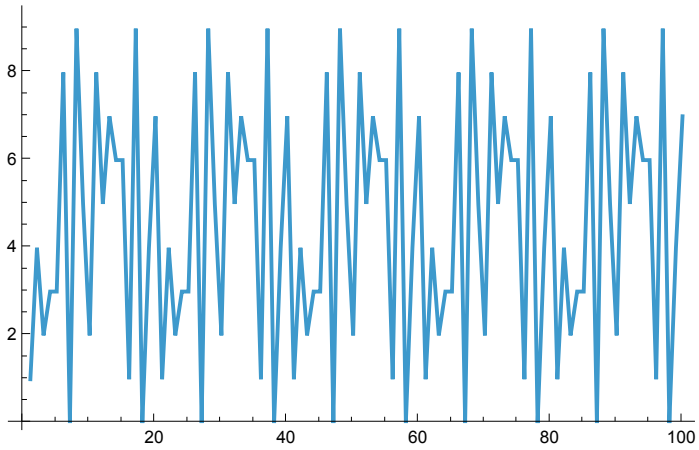
Exercises from EIWL3 Section 31

In[627]:=
```
Take[IntegerDigits[2^1000], -5]
```
Out[627]=
```
{6, 9, 3, 7, 6}
```

In[628]:=
```
Take[Alphabet[], {10, 20}]
```
Out[628]=
```
{j, k, l, m, n, o, p, q, r, s, t}
```

In[629]:=
```
Table[FromLetterNumber[n], {n, 2, 26, 2}]
```
Out[629]=
```
{b, d, f, h, j, l, n, p, r, t, v, x, z}
```

In[630]:=
```
ListLinePlot[Table[IntegerDigits[12^n][[-2]], {n, 100}]]
```
Out[630]=



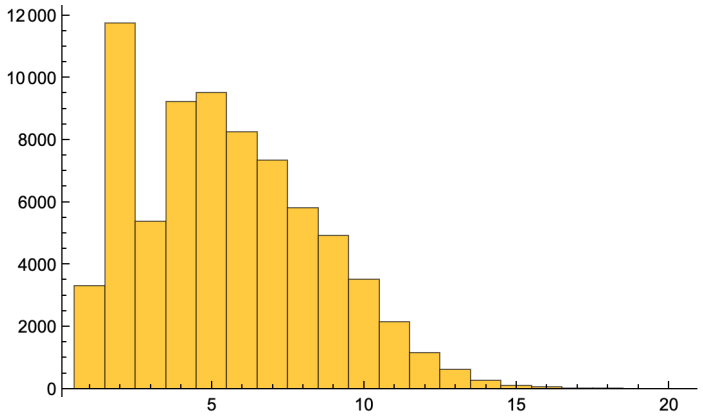
In[631]:=
```
TakeSmallest[Join[#^2 & /@ Range[20], #^3 & /@ Range[20]], 10]
```
Out[631]=
```
{1, 1, 4, 8, 9, 16, 25, 27, 36, 49}
```

In[632]:=
```
StringPosition[WikipediaData["computers"], "software"]
```
Out[632]=
```
{{410, 417}, {38 125, 38 132}, {39 662, 39 669}, {40 223, 40 230}, {40 352, 40 359},
 {45 085, 45 092}, {45 244, 45 251}, {45 269, 45 276}, {45 301, 45 308}, {45 384, 45 391},
 {52 958, 52 965}, {53 685, 53 692}, {53 738, 53 745}, {53 812, 53 819}, {53 975, 53 982}}
```

I think Wolfram wanted the position numbering each word rather than numbering each character. Also, why are all these coming out as pairs?

In[633]:=
```
Histogram[Flatten[StringPosition[WordList[], "e"]]]
```

Out[633]=



In[634]:=
```
positions = Flatten[Position[Table[n^3, {n, 100}], #] & /@
    Select[Table[n^3, {n, 100}], IntegerQ[Sqrt[#]] &]];
ReplacePart[Table[n^3, {n, 100}], Thread[positions → Red]]
```

Out[635]=

{■, 8, 27, ■, 125, 216, 343, 512, ■, 1000, 1331, 1728, 2197, 2744, 3375, ■, 4913, 5832,
6859, 8000, 9261, 10 648, 12 167, 13 824, ■, 17 576, 19 683, 21 952, 24 389, 27 000,
29 791, 32 768, 35 937, 39 304, 42 875, ■, 50 653, 54 872, 59 319, 64 000, 68 921,
74 088, 79 507, 85 184, 91 125, 97 336, 103 823, 110 592, ■, 125 000, 132 651, 140 608,
148 877, 157 464, 166 375, 175 616, 185 193, 195 112, 205 379, 216 000, 226 981,
238 328, 250 047, ■, 274 625, 287 496, 300 763, 314 432, 328 509, 343 000, 357 911,
373 248, 389 017, 405 224, 421 875, 438 976, 456 533, 474 552, 493 039, 512 000, ■,
551 368, 571 787, 592 704, 614 125, 636 056, 658 503, 681 472, 704 969, 729 000,
753 571, 778 688, 804 357, 830 584, 857 375, 884 736, 912 673, 941 192, 970 299, ■}

In[636]:=
```
Select[Prime /@ Range[100], IntegerDigits[#][[1]] ≥ 5 &]
```

Out[636]=
```
{5, 7, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 503, 509, 521, 523, 541}
```

In[637]:=
```
Grid[NestList[Delete[#, RandomInteger[{1, Length[#]}]] &, Range[10], 9]]
```

Out[637]=
```
1  2  3  4  5  6  7  8  9  10
1  3  4  5  6  7  8  9  10
1  3  4  5  6  7  9  10
1  3  5  6  7  9  10
1  5  6  7  9  10
5  6  7  9  10
5  6  9  10
5  6  10
6  10
10
```

In[638]:=
```
TakeLargestBy[WordList[], StringLength, 10]
```
Out[638]=
```
{electroencephalographic, electroencephalograph,
 buckminsterfullerene, compartmentalization,
 counterrevolutionary, electroencephalogram, internationalization,
 magnetohydrodynamics, uncharacteristically, counterintelligence}
```

In[639]:=
```
TakeLargestBy[IntegerName /@ Range[100], StringLength, 5]
```
Out[639]=
```
{seventy-three, seventy-seven, seventy-eight, twenty-three, twenty-seven}
```

In[640]:=
```
TakeLargestBy[IntegerName /@ Range[100], StringCount[#, "e"] &, 5]
```
Out[640]=
```
{seventeen, seventy-three, seventy-seven, eleven, eighteen}
```

Exercises from EIWL3 Section 32

In[641]:=
```
Cases[IntegerDigits[Range[1000]], {1, __, 9}]
```
Out[641]=
```
{{1, 0, 9}, {1, 1, 9}, {1, 2, 9}, {1, 3, 9},
 {1, 4, 9}, {1, 5, 9}, {1, 6, 9}, {1, 7, 9}, {1, 8, 9}, {1, 9, 9}}
```

In[642]:=
```
Cases[IntegerDigits[Range[1000]], {x_, x_, x_}]
```
Out[642]=
```
{{1, 1, 1}, {2, 2, 2}, {3, 3, 3}, {4, 4, 4},
 {5, 5, 5}, {6, 6, 6}, {7, 7, 7}, {8, 8, 8}, {9, 9, 9}}
```

In[643]:=
```
Cases[IntegerDigits[#^2 & /@ Range[1000]], {9, __, 1 | 0}]
```
Out[643]=
```
{{9, 0, 0}, {9, 6, 1}, {9, 8, 0, 1}, {9, 0, 0, 0, 0},
 {9, 0, 6, 0, 1}, {9, 5, 4, 8, 1}, {9, 6, 1, 0, 0}, {9, 6, 7, 2, 1},
 {9, 0, 0, 6, 0, 1}, {9, 0, 2, 5, 0, 0}, {9, 0, 4, 4, 0, 1}, {9, 1, 9, 6, 8, 1},
 {9, 2, 1, 6, 0, 0}, {9, 2, 3, 5, 2, 1}, {9, 3, 8, 9, 6, 1}, {9, 4, 0, 9, 0, 0},
 {9, 4, 2, 8, 4, 1}, {9, 5, 8, 4, 4, 1}, {9, 6, 0, 4, 0, 0}, {9, 6, 2, 3, 6, 1},
 {9, 7, 8, 1, 2, 1}, {9, 8, 0, 1, 0, 0}, {9, 8, 2, 0, 8, 1}, {9, 9, 8, 0, 0, 1}}
```

In[644]:=
```
IntegerDigits[Range[100]] /. {0 → Gray, 9 → Orange}
```

Out[644]=
```
{{1}, {2}, {3}, {4}, {5}, {6}, {7}, {8}, {■}, {1, ■}, {1, 1}, {1, 2}, {1, 3},
 {1, 4}, {1, 5}, {1, 6}, {1, 7}, {1, 8}, {1, ■}, {2, ■}, {2, 1}, {2, 2},
 {2, 3}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {2, ■}, {3, ■}, {3, 1}, {3, 2},
 {3, 3}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {3, ■}, {4, ■}, {4, 1}, {4, 2},
 {4, 3}, {4, 4}, {4, 5}, {4, 6}, {4, 7}, {4, 8}, {4, ■}, {5, ■}, {5, 1}, {5, 2},
 {5, 3}, {5, 4}, {5, 5}, {5, 6}, {5, 7}, {5, 8}, {5, ■}, {6, ■}, {6, 1}, {6, 2},
 {6, 3}, {6, 4}, {6, 5}, {6, 6}, {6, 7}, {6, 8}, {6, ■}, {7, ■}, {7, 1}, {7, 2},
 {7, 3}, {7, 4}, {7, 5}, {7, 6}, {7, 7}, {7, 8}, {7, ■}, {8, ■}, {8, 1}, {8, 2},
 {8, 3}, {8, 4}, {8, 5}, {8, 6}, {8, 7}, {8, 8}, {8, ■}, {■, ■}, {■, 1},
 {■, 2}, {■, 3}, {■, 4}, {■, 5}, {■, 6}, {■, 7}, {■, 8}, {■, ■}, {1, ■, ■}}
```

In[645]:=
```
IntegerDigits[2^1000] /. {0 → Red}
```

Out[645]=
```
{1, ■, 7, 1, 5, ■, 8, 6, ■, 7, 1, 8, 6, 2, 6, 7, 3, 2, ■, 9, 4, 8, 4, 2, 5, ■, 4, 9,
 ■, 6, ■, ■, ■, 1, 8, 1, ■, 5, 6, 1, 4, ■, 4, 8, 1, 1, 7, ■, 5, 5, 3, 3, 6, ■,
 7, 4, 4, 3, 7, 5, ■, 3, 8, 8, 3, 7, ■, 3, 5, 1, ■, 5, 1, 1, 2, 4, 9, 3, 6, 1, 2,
 2, 4, 9, 3, 1, 9, 8, 3, 7, 8, 8, 1, 5, 6, 9, 5, 8, 5, 8, 1, 2, 7, 5, 9, 4, 6, 7, 2,
 9, 1, 7, 5, 5, 3, 1, 4, 6, 8, 2, 5, 1, 8, 7, 1, 4, 5, 2, 8, 5, 6, 9, 2, 3, 1, 4, ■,
 4, 3, 5, 9, 8, 4, 5, 7, 7, 5, 7, 4, 6, 9, 8, 5, 7, 4, 8, ■, 3, 9, 3, 4, 5, 6, 7, 7,
 7, 4, 8, 2, 4, 2, 3, ■, 9, 8, 5, 4, 2, 1, ■, 7, 4, 6, ■, 5, ■, 6, 2, 3, 7, 1, 1,
 4, 1, 8, 7, 7, 9, 5, 4, 1, 8, 2, 1, 5, 3, ■, 4, 6, 4, 7, 4, 9, 8, 3, 5, 8, 1, 9, 4,
 1, 2, 6, 7, 3, 9, 8, 7, 6, 7, 5, 5, 9, 1, 6, 5, 5, 4, 3, 9, 4, 6, ■, 7, 7, ■, 6,
 2, 9, 1, 4, 5, 7, 1, 1, 9, 6, 4, 7, 7, 6, 8, 6, 5, 4, 2, 1, 6, 7, 6, 6, ■, 4, 2, 9,
 8, 3, 1, 6, 5, 2, 6, 2, 4, 3, 8, 6, 8, 3, 7, 2, ■, 5, 6, 6, 8, ■, 6, 9, 3, 7, 6}
```

In[646]:=
```
Characters["The Wolfram Language"] /. Thread[{"a", "e", "i", "o", "u"} → Nothing]
```

Out[646]=
```
{T, h,  , W, l, f, r, m,  , L, n, g, g}
```

In[647]:=
```
Cases[IntegerDigits[2^1000], 0 | 1]
```

Out[647]=
```
{1, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1, 1, 1, 1, 0, 1, 0, 0}
```

In[648]:=

```
Cases[IntegerDigits[Range[100, 999]], {x_, __, x_}]
```

Out[648]=

```
{{1, 0, 1}, {1, 1, 1}, {1, 2, 1}, {1, 3, 1}, {1, 4, 1}, {1, 5, 1}, {1, 6, 1}, {1, 7, 1},
 {1, 8, 1}, {1, 9, 1}, {2, 0, 2}, {2, 1, 2}, {2, 2, 2}, {2, 3, 2}, {2, 4, 2}, {2, 5, 2},
 {2, 6, 2}, {2, 7, 2}, {2, 8, 2}, {2, 9, 2}, {3, 0, 3}, {3, 1, 3}, {3, 2, 3}, {3, 3, 3},
 {3, 4, 3}, {3, 5, 3}, {3, 6, 3}, {3, 7, 3}, {3, 8, 3}, {3, 9, 3}, {4, 0, 4}, {4, 1, 4},
 {4, 2, 4}, {4, 3, 4}, {4, 4, 4}, {4, 5, 4}, {4, 6, 4}, {4, 7, 4}, {4, 8, 4}, {4, 9, 4},
 {5, 0, 5}, {5, 1, 5}, {5, 2, 5}, {5, 3, 5}, {5, 4, 5}, {5, 5, 5}, {5, 6, 5}, {5, 7, 5},
 {5, 8, 5}, {5, 9, 5}, {6, 0, 6}, {6, 1, 6}, {6, 2, 6}, {6, 3, 6}, {6, 4, 6},
 {6, 5, 6}, {6, 6, 6}, {6, 7, 6}, {6, 8, 6}, {6, 9, 6}, {7, 0, 7}, {7, 1, 7},
 {7, 2, 7}, {7, 3, 7}, {7, 4, 7}, {7, 5, 7}, {7, 6, 7}, {7, 7, 7}, {7, 8, 7},
 {7, 9, 7}, {8, 0, 8}, {8, 1, 8}, {8, 2, 8}, {8, 3, 8}, {8, 4, 8}, {8, 5, 8},
 {8, 6, 8}, {8, 7, 8}, {8, 8, 8}, {8, 9, 8}, {9, 0, 9}, {9, 1, 9}, {9, 2, 9},
 {9, 3, 9}, {9, 4, 9}, {9, 5, 9}, {9, 6, 9}, {9, 7, 9}, {9, 8, 9}, {9, 9, 9}}
```