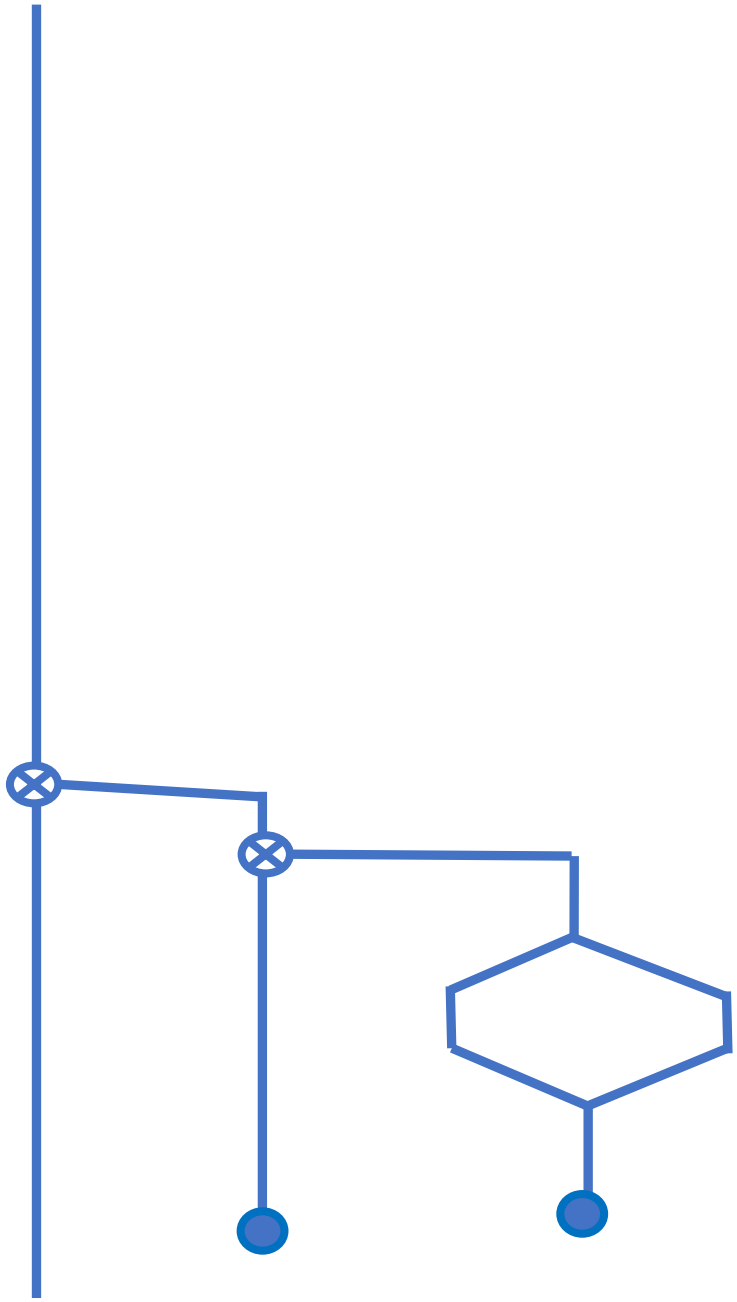
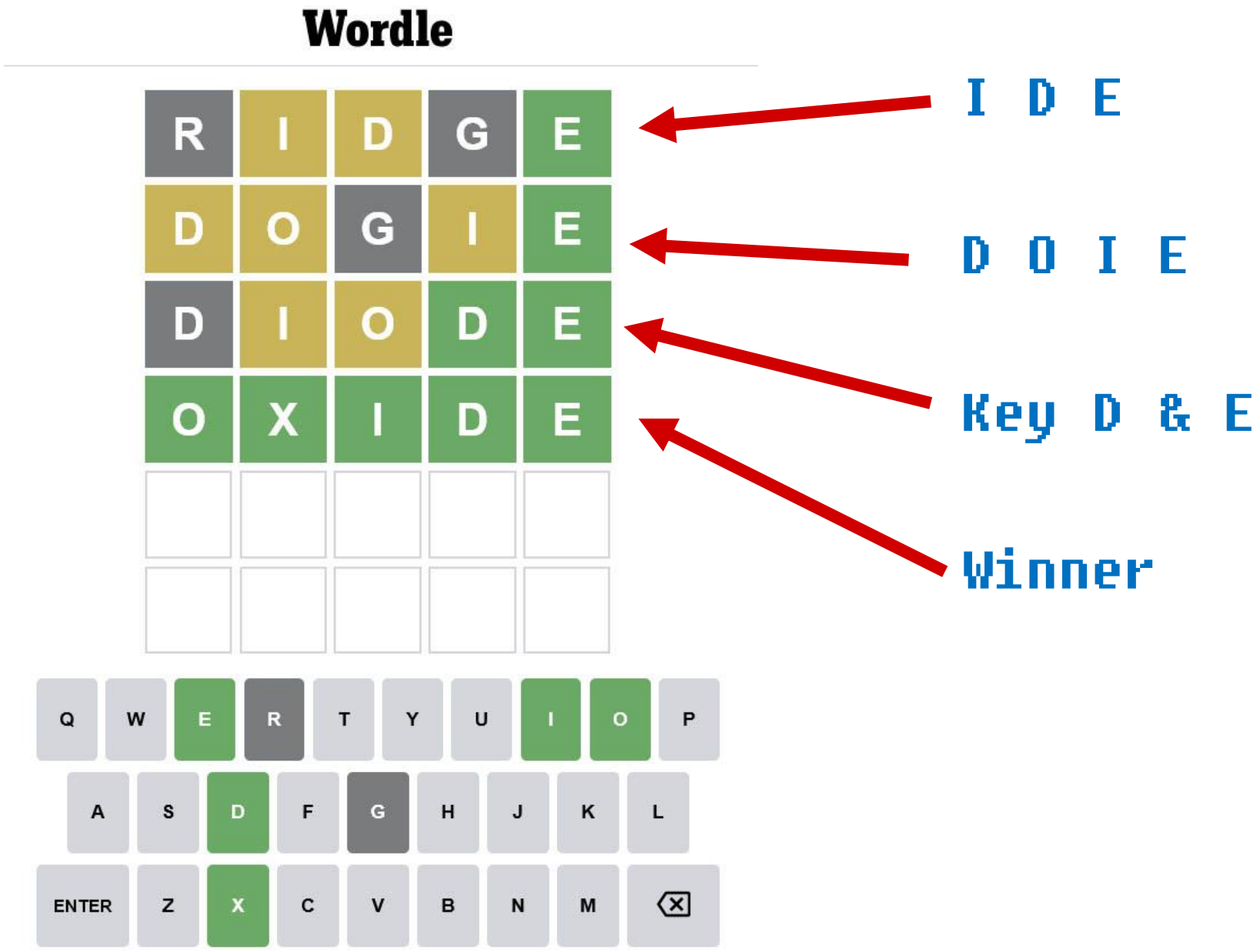


Wordle
Part 3

SVFIG
June 25, 2022
Bill Ragsdale

The Wordle Game

1. Guess a five letter word.
2. You have six tries.
3. A correct letter in the correct position will be shown in GREEN.
4. A correct letter will be shown in GOLD.


Wordle
R I D G E
D O G I E
D I O D E
O X I D E
I D E
D O I E
Key D & E
Winner
Q W E R T Y U I O P
A S D F G H J K L
ENTER Z X C V B N M

June Forth Challenge

1. Develop a large list of five letter words: 20 to thousands. [Wordle = 12,875 words]
2. Form evaluation criteria for closeness between words.
3. For each word, rank its closeness with the remaining words.

The Words

```
opacity: 0;\n    }\n  </style>\n  <div class="toast"></div>\n';var bo=function(e){
0),e.attachShadow({mode:"open"}),e}return r(n,[{key:"connectedCallback",value:funct
t=this.shadowRoot.querySelector(".toast");t.textContent=this.getAttribute("text"),
setTimeout((function(){t.classList.add("fade")}),this._duration),t.addEventListene
customElements.define("game-toast",bo);var
ko=["cigar","rebut","sissy","humph","awake","blush","focal","evade","naval","serve
ath","fresh","crust","stool","colon","abase","marry","react","batty","pride","floss
epay","digit","crate","cluck","spike","mimic","pound","maxim","linen","unmet","fles
stout","panel","crass","flume","offal","agree","error","swirl","argue","bleed","de
"golem","lusty","loopy","round","audit","lying","gamma","labor","islet","civic","f
,"guild","aback","motor","alone","hatch","hyper","thumb","dowry","ought","belch","
","erode","world","gouge","click","briar","great","altar","pulpy","blurt","coast",
a","finer","surer","radio","rouge","perch","retch","wrote","clock","tilde","store"
al","conic","masse","sonic","vital","trace","using","peach","champ","baton","brake
bus","boost","truss","siege","tiger","banal","slump","crank","gorge","query","drin
rimp","knoll","sugar","whack","mount","perky","could","wrung","light","those","moi
cynic","aroma","caulk","shake","dodge","swill","tacit","other","thorn","trove","bl
"sweet","month","lapse","watch","today","focus","smelt","tease","cater","movie","s
,"stove","lowly","snout","trope","fewer","shawl","natal","comma","foray","scare","
","oxide","plant","olive","inert","askew","heist","shown","zesty","trash","larva",
g","tipsy","metal","yield","delve","being","scour","glass","gamer","scrap","money"
se","froth","depth","gloom","flood","trait","girth","piety","goose","float","donor
ady","rusty","retro","droll","gawky","hutch","pinto","egret","lilac","sever","fiel
```

The Ranking Criteria

Over N five letter words, select a test word.

For each letter in the test word, compare each of its letters to the N-1 remaining words.

Score 3 for a letter at the same position in both.

Score 1 for a match elsewhere.

```
S T A R E
T O A S T
1 0 3 1 0    T can only be scored once.
```

Build The Word File

```
\ Name the disc file
here to My-File-Name ," c:\data\forth\For
Talks\Wordle-III\Wordle-Daily-List.txt“

\ Open the disc file; get its FID.
My-File-Name count r/o open-file
-280 ?throw  to My-File-ID

\ Find the file size
my-file-id  file-size -281 ?throw  to My-File-Size

\ Copy the disc words to Forth array
My-File-Contents My-File-Size My-File-ID read-file
-281 ?throw  drop
```

Count The Words, Create Matrix

```
: CountWords   (  --- count )
    0 My-File-Contents  My-File-Size over + swap
   do  i c@  ascii ,  = if 1+ then loop 1+  ;


\ Create 2,309 x 2 matrix for words
CountWords 2 * 2 create{ Word-Set{
```

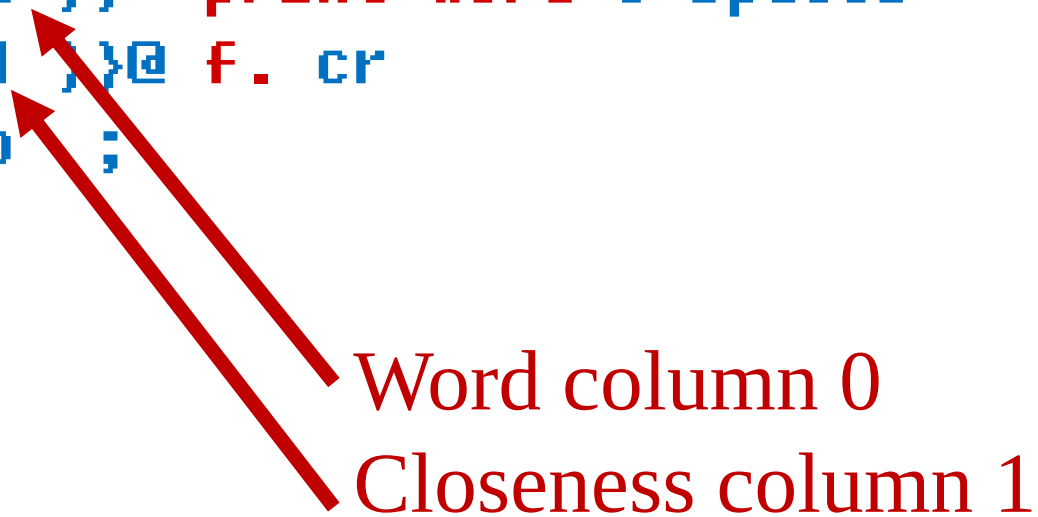
Copy The Words To The Matrix

```
\ Scan comma delimited words, formatting matrix

: }Form-Matrix       ( Word-Set{ )
   0 to Matrix-Row  0 to index-Offset
   My-File-Contents  My-File-Size  over + swap
     do  i c@  dup ?ascii
        if dup  32 - 2pick  Matrix-Row 0 }}
           index-Offset +  c!
           1 +to index-Offset
         then
       ascii ,  =
       if 0  to index-Offset
          1 +to Matrix-Row   then
    loop  drop ;
```

Print The Word Matrix

```
: }Print-Matrix ( n words)
 0 do
      dup i 0 }}  print-word 3 spaces
      dup i 1 }}@ f. cr
   loop  drop  ;
```



Starting Random Matrix

```
Word-Set{    }Form-Matrix
Word-Set{ 10 }Print-Matrix
     CIGAR    .0000
     REBUT    .0000
     SISSY    .0000
     HUMPH    .0000
     AWAKE    .0000
     BLUSH    .0000
     FOCAL    .0000
     EVADE    .0000
     NAVAL    .0000
     SERVE    .0000
```

Score One Word

```
: }Score (  --- score )   refresh-words
 0   5 0  \ for 3 points
   do  guess i + c@   unknown i + c@  =
       if 3 + 1 guess i + c! 2 unknown i + c! then
     loop
     guess 5 over + swap
   do  unknown 5 over + swap \ for 1 point
      do  j c@   i c@  = if 1+  3 i c!  then
      loop
     loop  ;
```

Score All Words

```
: }All-Scores
   my-word-count 0 do 0 Word-Set{ i 1 }} ! loop
   my-word-count       \ words tested
   0 do my-word-count \ against all words
       0 do j i  <>
         if  Word-Set{  j 0 }} new-guess   5 cmove
             Word-Set{  i 0 }} new-unknown 5 cmove
               }Score  negate
             Word-Set{  i 1 }} +!
           then
         loop
     loop
  my-word-count 0 do Word-Set{ i 1 }} dup @ s>f F!
  loop ;
```

Highest Ranked Words

STARE	-5388.
AROSE	-5316.
RAISE	-5315.
ARISE	-5313.
SLATE	-5310.
ERASE	-5310.
SANER	-5285.
SNARE	-5279.
IRATE	-5265.
EATER	-5256.
CRATE	-5229.
STALE	-5210.

Lowest Ranked Words

FUZZY	1832.
FLUFF	1932.
FIZZY	2038.
PYGMY	2050.
JUMBO	2057.
JIFFY	2102.
VIVID	2103.
JAZZY	2107.
MUMMY	2119.
WHIFF	2140.
HUMPH	2156.
DIZZY	2178.

Performance

2,309 words

5.3 million word comparisons

133 million letter comparisons

Takes 24 seconds

2,309 item bubble sort
2.7 million floating point comparisons

Takes 6 seconds. [0.45 megaflops]

July Forth Challenge

1. Develop an alphabetic grid such that . . .
2. When an unknown word is tested against a series of known words . . .
3. The grid notes the letters known by their location (Green) and the letters used but in an unknown location (Gold).
4. The purpose is to sequentially improve the grid as a model of the unknown word.
5. In Wordle you are allowed only six tries.