

Eli — PS 12 — 2025-03-21

EIWL3 Sections 31 and 32

Parts of Lists

```
In[1]:= (*31.1*) Take[IntegerDigits[2^1000], -5]
```

```
Out[1]= {6, 9, 3, 7, 6}
```

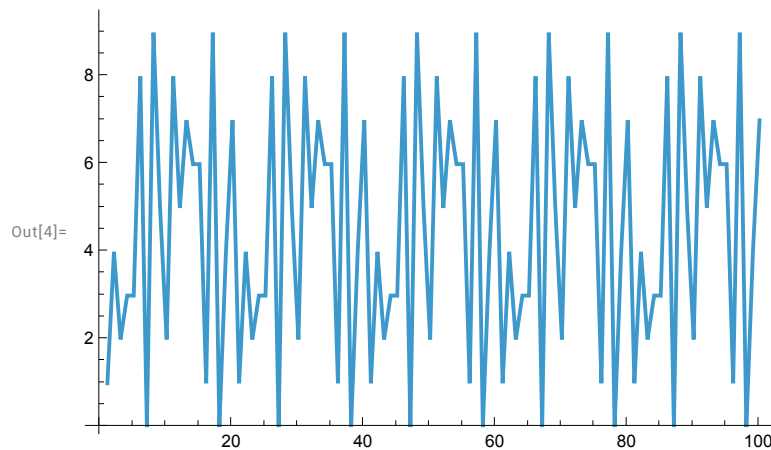
```
In[2]:= (*31.2*) Alphabet[][[10 ;; 20]]
```

```
Out[2]= {j, k, l, m, n, o, p, q, r, s, t}
```

```
In[3]:= (*31.3*) GatherBy[Alphabet[], EvenQ[LetterNumber[#]] &][[2]]
```

```
Out[3]= {b, d, f, h, j, l, n, p, r, t, v, x, z}
```

```
In[4]:= (*31.4*) ListLinePlot[Table[IntegerDigits[12^n], {n, 100}][[All, -2]]]
```



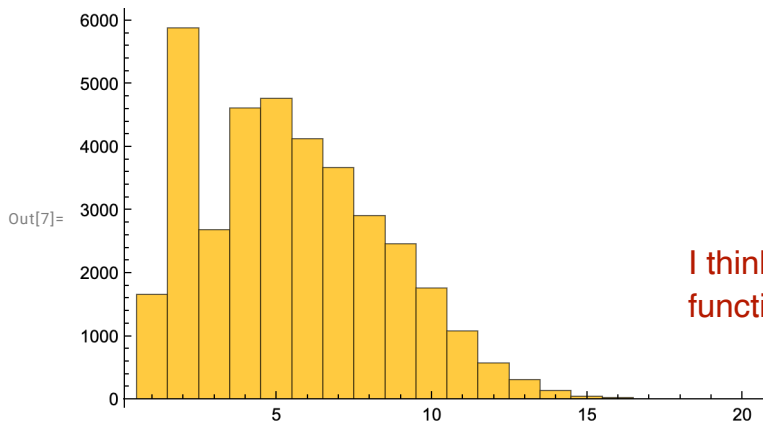
```
In[5]:= (*31.5*) TakeSmallest[Flatten[Table[{n^2, n^3}, {n, 20}]], 10]
```

```
Out[5]= {1, 1, 4, 8, 9, 16, 25, 27, 36, 49}
```

```
In[6]:= (*31.6*) Position[TextWords[WikipediaData["computers"]], "software"]
```

```
Out[6]= {{62}, {6110}, {6204}, {6226}, {6966}, {6988},  
         {6991}, {6995}, {7009}, {8212}, {8313}, {8320}, {8328}, {8350}}
```

```
In[7]:= (*31.7*)Histogram[Position[Characters[WordList[]], "e"][[All, 2]]]
```



I think it doesn't work because your anonymous function isn't Listable.

Testing IntegerQ==True is redundant (but harmless).

```
In[8]:= (*31.8*)If[IntegerQ[Sqrt[Position[#]]] == True &, Red, Table[x^3, {x, 100}]]
(*Can't figure out why this one isn't working*)
```

```
Out[8]= If[IntegerQ[Sqrt[Position[#]]] == True &, Red, Table[x^3, {x, 100}]]
```

Looks like you got an alternative working though.

```
In[9]:= If[IntegerQ[Sqrt[#]] == True, Red, #] & /@ Table[x^3, {x, 100}]
```

```
Out[9]= {
  8, 27, 64, 125, 216, 343, 512, 729, 1000, 1331, 1728, 2197, 2744, 3375, 4096, 4913, 5832,
  6859, 8000, 9261, 10648, 12167, 13824, 15625, 17576, 19683, 21952, 24389, 27000,
  29791, 32768, 35937, 39304, 42875, 46656, 50653, 54872, 59319, 64000, 68921,
  74088, 79507, 85184, 91125, 97336, 103823, 110592, 117625, 125000, 132651, 140608,
  148877, 157464, 166375, 175616, 185193, 195112, 205379, 216000, 226981,
  238328, 250047, 262025, 274368, 287072, 300143, 313576, 327379, 341548, 356079,
  370970, 386219, 401833, 417809, 434144, 450836, 467883, 485283, 503034, 521143,
  539608, 558427, 577600, 597125, 617000, 637223, 657793, 678704, 700055, 721844,
  744070, 766731, 789826, 813354, 837313, 861701, 886517, 911760, 937438, 963549, 990091, 1017062, 1044461, 1072287, 1100538, 1129213, 1158311, 1187831, 1217771, 1248130, 1278907, 1309101, 1339711, 1370736, 1402175, 1434027, 1466291, 1498966, 1532051, 1565545, 1599447, 1633756, 1668471, 1703591, 1739115, 1775042, 1811371, 1848101, 1885231, 1922760, 1960688, 1999014, 2037737, 2076856, 2116370, 2156278, 2196579, 2237272, 2278356, 2319829, 2361690, 2403937, 2446569, 2489585, 2532984, 2576765, 2620926, 2665466, 2710384, 2755679, 2801350, 2847396, 2893816, 2940609, 2987774, 3035309, 3083213, 3131485, 3180124, 3229129, 3278499, 3328232, 3378327, 3428783, 3479599, 3530774, 3582307, 3634197, 3686443, 3739044, 3791999, 3845307, 3898968, 3952981, 4007345, 4062058, 4117119, 4172527, 4228281, 4284380, 4340823, 4397610, 4454740, 4512212, 4569925, 4627978, 4686370, 4745100, 4804167, 4863570, 4923308, 4983380, 5043785, 5104522, 5165590, 5226988, 5288715, 5350770, 5413152, 5475860, 5538893, 5602250, 5665930, 5729932, 5794255, 5858898, 5923859, 5989136, 6054728, 6120634, 6186853, 6253384, 6320225, 6387375, 6454833, 6522598, 6590669, 6659045, 6727725, 6796707, 6865989, 6935570, 7005450, 7075628, 7146003, 7216574, 7287340, 7358399, 7429750, 7501392, 7573324, 7645545, 7717954, 7790550, 7863332, 7936300, 8009452, 8082787, 8156304, 8229992, 8303850, 8377877, 8452072, 8526434, 8600952, 8675625, 8750452, 8825432, 8900564, 8975847, 9051280, 9126862, 9202592, 9278470, 9354495, 9430666, 9506982, 9583442, 9659945, 9736590, 9813377, 9890304, 9967379, 10044592, 10121942, 10199428, 10277049, 10354804, 10432692, 10510712, 10588863, 10667144, 10745554, 10824093, 10902760, 10981554, 11060474, 11139518, 11218685, 11297974, 11377384, 11456914, 11536563, 11616330, 11696214, 11776214, 11856328, 11936555, 12016894, 12097344, 12177903, 12258571, 12339347, 12420230, 12501220, 12582316, 12663517, 12744822, 12826231, 12907743, 12989357, 13071072, 13152888, 13234794, 13316799, 13398903, 13481105, 13563404, 13645799, 13728290, 13810876, 13893556, 13976329, 14059194, 14142150, 14225196, 14308331, 14391554, 14474864, 14558260, 14641741, 14725306, 14808954, 14892684, 14976495, 15060386, 15144356, 15228404, 15312529, 15396729, 15481003, 15565350, 15649769, 15734259, 15818819, 15903448, 15988146, 16072912, 16157745, 16242644, 16327608, 16412636, 16497727, 16582880, 16668094, 16753367, 16838698, 16924087, 17009533, 17095034, 17180589, 17266197, 17351857, 17437568, 17523329, 17609139, 17694998, 17780905, 17866858, 17952856, 18038900, 18124988, 18211120, 18297304, 18383539, 18469824, 18556158, 18642540, 18728970, 18815447, 18901969, 18988535, 19075144, 19161795, 19248487, 19335219, 19421989, 19508797, 19595642, 19682523, 19769439, 19856389, 19943372, 20030387, 20117432, 20204506, 20291608, 20378737, 20465892, 20553072, 20640276, 20727503, 20814752, 20902022, 20989312, 21076621, 21163949, 21251295, 21338658, 21426037, 21513431, 21600840, 21688263, 21775699, 21863147, 21950606, 22038075, 22125553, 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```

```
In[11]:= (*31.10*)
Grid[NestList[ReplacePart[#, RandomInteger[Length[#]] → Nothing] &, Range[10], 9]]
```

```
Out[11]=
 1 2 3 4 5 6 7 8 9 10
 1 2 3 4 5 6 7 8 10
 1 3 4 5 6 7 8 10
 1 3 4 5 6 7 8
 1 4 5 6 7 8
 1 4 6 7 8
 1 4 7 8
 1 4 8
```

```
In[12]:= (*31.11*) TakeLargestBy[WordList[], StringLength[#] &, 10]
```

```
Out[12]=
{electroencephalographic, electroencephalograph,
 buckminsterfullerene, compartmentalization,
 counterrevolutionary, electroencephalogram, internationalization,
 magnetohydrodynamics, uncharacteristically, counterintelligence}
```

```
In[13]:= (*31.12*) TakeLargestBy[IntegerName[Range[100]], StringLength[#] &, 5]
```

```
Out[13]=
{seventy-three, seventy-seven, seventy-eight, twenty-three, twenty-seven}
```

```
In[14]:= (*31.13*) TakeLargestBy[IntegerName[Range[100]],
 Length[Position[Characters[#], "e"]] &, 5]
```

```
Out[14]=
{seventeen, seventy-three, seventy-seven, eleven, eighteen}
```

Patterns

```
In[15]:= (*32.1*) Cases[IntegerDigits[Range[1000]], {1, __, 9}]
```

```
Out[15]=
{{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[16]:= (*32.2*) Cases[IntegerDigits[Range[1000]], {x_, x_, x_}]
```

```
Out[16]=
{{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[17]:= (*32.3*) Cases[Table[IntegerDigits[x^2], {x, 1000}], {9, __, 0 | 1}]
```

```
Out[17]=
```

```
{ {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[18]:= (*32.4*) IntegerDigits[Range[100]] /. {9 → Orange, 0 → Gray}
```

```
Out[18]=
```

```
{ {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[19]:= (*32.5*) IntegerDigits[2^1000] /. 0 → Red
```

```
Out[19]=
```

```
{ 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[20]:= (*32.6*) Characters["The Wolfram Language"] /. {"a" | "e" | "i" | "o" | "u" → Nothing}
```

```
Out[20]=
```

```
{T, h, , W, l, f, r, m, , L, n, g, g}
```

```
In[21]:= (*32.7*) Cases[IntegerDigits[2^1000], 0 | 1]
```

```
Out[21]=
```

```
{ 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[22]:= (*32.8*) Cases[IntegerDigits[Range[100, 999]], {x_, __, x_}]
```

```
Out[22]=
```

```
{ {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} }
```