

# Brian — PS 10 — 2025-02-25 — Solution

## *EIWL3* Sections 26, 27, and 28

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### Exercises from *EIWL3* Section 26

In[78]:= (\* 26.1 \*) Power[#, 2] & /@ Range[20]

Out[78]=  
{1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400}

In[79]:= (\* 26.2 \*) Blend[{Red, #}] & /@ {Yellow, Green, Blue}

Out[79]=  
{, , }

In[80]:= (\* 26.3 \*) Framed[Column[{ToUpperCase[#], #}]] & /@ Alphabet[]

Out[80]=  

A	B	C	D	E	F	G	H	I	J	K	L
a	b	c	d	e	f	g	h	i	j	k	l


  

M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
m	n	o	p	q	r	s	t	u	v	w	x	y	z

In[81]:= (\* 26.4 \*) Framed[Style[#, RandomColor[]], Background -> RandomColor[]] & /@ Alphabet[]

Out[81]=  

a	b	c	d	e	f	g	h	i	j	k	l		
m	n	o	p	q	r	s	t	u	v	w	x	y	z

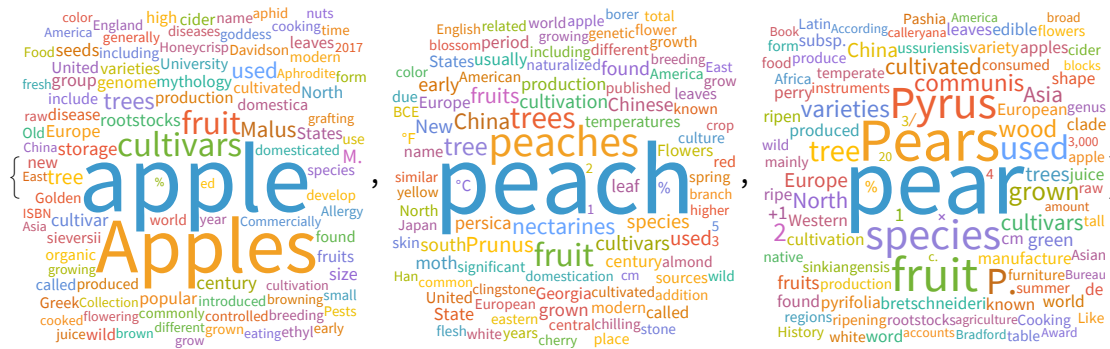
```
In[82]:= (* 26.5 *) {EntityValue[#, "Name"], EntityValue[#, "Flag"]} & /@
EntityList[ Group of 5 COUNTRIES] // Grid[#, Frame -> All] &
```

Out[82]=

France	
Germany	
Japan	
United Kingdom	
United States	

```
In[83]:= (* 26.6 *) WordCloud[WikipediaData[#]] & /@ {"apple", "peach", "pear"}
```

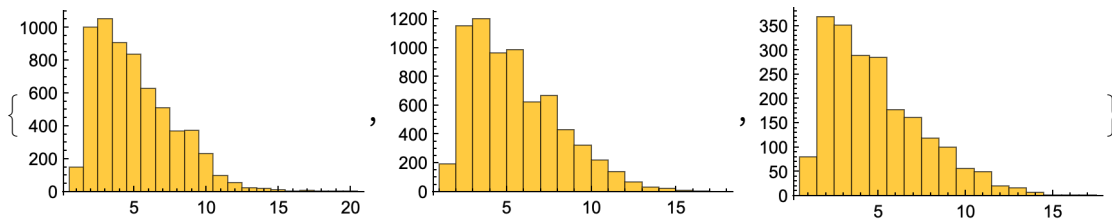
Out[83]=



```
In[84]:= (* 26.7 *)
```

```
Histogram[StringLength[TextWords[WikipediaData[#]]] ] & /@ {"apple", "peach", "pear"}
```

```
Out[84]=
```



```
In[85]:= (* 26.8 *) GeoListPlot[#, GeoRange → Central America COUNTRIES ] & /@
```

```
EntityList[ Central America COUNTRIES ]
```

```
Out[85]=
```



## Exercises from *EIWL3* Section 27

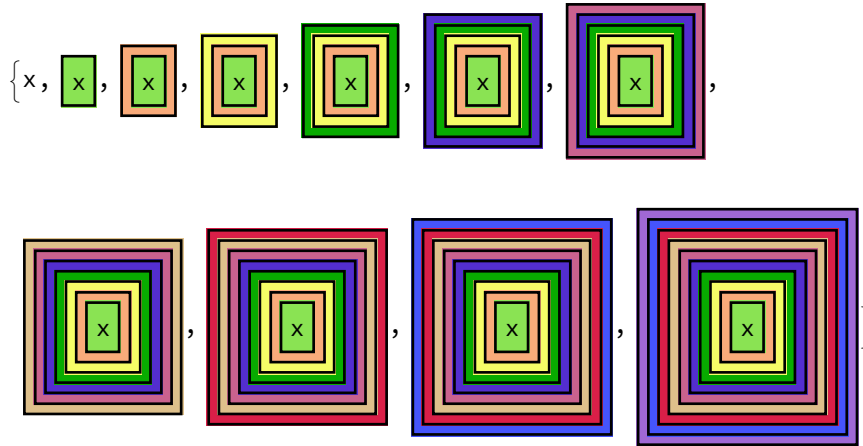
```
In[86]:= (* 27.1 *) NestList[Blur, Rasterize[Style["X", 30]], 10]
```

Out[86]=

{X, X, X, X, X, X, X, X, X, X, X}

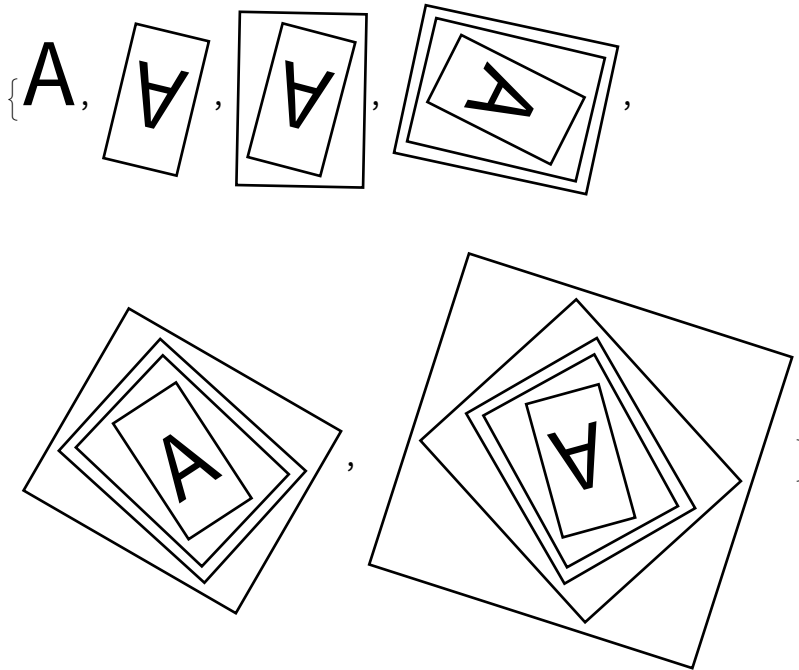
```
In[87]:= (* 27.2 *) NestList[Framed[#, Background → RandomColor[]] &, x, 10]
```

Out[87]=



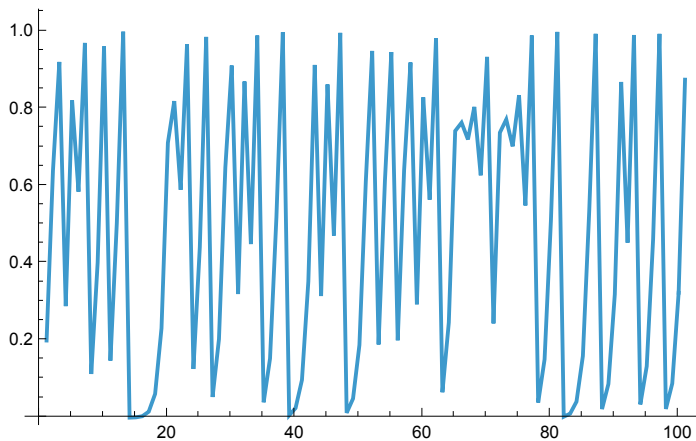
```
In[88]:= (* 27.3 *) NestList[
  Rotate[Framed[#], RandomReal[] 360 °] &,
  Style["A", 50],
  5
]
(* This was another one that I used indentation to help me *)
(* see the organization of the functions and their arguments. *)
```

Out[88]=



```
In[89]:= (* 27.4 *) ListLinePlot[NestList[4 # (1 - #) &, 0.2, 100]]
```

Out[89]=



```
In[90]:= (* 27.5 *) Nest[1 + 1 / # &, 1, 30] // N
```

Out[90]=

1.61803

```
In[91]:= (* 27.6 *) NestList[3#&, 1, 10] (* This gives 11 results, of course. *)
```

```
Out[91]:= {1, 3, 9, 27, 81, 243, 729, 2187, 6561, 19683, 59049}
```

```
In[92]:= (* 27.7 *) NestList[(# + 2 / #) / 2 &, 1.0, 5] - Sqrt[2]
```

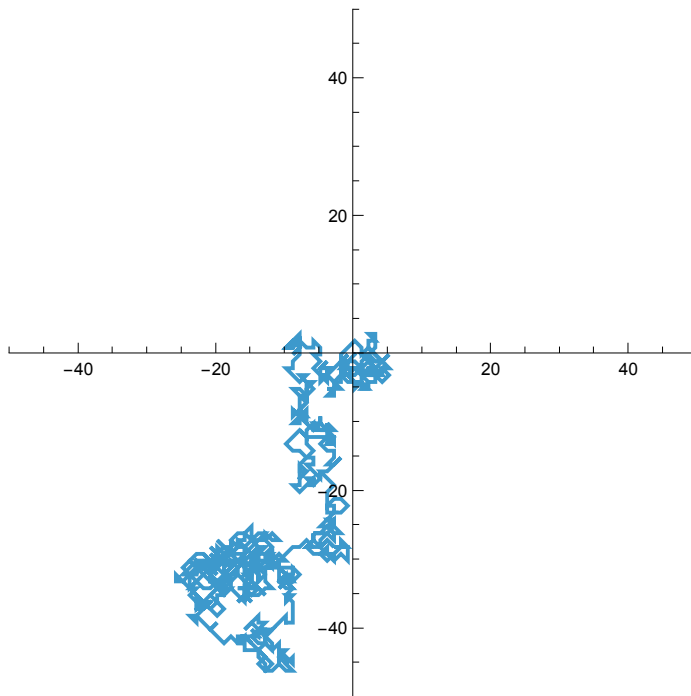
```
Out[92]:= {-0.414214, 0.0857864, 0.0024531, 2.1239 × 10-6, 1.59472 × 10-12, -2.22045 × 10-16}
```

```
In[93]:= (* 27.8 *) (* Hmmm. He asked for a
```

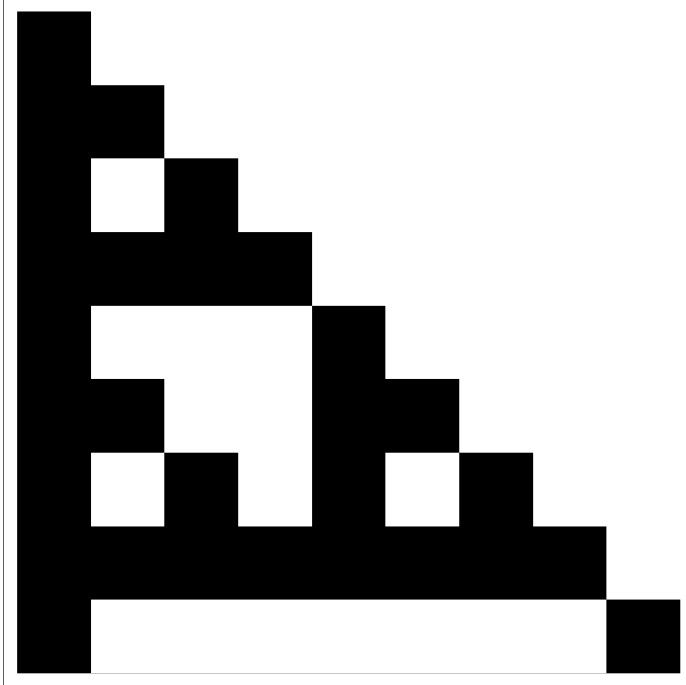
```
Graphics. Is it ok that I used a ListLinePlot? *)
```

```
(* I used AspectRatio→1 and PlotRange→{{-50,50},{-50,50}} so that the result *)  
(* wouldn't be scrunched along whichever axis happened the walk went further. *)  
ListLinePlot[NestList[# + {RandomChoice[{{+1, 0, -1}}, RandomChoice[{{+1, 0, -1}}] &,  
{0, 0}}, 1000], AspectRatio → 1, PlotRange → {{-50, 50}, {-50, 50}}]
```

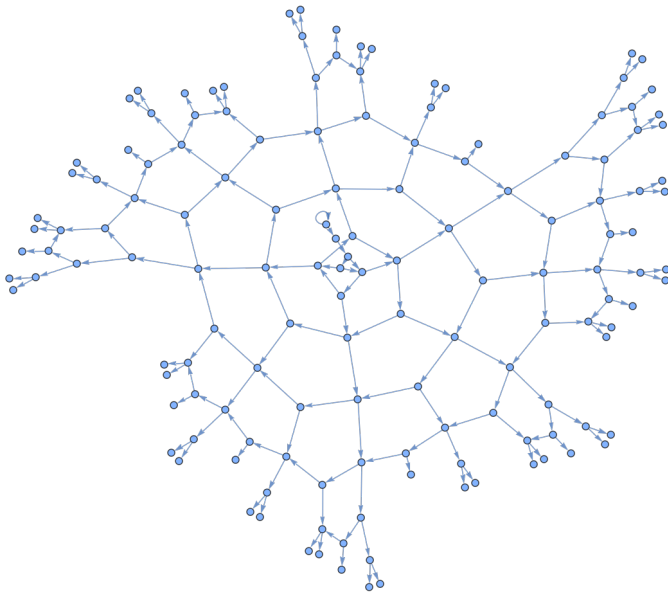
```
Out[93]=
```



```
In[94]:= (* 27.9 *) NestList[Mod[Join[{0}, #] + Join[#, {0}], 2] &, {1}, 8] // ArrayPlot
Out[94]=
```

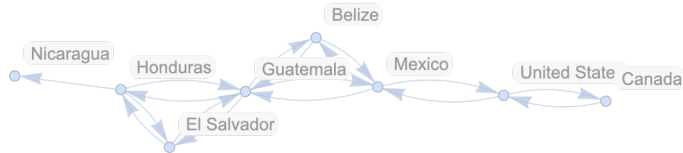


```
In[95]:= (* 27.10 *) NestGraph[{{# + 1, 2 #} &, 0, 10]
Out[95]=
```



```
(* 27.11 *) NestGraph[{"BorderingCountries"} &,
  United States COUNTRY ✓, 4, VertexLabels → All]
```

Out[96]=



## Exercises from *EIWL3* Section 28

```
In[97]:= (* 28.1 *) 123321 > 456123
```

Out[97]=

True

```
In[98]:= Total[IntegerDigits[#]] < 5 & /@ 3
```

Out[98]=

3

```
In[99]:= Select[IntegerDigits[#] == {1, 2}, Range[100]]
```

Out[99]=

True

In[100]:=

```
(* 28.2 *) Select[
  Range[100],
  Total[IntegerDigits[#]] < 5 &
]
```

Out[100]=

```
{1, 2, 3, 4, 10, 11, 12, 13, 20, 21, 22, 30, 31, 40, 100}
```

In[101]:=

```
(* 28.3 *) If[PrimeQ[#], Style[#, Red], #] & /@ Range[20]
```

Out[101]=

```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20}
```

In[102]:=

```
(* 28.4 *) Select[
  WordList[], First[Characters[#]] == "p" && Last[Characters[#]] == "p" &
]
```

Out[102]=

```
{pap, paperclip, parsnip, partisanship, partnership, pawnshop, peep, penmanship,
  pep, pickup, pileup, pip, plop, plump, polyp, pomp, pop, premiership,
  prep, primp, professorship, prop, proprietorship, pulp, pump, pup}
```



```

In[103]:=
(* 28.5 *) Select[Prime[Range[100]], Last[IntegerDigits[#]] == 3 &]

Out[103]=
{3, 13, 23, 43, 53, 73, 83, 103, 113, 163, 173, 193, 223,
 233, 263, 283, 293, 313, 353, 373, 383, 433, 443, 463, 503, 523}

In[104]:=
(* 28.6 *) Select[RomanNumeral[Range[100]], ! StringContainsQ[#, "I"] &]

Out[104]=
{V, X, XV, XX, XXV, XXX, XXXV, XL, XLV,
 L, LV, LX, LXV, LXX, LXXV, LXXX, LXXXV, XC, XCV, C}

In[105]:=
(* 28.7 *) Select[RomanNumeral[Range[1000]], # == StringReverse[#] &]

Out[105]=
{I, II, III, V, X, XIX, XX, XXX, L, C, CXC, CC, CCC, D, M}

In[106]:=
(* 28.8 *) Select[IntegerName[Range[100]],
  First[Characters[#]] == Last[Characters[#]] &]

Out[106]=
{nineteen, twenty-eight, thirty-eight, eighty-one,
 eighty-three, eighty-five, eighty-nine, ninety-seven}

In[107]:=
(* 28.9 *) Select[TextWords[WikipediaData["words"]], StringLength[#] > 15 &]

Out[107]=
{yibi-jarran-gabun, yibi-gabun-jarran, orthographically,
 multiple-morpheme, Proto-Indo-European, 978-0-08-044854-1}

In[108]:=
(* 28.10 *) NestList[If[EvenQ[#], #/2, 3# + 1] &, 1000, 200]

Out[108]=
{1000, 500, 250, 125, 376, 188, 94, 47, 142, 71, 214, 107, 322, 161, 484, 242, 121, 364,
 182, 91, 274, 137, 412, 206, 103, 310, 155, 466, 233, 700, 350, 175, 526, 263,
 790, 395, 1186, 593, 1780, 890, 445, 1336, 668, 334, 167, 502, 251, 754, 377,
 1132, 566, 283, 850, 425, 1276, 638, 319, 958, 479, 1438, 719, 2158, 1079, 3238,
 1619, 4858, 2429, 7288, 3644, 1822, 911, 2734, 1367, 4102, 2051, 6154, 3077,
 9232, 4616, 2308, 1154, 577, 1732, 866, 433, 1300, 650, 325, 976, 488, 244, 122,
 61, 184, 92, 46, 23, 70, 35, 106, 53, 160, 80, 40, 20, 10, 5, 16, 8, 4, 2, 1, 4, 2,
 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4,
 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1,
 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2, 1, 4, 2}

```



digestive, dinginess, disarranged, discernible, discipline, discommode, discredited, disjoint, dispraise, distrait, divinely, dooryard, doubleheader, drizzle, dumbfound, duologue, ebullient, egoistical, elsewhere, emasculate, embodiment, emendation, empathetic, encrust, epitaxy, espouse, eulogize, eventual, excellent, excoriate, falseness, fatalistic, fatherhood, ferryman, finitely, fluorine, flurry, forefoot, forewarn, forgiver, forsaking, fountain, frisson, gauntlet, geographer, gladiolus, glissando, glutamate, godparent, grandaunt, grappling, grouper, grumpy, harmonics, healthily, hemoglobin, hirsute, hobbyist, hollering, holograph, honeycomb, honoring, hospital, hotness, imbroglia, immature, impaction, imported, impotence, inadequacy, inapplicable, inefficient, inflation, ingrown, innately, innovate, inoculate, insecticide, intellect, interbreed, interfere, irritate, jailhouse, judiciary, kibitzer, knothole, landholding, landscaping, largeness, leveraging, liberalism, liberator, lightning, likelihood, limpidly, litotes, lubricant, macrocosm, magnetize, martinet, martingale, matchless, matchmaking, maximize, meatpacking, mercantile, mercurial, merganser, meridional, merrily, midpoint, mirrored, misdirect, missus, molecular, morphemic, moussaka, mummify, nastily, neoclassic, nestling, neuronal, nihilist, ninepins, nonhuman, nostalgic, notional, numeracy, nutty, obscenely, offhandedly, operetta, ornament, outflank, outlier, outlined, outrank, outset, overboard, palpitate, paramecium, pasture, pathless, personage, personal, perturb, phagocyte, phlebitis, pianistic, pilaster, pistachio, plastered, plebiscite, plummet, plummy, postdate, posting, postpaid, potbellied, pounding, pouring, prevent, primary, printer, producer, profuse, progeny, publicly, pumpkin, pursue, putter, pyridine, quadrangle, quarry, quarter, quicklime, radiocarbon, raillery, ravisher, receptor, reciprocal, redeploy, refinery, reflation, regimented, regroup, reimpose, renovate, repress, reprint, reprobate, reputable, reschedule, researcher, reshuffle, resolved, restore, retiring, reversal, riverbank, roadster, roomful, roommate, ruction, sagebrush, saintlike, saintly, salacious, savory, scoreboard, scrapbook, scrummage, sculpted, scuttle, selective, self-defense, semaphore, semitone, septicemia, services, session, shadowing, shakedown, shakeout, shattered, shibboleth, shipyard, shooter, shortcake, shrieking, slightly, simulate, sleepyhead, smitten, snobbery, socialism, souging, sparkler, spirited, splashy, spyhole, squint, stagecraft, stalemated, starfish, starling, status, strangled, stress, striker, subsume, sucrose, surcharge, surely, sweetened, sweptback, swimmer, swollen, syndicate, tailspin, telephone, telescope, temperance, temporal, tensely, tetanus, thalidomide, therefore, thickening, thievish, thirty, thorny, threatened, thumbnail, tinkerer, towards, traction, trademarked, transect, transom, trembling, triplet, tropics, truism, tularemia, tuppence, turkey, turnoff, twisted, unaltered, unavailable, unbounded, unbridgeable, unbroken, uncombined, underdone, underlay, undress, unequaled, unfasten, unfreeze, unhorse, unkempt, unlighted, unmanly, unmatchable, unmodified, unrelated, unwearied, urbanized, urticaria, useless, utensil, variety, varnished, venation, verbalize, vinous, vouchsafe, waterbird, Wednesday, whenever, whirling, whiskey, wholesale, whooper, writing, yarrow}