

EIWL Sections 41,42

8/8

Due to getting a little behind in the final two weeks of the semester, I only checked for completeness on PS 18-21.

~Brian

Section 41

```
In[*]:= Cases[IntegerDigits[Range[100]^2], {____, x_, x_, ____}]
Out[*]=
{{1, 0, 0}, {1, 4, 4}, {2, 2, 5}, {4, 0, 0}, {4, 4, 1}, {9, 0, 0}, {1, 1, 5, 6},
 {1, 2, 2, 5}, {1, 4, 4, 4}, {1, 6, 0, 0}, {2, 1, 1, 6}, {2, 2, 0, 9},
 {2, 5, 0, 0}, {3, 3, 6, 4}, {3, 6, 0, 0}, {3, 8, 4, 4}, {4, 2, 2, 5},
 {4, 4, 8, 9}, {4, 9, 0, 0}, {5, 7, 7, 6}, {6, 4, 0, 0}, {6, 8, 8, 9},
 {7, 2, 2, 5}, {7, 7, 4, 4}, {8, 1, 0, 0}, {8, 8, 3, 6}, {1, 0, 0, 0, 0}}

In[*]:= Cases[Characters[RomanNumeral[Range[100]]], {____, "L", ____, "I", ____, "X"}]
Out[*]=
{{X, L, I, X}, {L, I, X}, {L, X, I, X}, {L, X, X, I, X}, {L, X, X, X, I, X}}

In[*]:= Cases[Partition[TextWords[WikipediaData["alliteration"]], 2, 1],
 {a_, b_} /; StringTake[a, 1] == StringTake[b, 1]]
Out[*]=
{{or, of}, {as, a}, {Peter, Piper}, {pickled, peppers}, {Irish, It},
 {as, an}, {ideas, in}, {Icelandic, It}, {cartoon, characters}, {the, term},
 {identical, initial}, {several, special}, {as, alliteration}, {stressed, syllables},
 {as, an}, {lazy, languid}, {languid, line}, {as, alliteration}, {be, because},
 {such, syllables}, {syllables, start}, {consonant, clusters}, {sp, st},
 {consonant, clusters}, {s, sound}, {consonant, cluster}, {cluster, can},
 {with, words}, {consonant, cluster}, {s, such}, {sp, st}, {Walt, Whitman},
 {Splendid, Silent}, {Silent, Sun}, {consonant, clusters}, {sp, st},
 {spit, sting}, {stick, skin}, {consonant, clusters}, {s, seems}, {same, source},
 {consonant, clusters}, {to, the}, {the, two}, {identical, in}, {at, any},
 {home, hot}, {as, a}, {stressed, syllable}, {humble, house}, {potential, power},
 {power, play}, {play, picture}, {picture, perfect}, {money, matters}, {rocky, road},
 {quick, question}, {Peter, Piper}, {pickled, peppers}, {of, outside}, {same, sound},
 {of, outside}, {to, the}, {brown, blazers}, {in, its}, {Poetry, Poets}, {can, call},
```

{splendid, silent}, {silent, sun}, {Walt, Whitman}, {Splendid, Silent},
 {Silent, Sun}, {wondered, what}, {his, horse}, {also, add}, {to, the},
 {harsh, hard}, {they, than}, {slipperd, sleep}, {lean, lithe}, {fleet, flown},
 {E., E.}, {heaped, heartbreak}, {fire, forthrightly}, {Chappell, Chestnuts},
 {finally, finding}, {Finch, Fresh-firecoal}, {plotted, pieced}, {fold, fallow},
 {height, hangs}, {hangs, his}, {who, wanders}, {barred, by}, {Who, Wanders},
 {I, In}, {sat, silent}, {We, Were}, {swart, ship}, {with, weeping}, {out, onward},
 {out, of}, {to, the}, {sun, sword}, {axe, angles}, {hell's, handiwork},
 {silken, sad}, {breeze, blew}, {foam, flew}, {furrow, followed}, {followed, free},
 {stood, still}, {churlish, chiding}, {winter's, wind}, {brown, below},
 {harvests, hang}, {heavy, head}, {Brent, Bernard}, {who, watch}, {watch, with},
 {with, wild}, {wild, wonder}, {wide, window}, {beautiful, birds}, {birds, begin},
 {bountiful, birdseed}, {Thurston, Three}, {grey, geese}, {Grey, Geese},
 {Betty, Botter}, {butter, but}, {she, said}, {butter's, bitter}, {it, in},
 {make, my}, {batter, bitter}, {bitter, but}, {better, butter}, {make, my},
 {bitter, batter}, {batter, better}, {the, tongue-twister}, {Betty, Botter},
 {Peter, Piper}, {pickled, peppers}, {Peter, Piper}, {pickled, peppers},
 {pickled, peppers}, {Peter, Piper}, {Helplessly, Hoping}, {throughout, the},
 {stand, still}, {stood, still}, {Fairylnd, Fanfare}, {legend, live},
 {live, life}, {all, alone}, {to, the}, {lunar, lure}, {lacking, lustre},
 {late, last}, {as, an}, {an, artistic}, {emotional, effect}, {any, attitude},
 {is, in}, {as, an}, {which, we}, {our, only}, {of, our}, {our, own}, {but, by},
 {today, that}, {that, the}, {truths, that}, {is, inextricably}, {to, the},
 {itself, is}, {testimony, to}, {to, the}, {have, had}, {because, brave},
 {freedom's, front}, {Ronald, Reagan}, {Vietnam, Veterans}, {new, nation}, {to, the},
 {portae, proficiscere}, {blonde, bad-built}, {bad-built, butch}, {butch, body},
 {and, adds}, {adds, an}, {an, alliterative}, {Μάρθα, Μάρθα}, {Martha, Martha},
 {Martha, Martha}, {House, Handbook}, {Modern, Memory}, {to, the}, {Some, Suggestive},
 {4, 438}, {438, 45}, {E, E}, {55, 5}, {388, 390}, {Indolence, ISBN},
 {R, R}, {alliteration, and}, {and, alliterative}, {alliterations, and}}

In[*]:= Grid[

FixedPointList[({# /. {x___, b_, a_, y___} /; b > a → {x, a, b, y}) &, {4, 5, 1, 3, 2}]]

Out[*]=

```
4 5 1 3 2
4 1 5 3 2
1 4 5 3 2
1 4 3 5 2
1 3 4 5 2
1 3 4 2 5
1 3 2 4 5
1 2 3 4 5
1 2 3 4 5
```



```
In[*]:= IntegerDigits[100!] /. {x___, 0 ..} -> {x}
```

```
Out[*]=
```

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

```
In[*]:= newList[{x_, y_, everythingElse___}] :=
```

```
Switch[x, 1, Join[{everythingElse}, {0, 1}], 0, Join[{everythingElse}, {1, 0, 0}]]
Length /@ NestList[newList, {1, 0}, 200]
```

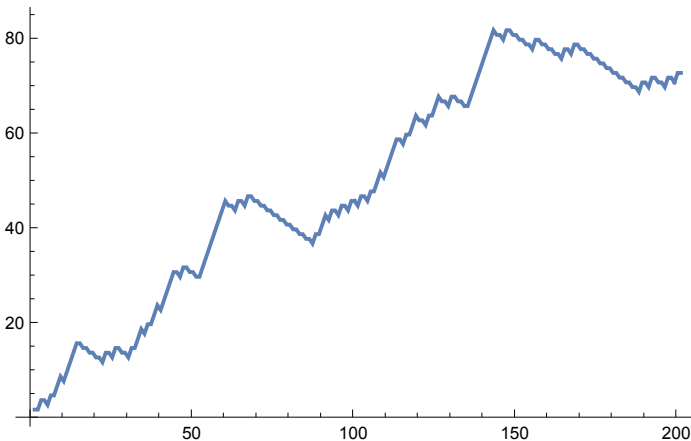
```
Out[*]=
```

```
{2, 2, 3, 3, 4, 4, 5, 6, 6, 7, 8, 9, 9, 10, 11, 11, 12, 12, 13, 13, 14, 14, 15, 16, 16, 17,
 17, 18, 19, 19, 20, 21, 22, 22, 23, 23, 24, 24, 25, 25, 26, 26, 27, 28, 29, 29, 30,
 30, 31, 32, 32, 33, 33, 34, 35, 35, 36, 37, 37, 38, 38, 39, 40, 40, 41, 42, 43, 43,
 44, 44, 45, 45, 46, 46, 47, 47, 48, 48, 49, 50, 50, 51, 52, 53, 53, 54, 55, 55, 56,
 56, 57, 58, 58, 59, 59, 60, 61, 61, 62, 62, 63, 64, 64, 65, 66, 67, 67, 68, 69, 69,
 70, 70, 71, 71, 72, 72, 73, 74, 74, 75, 76, 77, 77, 78, 78, 79, 79, 80, 80, 81, 82,
 82, 83, 84, 85, 85, 86, 87, 87, 88, 88, 89, 89, 90, 90, 91, 92, 92, 93, 93, 94, 95,
 95, 96, 97, 98, 98, 99, 100, 100, 101, 101, 102, 103, 103, 104, 104, 105, 106,
 106, 107, 108, 109, 109, 110, 111, 111, 112, 112, 113, 113, 114, 114, 115, 116,
 116, 117, 117, 118, 119, 119, 120, 121, 122, 122, 123, 123, 124, 124, 125, 125}
```

```
In[*]:= newnewList[{x_, y_, everythingElse___}] := Switch[x, 1, Join[{everythingElse}, {0}],
 0, Join[{everythingElse}, {2, 1}], 2, Join[{everythingElse}, {0, 2, 1, 2}]]
```

```
In[*]:= ListLinePlot[Length /@ NestList[newnewList, {0, 0}, 200]]
```

```
Out[*]=
```



Section 42

```
In[*]:= StringReplace["1 2 3 4", {" " -> "---"}]
```

```
Out[*]=
```

```
1---2---3---4
```

```
In[ ]:= StringCases[WikipediaData["computers"],
  {DigitCharacter ~~ DigitCharacter ~~ DigitCharacter ~~ DigitCharacter}]
```

```
Out[ ]:=
{1940, 1950, 1970, 1613, 1943, 1640, 1897, 1945, 1937, 2400, 1901, 1235, 1000,
 1620, 1630, 1770, 1831, 1835, 4000, 1872, 1876, 1920, 1890, 1901, 1822, 1833,
 1888, 1906, 1914, 1920, 1872, 1876, 1927, 1950, 1950, 1937, 1938, 1939, 1941,
 2000, 1950, 1941, 1930, 1934, 1942, 1943, 1943, 1944, 5000, 1943, 1945, 1936,
 1936, 1945, 1945, 1945, 1948, 1998, 1951, 1953, 1957, 1947, 1949, 1951,
 1925, 1947, 1948, 1955, 1953, 1955, 1955, 1955, 1960, 1952, 1958, 1958,
 1959, 1959, 1962, 1964, 1967, 1968, 4004, 1970, 1945, 5100, 2000, 2000,
 1970, 1357, 1357, 2468, 1595, 2016, 6502, 6510, 1947, 1950, 1970, 1990}
```

```
In[ ]:=
```

```
In[ ]:= Grid[Table[StringTemplate["`i`+`j`"]][<|"i"→i,"j"→j|>], {i, 1, 9}, {j, 1, 9}]]
```

```
Out[ ]:=
1+1 1+2 1+3 1+4 1+5 1+6 1+7 1+8 1+9
2+1 2+2 2+3 2+4 2+5 2+6 2+7 2+8 2+9
3+1 3+2 3+3 3+4 3+5 3+6 3+7 3+8 3+9
4+1 4+2 4+3 4+4 4+5 4+6 4+7 4+8 4+9
5+1 5+2 5+3 5+4 5+5 5+6 5+7 5+8 5+9
6+1 6+2 6+3 6+4 6+5 6+6 6+7 6+8 6+9
7+1 7+2 7+3 7+4 7+5 7+6 7+7 7+8 7+9
8+1 8+2 8+3 8+4 8+5 8+6 8+7 8+8 8+9
9+1 9+2 9+3 9+4 9+5 9+6 9+7 9+8 9+9
```

```
In[ ]:= Cases[Characters[IntegerName[Range[50]]], {___, "i", ___, "e", ___}]
```

```
Out[ ]:=
{{f, i, v, e}, {n, i, n, e}, {t, h, i, r, t, e, e, n}, {f, i, f, t, e, e, n},
 {s, i, x, t, e, e, n}, {e, i, g, h, t, e, e, n}, {n, i, n, e, t, e, e, n},
 {t, w, e, n, t, y, -, f, i, v, e}, {t, w, e, n, t, y, -, n, i, n, e},
 {t, h, i, r, t, y, -, o, n, e}, {t, h, i, r, t, y, -, t, h, r, e, e},
 {t, h, i, r, t, y, -, f, i, v, e}, {t, h, i, r, t, y, -, s, e, v, e, n},
 {t, h, i, r, t, y, -, e, i, g, h, t}, {t, h, i, r, t, y, -, n, i, n, e},
 {f, o, r, t, y, -, f, i, v, e}, {f, o, r, t, y, -, n, i, n, e}}
```

```
In[ ]:= ToUpperCase[StringCases[TextSentences[WikipediaData["computers"]][[1]],
  {Whitespace ~~ LetterCharacter ~~ LetterCharacter ~~ Whitespace}]]
```

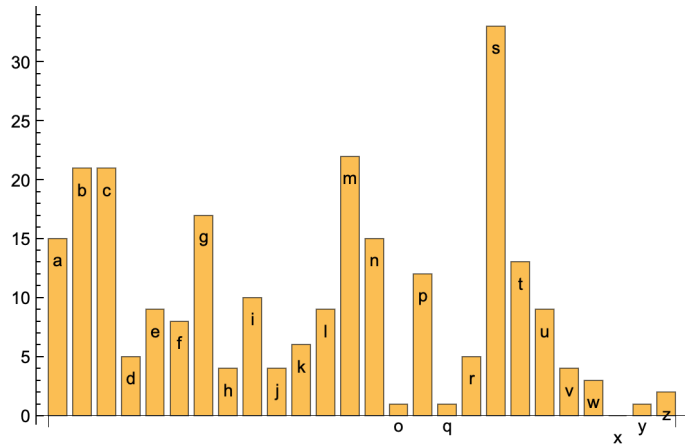
```
Out[ ]:=
{ IS , BE , TO , OF , OR }
```

```

In[ ]:= BarChart[Count[StringTake[CommonName[
EntityList[all countries, dependencies, and territories COUNTRIES], 1], #] & /@
ToUpperCase[Alphabet[]], ChartLabels -> Placed[Alphabet[], Top]]

```

Out[]:=



```

In[ ]:= Grid[Table[StringTemplate["`^`= `"][i, j, i^j], {i, 5}, {j, 5}]]

```

Out[]:=

```

1^1=1 1^2=1 1^3=1 1^4=1 1^5=1
2^1=2 2^2=4 2^3=8 2^4=16 2^5=32
3^1=3 3^2=9 3^3=27 3^4=81 3^5=243
4^1=4 4^2=16 4^3=64 4^4=256 4^5=1024
5^1=5 5^2=25 5^3=125 5^4=625 5^5=3125

```